

Developing historical understanding in primary education, using Synergeiaⁱ

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Computer Supported Collaborative Learning (CSCL) is set to play an increasingly important role in education. In the field of learning science and research on education CSCL is seen as one of the most promising pedagogical paradigms. Same time with the increase in research the CSCL practices are more and more implemented in schools across Europe (Rubens et al, 2003). In the ITCOLE-projectⁱⁱⁱ several projects were carried out, based on CSCL. Pedagogical models and software for CSCL were developed and tested. In this paper we describe the use of CSCL(-software) for developing historical understanding. Does CSCL contribute to the development of historical understanding? What does it mean for the work of teachers? In this paper we try to find answers to these questions, based on two multiple case studies: two Dutch schools for primary education did two historical projects, using CSCL-software.

First we give an overview of the used software and research instruments. After that we describe briefly how historical education is provided in Dutch primary education, and we picture –more in detail- the two cases. The following two parts contain evaluations of the two case studies. Finally, in the last part of this paper we want to address the following questions:

- I. What were –according to teachers- the most important results of using Synergeia for historical education?
- II. Did working with Synergeia support the development of historical understanding of the pupils of both schools?
- III. What was the impact of working with Synergeia for the daily work of teachers?
- IV. How did teachers experience the relationship of working with Synergeia and the present curriculum?

1. Used software: Synergeia

One of the software applications, developed within the ITCOLE-project, is called Synergeia.

Synergeia was used in the two projects, described below.

The aim of the Synergeia-environment is to be a modular knowledge-building environment to support collaborative learning and computer supported collaborative learning, especially for primary and secondary education, in various European countries. The theoretical basis of the development of Synergeia is formed by the so called "Model of Progressive Inquiry". Rubens et al. (2003) describe this model as follows: "Progressive inquiry is a heuristic framework for structuring and supporting students' epistemological advancement and knowledge building skills. The model relies on recent advancement in cognitive research on educational practices and equally, on a conception of inquiry emerging from the philosophy of science. Shared knowledge advancement requires that students engage in a systematic effort to advance shared knowledge objects - theories, explanations or interpretations. Both of these approaches acknowledge the socially shared character of inquiry. The following elements describe the progressive inquiry process:

- a) Creating the context to anchor the inquiry to central conceptual principles of the domain or complex real-world problems;
- b) Setting up students' own research questions;
- c) Constructing students' own working theories for the phenomena before using information sources;
- d) Critical evaluation of the produced theories and explanations;
- e) Searching deepening knowledge using external information sources;
- f) Generating subordinate questions;
- g) Developing new more advanced working theories;

h) Distributed expertise, which means sharing the whole process between all learning community members”.

Synergeia combines features of the two types of electronic learning environments: it consists of communication tools, and empty spaces to allow the teacher to create and shape his courses. But it also has shared workspaces and document sharing from the collaborative workspaces. Synergeia can be seen as a shared workspace for learners, prepared and shaped by the teacher. Since the model of progressive inquiry is the theoretical basis of Synergeia, the knowledge-building area is an important functionality of Synergeia. Knowledge-building proceeds largely through discussion. Therefore, each personal, group and course perspective automatically contains a threaded discussion component: the “knowledge-building area”. Discussion within the knowledge-building areas is scaffolded with a set of thinking type categories for the notes. Before someone can enter a note, they have to decide what category of note they want to add to the existing discussion. For instance, do they want to state the problem that is to be pursued, propose a working theory, deepen the knowledge that is already there, or make a metacomment about the knowledge-building process that is taking place (Stahl, 2002)? The following thinking types were used in the projects described below:

Problem

The study problem in research. The learning process aims at answering to the problems presented by the pupils. The purpose of defining a problem statement is to explicate the learning goals, to explain the research interests and also to introduce the questions that are directing the inquiry. After critically viewing the present working theories and by introducing new deepening knowledge to the discussion, also new subordinate problems can be defined.

My Explanation

My Explanation presents conceptions of the pupil (hypothesis, theory, explanation, interpretation) about the problems that are presented. "My Explanation" is not necessarily well defined or articulated early in the inquiry process. However, it is crucial that the explication of the explanations evolves during the process and the working theories become more refined and developed.

Scientific Explanation

Scientific Explanation presents some scientific findings or other knowledge that were sought. Under Scientific Explanation a pupil may bring to the discussion some new points or views to continue the inquiry process. It differs from "My Explanation" because it represents knowledge produced by others, generally some authority or expert. "My Explanations" should be pupils' own ideas where as Scientific Explanation is some ones else idea in the area in concern.

Evaluation of the Process

Comment that focuses on the inquiry process and its methods instead of the process outcomes (meta-comment). With a "Evaluation of the Process" pupils may evaluate e.g. whether the process is progressing in the desired direction, whether appropriate methods are used, how sharing of tasks and inquiry process is accomplished among the members of the learning community.

Summary

With a summary pupils draw pieces of the discussion together and provide inferences based on the discussion in the Knowledge Building. The summary may aim at identifying a new Course Context or may reflect the views of the writer on the progression of the inquiry learning process.

On top of this Synergeia adds some features that are specific to this learning environment, and are used to facilitate CSCL. One of these features is the MapTool, a shared whiteboard together with chat functionality specifically designed for CSCL.

2. Method

This paper is based on the following research instruments:

- One group interview.
Three teachers of the two schools participated. Besides, one teacher-assistant –who was involved in the project- participated. One teacher who was involved in the project, was not able to join the group interview. Teachers were interviewed about organisational and

pedagogical aspects, aspects concerning collaboration between pupils and evaluation of learning results. The group interview was analysed, using a codescheme.

- Teacher questionnaire.
The four teachers, involved in the two projects, filled in the teacher questionnaire (used in the ITCOLE-project). Teachers were asked about the evaluation of functionalities of Synergeia, about collaboration and collaborative research using Synergeia, about guidance by the teacher and about userfriendliness of the virtual learning environment.
- Individual interviews.
One teacher of every school was interviewed individually about the process of the project.
- Database analysis.
The questionnaires and the interviews were meant to gather both quantitative and qualitative data. To elaborate on the findings from the questionnaires and interviews, analyses have been performed on the activities within the educational projects. A content analysis was done on the knowledge building areas. In the ITCOLE-project a codescheme was developed to analyse the data.
- Study of relevant e-mails.
The involved teachers send several e-mail messages about the progress of the project. These messages were studied.

3. Historical education in Dutch primary schools^{iv}

Before we provide an overview of the two cases, we want to describe shortly the way historical education in Dutch primary schools is organised.

The Dutch government has formulated attainment targets (“kerndoelen”) for historical education. These attainment targets are not dealing with facts and figures. They are for example about how to deal with historical resources. Educational editors develop teaching methods, based on these attainment targets. Teachers use these teaching methods in their class.

In Dutch historical education the most important aims are:

- The development of historical understanding
- Getting insight in relations between past and present

In grade 5-8 of Dutch primary schools the same six periods/themes are subject of historical education. In every grade knowledge of a period/theme is extended. In the teaching methods stories are used to clarify historical concepts. In these stories children play a central role, so education gears to pupils’ every day lives.

The teaching methods use questions to reproduce and apply knowledge and to stimulate judgement. In classroom pupils work independently and individually or they receive instruction of a teacher. When pupils work independently, the teacher is able to help “difficult learners”.

The classroom practice is for example as follows:

Assignment to start	5 minutes	Pupils study cartoons and formulate associative words.
Instruction	15 minutes	The teacher reads the story and discusses the cartoons with the children.
Independent working	10 minutes	Pupils answer questions and make assignments.
Instruction	10 minutes	The teacher checks the progress and discusses difficult questions.
Independent working	10 minutes	Pupils continue answering questions and making assignments. Fast pupils receive

Wrap up	10 minutes	an additional assignment. Brief review of the questions and assignment.
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In several cases teachers teach historical education to a group of pupils of two grades (e.g. 7 and 8), at the same time. When one grade works independently, the other grade receives instruction.

Developers of learning methods often focus on a basic teaching program. Besides this program teachers are free to develop optional lessons (“keuzelessen”). These lessons –to be provided in a few weeks- are less based on cognition. They are often project-based. It is also possible for teachers to use these lessons for repetition.

It can be concluded that (in general) teaching methods for historical education in Dutch primary schools are not based on principles of CSCL, although it is possible to construct the optional lessons according to CSCL-principles. This depends on the preference of the individual teacher.

Teachers in Dutch primary schools teach several subjects, not only history. Their pedagogical content knowledge often is limited.

4. Dutch casestudies

In the Netherlands, 17 teachers and 347 pupils participated in the evaluation of the ITCOLE-project. The teachers and pupils carried out 18 projects. This paper is based on two of these projects.

Table 1. Summary: Dutch CSCL projects on history

Project name (subject domains)	Teacher #, sex (age, number of years teaching, experience of CSCL), school	School grade (age of pupils)	# of pupils	# of available PC's with Internet access	Duration in weeks (hours /week)	Role teacher	Database: Notes + docs + links by pupils/ teachers
1. 400 years Dutch East Asia Company (History)	Teacher 3. Female (28, 3, not much), Teacher 4. Male (30, 6, not much), BS De Duizendpoot	Primary 7 th and 8 th (age 10-13)	41	4	6 weeks (4 hours /week)	Did not structure a lot; guidance especially for “difficult learning” and groups	35/5 + 17/6 + 1/11
2. The Dark Middle Ages (History)	Teacher 1. Male (21, 1, not much), and Teacher 2. Male (55, 33, not much), BS ‘t Kempke	Primary 7 th and 8 th (age 10-12)	46	22	8 weeks (1.5 hours /week)	Structured project through assignments; provided help to individual pupils	78/2 + 8/6 + 0/0

Pedagogical design case study 1: 400 years United Dutch East Asia Company

Already 400 years ago, the Dutch East Asia Company (Verenigde Oost-Indische Compagnie, VOC) was founded. The VOC is a subject of the teaching method that is used in history lessons in primary education. According to the teachers of public school for primary education “De Duizendpoot”, the used teaching method stimulates an instructive way of teaching. They wanted to change this way of learning, using ICT.

A museum in Amsterdam asked the schools in the Netherlands to produce a brochure about the foundation of the VOC. This brochure was meant for children. This was a chance for teachers of “De Duizendpoot” to organise history education in a more social-constructive way: they used history

lessons to produce this brochure in a collaborative way. The virtual learning environment Synergeia was used to realise the process.

The participants were 41 pupils in the 7th and 8th grade (10-13 years). The pupils varied in their cultural background. In this project, groups of four pupils were formed. The groups were mixed from grades 7 and 8. Four PC's were available for all the pupils. The teachers made a scheme so every pupil could work on a computer. Synergeia was used for 6 weeks, mostly 2 times a week during 2 hours.

Figure 1 is a photograph from the computer lab.



Figure 1: Four computers were available for 41 pupils.

In the classroom, the pupils had the opportunity to study books and watch videos about the VOC. In class groups discussed about the subject. Within a group, they divided the tasks. In the first lesson, the subject was introduced. Teachers told about the foundation of the Dutch East Asia Company, and about the request of the museum. They had formulated the request as an assignment for pupils. The assignment contained some questions that focused on facts (e.g. “What does Public Limited Company mean?”). But several questions stimulated deeper understanding, for example: “The Dutch East Asia Company changes daily live. The Dutch East Asia Company brings several thinks back to Holland, such as spices, coffee, tea and fabrics. This leads to changes in Holland. What does change? How come?”

In this first lesson, the teachers also made clear the procedure of the project. The pupils became familiar with Synergeia. In the other lessons, the pupils came together in the classroom. They decided together, who had to do what task: who had to do what chapter of the brochure. They used Synergeia:

- To post questions,
- To answer questions of others,
- To add websites,
- To search for information (e.g. via selected websites), and
- To add documents with concept-texts.

Pupils also answered questions of other groups. In the beginning of the project, they were not willing to do this. Teachers stimulated this by giving rewards. Teachers guided the process. They did not give class instructions, but they helped those pupils who had problems (e.g. with grammar) individually, and they supported groups of pupils. Most of the files posted by teachers, were about the organisation of the project (e.g. description about the aim of the project and the procedures).

Pedagogical design case study 2: the Dark Middle Ages

One of the subjects in the regular history lessons of grade 7 and 8 of the school for primary education “t Kempke” was “The dark middle ages”. The teachers wanted to use Synergeia so pupils could deepen their knowledge beyond the regular method that was used. So Synergeia was used complementary to the used history method.

Every week one of the teachers uploaded assignments in Synergeia. These assignments structured the learning process of the pupils. During this project the teachers had to give much support to children, to help them work with Synergeia.

The project “The dark middle ages” started with a virtual discussion in a knowledge-building area about why the middle ages are called “dark”. The pupils had to react on each others contributions with the thinking type “My own explanation”. A lot of arguments were provided by the pupils. In the next phase the class was split up into five groups. These groups dealt with themes in the middle ages. The five groups of four pupils searched for information about there subject, for example “deseases in the middle ages”, “mail” and “leisure time” in the middle ages. The pupils used the Internet to search for information. They put the information they found in a Word-document and reformulated the text in their own words. This Word-document was uploaded in Synergeia, in their own group workspace. As a next step pupils reacted on their documents.

The participants were 46 pupils in the 7th and 8th grade (10-12 years). The pupils varied in their cultural background. The grades worked seperately. Twenty two PC’s with Internet-access were available, so every pupil could work on his/her own PC. Synergeia was used for 8 weeks, mostly 1 time a week during 1,5 hours. Figure 2 is a photograph from the computer lab.



Figure 2: Every pupil had his/her own computer.

5. Evaluation case study 1: 400 years United Dutch East Asia Company

In the interviews and in the teacher’s questionnaire the involved teachers of this school have expressed their satisfaction with the results of the project. They have underlined the pedagogical effectiveness of working with Synergeia. The teachers are especially satisfied about the process-based results. In their opinion, pupils have improved their capability to collaborate and to solve problems. Pupils have been also motivated to learn how to use ICT (e.g. Word, searching information on the Internet). In the regular curriculum they have separate lessons where pupils learn ICT-skills. These lessons are not linked with other subjects of the curriculum. Pupils do not like this, according to the teachers. The teachers have complained that the curriculum is very congested. They are wondering how they can fit

working with Synergeia in the curriculum. They do believe that the competences like the capability to collaborate with others are more important than knowledge based-facts, although the curriculum is dominated by details that pupils should know. The teachers have mentioned that several pupils have invested more efforts in the subject, now they used CSCL instead of traditional learning. It has to be noticed that pupils are often enthusiastic when they work with new technology for the first time. The pupils have also done the test that belongs to the traditional history method. The results of the questions about the VOC – in general – were good. Compared with the results of last years test, the results with Computer Supported Collaborative Learning were even better. For several reasons, it is not possible to explain this improvement from the different way of teaching, but this outcome has stimulated the teachers’ positive impression about working with Synergeia.

Analysis of the database based on a more general categorisation of the notes.

Table 2 shows a categorisation of the notes from pupils and teachers based on the categories developed in the ITCOLE-project (Emans & Sligte, eds, 2003).

In this project, the teachers had no very active participation through Synergeia. Three of four notes, posted by teachers, had to do with the progress of the process. The pupils used knowledge-building especially to ask content-related questions and to give their own opinion about the question. They used knowledge-building areas especially for questions and answers about facts. The use of thinking types was as follows: Problem 28%, My Explanation 36%, Scientific Explanation 33%, Evaluation of the Process 3%, Summary 0%. It is doubtful if the “Scientific Explanation” notes are *actual* scientific explanations. For example, in most cases the pupils did not mention the source. Figure 3 illustrates the lack of deep threads in the knowledge-building discourse.

Table 2: Database analysis based on the categorisation of each note.

Knowledge Category	Pupils (N=41)		Teachers (N = 2)	
	f	%	f	%
Social	0	0%	0	0%
On topic	0		0	
Community building	0		0	
Progress of the process	7	22%	3	75%
Organizational issues	7		3	
Evaluation and metalevel issues	0		0	
Content of inquiry	19	59%	1	25%
Wonderment, problems	8		1	
Low-level explanation	11		0	
High-level explanation	0		0	
Scientific information	3		0	
Irrelevant or difficult to categorise	6	19%	0	0%
Total	32	100%	4	100%

It should be taken into account that individual pupils did not have the opportunity to use Synergeia often. A lot of discussion between groups of pupils took place in the classroom. The teachers have also mentioned that pupils do not recognise the added value of online communication, if they see each other almost everyday in class. That is why discussions took place face-to-face. Results of discussions were reported in chapters of a brochure.



Figure 3: A part of the knowledge-building area where pupils discuss about facts.

6. Evaluation case study 2: the Dark Middle Ages

In the interviews and in the teacher questionnaire the two teachers of “t Kempke” have expressed their satisfaction with the results of the project. Similar to their colleagues of “De Duizendpoot” these teachers have been especially satisfied about the process-based results and about the pedagogical effectiveness of the working with Synergeia. In their opinion, pupils have improved their communication skills, the capability to express their opinions and to give arguments. These teachers have not been of the opinion that the capability of pupils to collaborate has been improved, although they believe this is an important aim of working with Synergeia. “We would have to work this way for a longer time”, one of the teachers of “t Kempke” said during the group interview. Pupils have also been motivated to learn how to use Internet technology.

Although the teachers have not assessed the learning outcomes, they have been of the opinion that the learning outcomes were very reasonable. Their judgement is based on a review of the products in Synergeia and on a general impression of the process.

Despite of the fact that the teachers have expressed satisfaction with the project, they have addressed some issues:

- They are not sure if real deep learning can be realised by this way of working.
- They wonder how they can reduce support to pupils, so pupils are able to learn more independently (in groups).
- They wonder how it can be prevented that only two of the pupils of a group of four do all the work.
- Their pupils prefer to discuss orally, since they see each other everyday (like the pupils of the other school).
- They are not sure about their own competences according to “digital pedagogy” (Simons, 2002).

During the group interview one teacher said: “I am not sure what kind of pedagogical competences a teacher should have. How do you select websites? Are pupils going to select websites or do you provide selected websites? How do you learn pupils to select information from these websites?”

The teachers have also addressed the fact that pupils lost interest, after several weeks. In their opinion this was due to a long timeframe. They also suggested that the subject did not gear enough to pupils’ every day lives.

Analysis of the database based on a more general categorisation of the notes.

Table 3 shows a categorisation of the notes from pupils and teachers. Two knowledge-building areas have been used for communication.

In this project, the teachers' participation through Synergeia was not intensive. The pupils used knowledge-building especially to ask content-related questions and to give their own opinion about the question. The use of thinking types was as follows: Problem 8%, My Explanation 77%, Scientific Explanation 6%, Evaluation of the Process 8%, Summary 1%. A more detailed analysis of the notes may lead to the conclusion that pupils did not use thinking types as meant.

Table 3: Database analysis based on the categorisation of each note.

Knowledge Category	Pupils (N=41)		Teachers (N = 2)	
	f	%	f	%
Social	8	11%	0	0%
On topic	6		0	
Community building	2		0	
Progress of the process	18	25%	1	50%
Organizational issues	16		0	
Evaluation and metalevel issues	2		1	
Content of inquiry	39	55%	1	50%
Wonderment, problems	1		1	
Low-level explanation	17		0	
High-level explanation	20		0	
Scientific information	1		0	
Irrelevant or difficult to categorise	6	9%	0	0%
Total	71	100%	2	100%

As said, two knowledge-building areas have been used in this project. One was initiated by the teacher, the other was initiated by the pupils of one group. It is interesting to make a distinction between the two knowledge-building areas.

Table 4: Database analysis of two KB-areas, based on the categorisation of each note.

Knowledge Category	KB-area 1 (Initiative teacher; pupils=41)		KB-area 2 (Initiative pupils; pupils=5)	
	f	%	f	%
Social	3	6%	5	21%
On topic	3		3	
Community building	0		2	
Progress of the process	3	6%	15	62%
Organizational issues	1		15	
Evaluation and metalevel issues	2		0	
Content of inquiry	38	81%	1	4%
Wonderment, problems	1		0	
Low-level explanation	16		1	
High-level explanation	20		0	
Scientific information	1		0	

Irrelevant or difficult to categorise	3	6%	3	12%
Total	47	99%	24	99%

There is a striking difference between the two KB-areas. In KB-area 2 the majority of notes (62%) were about organisational issues (progress of the process). In KB-area 1 a large majority was about content of inquiry. There were also many high level explanations placed by the pupils (almost 43%; 20 of 47 notes). This knowledge category was described as followed: “Elaborate clarifications, Personal explanations, personal observations, construction of models, constructions of arguments, summary (Thinking type). The teacher points to agreements or inconsistencies. The pupils use specific written statements of other groups and argue on their consistency. High risk in been challenged”(Emans & Sligte, eds. , 2003).

Possible explanations of these differences are:

- KB-area 1 was structured by the teacher. He encouraged participation (especially face-to-face).
- KB-area 1 was part of intentional and formal learning.
- Teachers and pupils were not very familiar with CSCL. In their mental model of learning the teacher is still the one who takes initiative for learning. Pupils communicate with each other about social and organisational issues.

7. Conclusions

In this last part of this paper we want to formulate answers to the questions mentioned at the beginning of this paper.

I. What were –according to teachers- the most important results of using Synergeia for historical education?

All the involved teachers have emphasized the importance of the process-based results. According to the teachers of “De Duizendpoot” pupils have improved competences on collaboration and problem-solving. Teachers of “t Kempke” think pupils have improved their communication skills, especially the capability to express their opinions and to give arguments. All the teachers have mentioned improvement of ICT-skills. It is striking that the involved teachers do not mention improvement of content knowledge as important result. A possible explanation is that teachers in Dutch primary education have limited pedagogical content knowledge. They are no teachers in historical education. This might lead to restricted commitment with specific content knowledge. Another possible reason is the fact that these teachers have criticised the dominant instructive way of the teaching practice in Dutch primary education (with a focus on facts). Their experiences with CSCL have shown that it is possible for pupils to learn relevant competences in a more social-constructive way. Perhaps this is a reason for the fact that they mention process-based results as the most important results of using Synergeia for historical education.

II. Did working with Synergeia support the development of historical understanding of the pupils of both schools?

It is not easy to answer this question unambiguously. All involved teachers have been of the opinion that the learning outcomes related to the development of historical understanding were at least reasonable, but only one school has assessed historical understanding. The judgement of the teachers of the other school have been based on a global impression. Furthermore in the group interview they have questioned if this way of working leads to deep learning. The database analysis does not substantiate a positive answer on this question as well.

Another argument why it is not easy to answer this question univocally is that in both schools learning have been taken place in a “blended” way. The teachers and pupils have not been working with Synergeia only. In fact, a lot of collaboration has been taken place face-to-face. As said pupils have been seen each other everyday. They (and their teachers) do not believe that the pedagogical benefits

of online communication (e.g. more equal participation, better reflection on contributions; Rubens 2003) countervailing against the efforts they have to make.

III. What was the impact of working with Synergeia for the daily work of teachers?

The use of Synergeia had large impact on the daily work of the teachers, involved in the project. On both schools their way of teaching has become less instructive. One of the teachers said during the group interview literally: “As a teacher I was very instructive. I learned that pupils are able to learn a lot from each other”. The teachers have provided the (virtual) learning environment, including the content. Pupils used assignments and groupwork to learn.

On one school (“De Duizendpoot”) teachers have focussed on support for “difficult learners”. The other pupils have been able to work in groups by themselves. Although they have indicated in the group interview that they have not spent enough time in getting familiar with Synergeia. The teachers of this school also have stated that they also had to spend time on solving conflicts between pupils. It is not clear if they have spent more time on solving conflicts by applying CSCL, compared with individual learning. On the other hand it is obvious that CSCL has impact on the group dynamics in the classroom. Moreover, these teachers also have discussed the progress with the pupils. They have mentioned that they should have spent more time on issues like planning. They also have noticed that their attention for the progress came to late.

Teachers of “’t Kempke have mentioned that they had to give a lot of support so pupils could work with Synergeia properly. One teacher has given a lot of attention on structuring the project through assignments. It is notable that when this teacher has initiated and structured knowledge-building, pupils have posted more notes about the content of inquiry (especially low-level and high-level explanations), compared with knowledge-building initiated by pupils themselves. Several research underlines the fact that pupils need structure and coördination for CSCL (e.g. Benbunan-Fich & Hiltz, 1999). Similar to their colleagues of the other school, these teachers have mentioned that their attention for the progress came to late.

The difference between the amount of support the teachers of the two schools have provided, is striking. A possible explanation is the confidence that teachers have in the capability of pupils to take responsibility for their own learning. One teachers of “’t Kempke” stated during the group interview: “We still guide a lot. Perhaps we should leave the initiative more by the pupils. At this moment we still guide from our pedagogical point of view.” This pedagogical point of view is rather instructivistic, although the teachers’ mental model of learning is changing towards a more social-constructive approach.

Besides, we should take into account that this was the first time that the teachers (and the pupils) worked this way (collaboratively and with a virtual learning environment). It takes more time and effort to change teaching practice.

IV. How did teachers experience the relationship of working with Synergeia and the present curriculum?

Teachers of “De Duizendpoot” have complained that the curriculum is very congested, so there is not much time to work with Synergeia. The other teachers have not mentioned the congested curriculum as a hindrance for working with Synergeia, although they have not contradict this opinion when the teachers made the complaint during the group interview. In general, teachers often have complained about the compatibility of Synergeia projects with the current curriculum (Sligte & Emans, 2003). In section 3 we have mentioned that the curriculum of historical education in Dutch primary education contains a basic teaching program and optional lessons (“keuzelessen”), that teachers can develop themselves. Schools have to deal with national attainment targets, but they are free in how to achieve them. So, the national curriculum officially is no obstruction for applying CSCL in primary schools. Nevertheless (mostly) teachers often use teaching methods that are not based on CSCL-principles, but which are “ready tu use” at once. This is probably due to work load and likely the main reason why teachers have complained about the lack of the compatibility of working with Synergeia and the current curriculum. Therefore, in daily practice they only see opportunity for CSCL in the optional lessons.

Finally it can be concluded that the participating teachers have been enthusiastic about collaborative learning using Synergeia. Teachers have mentioned process-based results as the most important benefits of working with Synergeia, although these process-based outcomes were not assessed. The development of historical knowledge seems to be less important. The fact that these teachers are not specialised in certain content knowledge (like history) is a possible explanation for this phenomenon. Despite of the enthusiasm of using Synergeia it seems to be hard for pupils and teachers to communicate with each other through Synergeia if they are able to meet each other in real life, every day. We also concluded that working with Synergeia has changed the daily work of teachers. We stated that teachers still have to grow in their changing role (from instructor to coach). As said, we should take into account that teachers were novice in CSCL. It is well known that it takes several years before educational innovations (like CSCL) become widely accepted in classroom practice (Lagerweij & Haak, 1996). The experiences in this project can be regarded as a first step of a long march.

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ⁱ Thanks to my colleague dr. Wilfried Admiraal for his comments on a draft version of this paper.

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ⁱⁱⁱ ITCOLE means "Innovative Technologies for Collaborative Learning". The ITCOLE-project is supported by the European Commission's IST programme as part of the School of Tomorrow thematic action line

^{iv} The information in this section is based on the teaching method "Bij de tijd". This teaching method is dominant in Dutch primary schools.