Supporting the development of social competences of teachers through computer supported collaborative learning

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In general, teacher professional development particularly focuses on the growth in competences in the area of pedadogy, classroom management, design of educational materials, and assessment and evaluation. If social competences of teachers are addressed, social interaction (communication as well as collaboration) is seen as a condition for learning effects in terms of acquiring more knowledge and skills in pedagogy and the subject matter. The assumption is that the more frequent, regular and shared the social interaction is, the more will be learned in terms of pedagogical skills and content knowledge. However, we argue that social competences themselves are also important in the profile of a competent and experienced teacher in secondary education. Teachers who are able and willing to interact, communicate and collaborate with peers and colleagues not only learn themselves but also stimulate a learning culture in a school. In this paper, we will elaborate on supporting the development of social competences of teachers in the context of computer support collaborative learning (CSCL) by student teachers in a pre-service or in-service setting and experienced teachers in the workplace.

In the Netherlands, uniform standards for the teaching profession are being implemented, since the Dutch Parliament two years ago accepted the proposal of the Dutch Association for Professional Quality of Teachers (Stichting Beroepskwaliteit Leraren; SBL). The standard for teachers in secondary and vocational education includes seven clusters of teacher competences. Social competences are represented in many categories or subcategories of competences teachers should accomplish. In general, teacher professional development particularly focuses on the growth in competences in the area of pedadogy, classroom management, design of educational materials, and assessment and evaluation. If social competences of teachers are addressed in research

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on professional development as in other research on learning, social interaction is mainly acknowledged as an important condition for individual knowledge acquisition, rather than as a learning goal in itself (Salomon, 1992). However, we argue that social competences themselves are also important in the profile of a competent and experienced teacher in secondary education.

The professional development of teachers in secondary education can take a variety of shapes: collective or individual development, continuing education, pre-service and in-service education, etc. In each, social competences as well as community building should be significant features of the professional development of teachers. Collaborative learning seems to be a promising way to trigger this kind of social learning effects. Supporting teachers with collaborative learning will facilitate collaborative activities in a learning setting, enabling them to develop social competences in a safe environment (with a learning goal). Technology might support the collaborative learning of teachers as teachers not only are flexible in the time and place where they undertake the collaborative activities but also have more possibilities to reread, rethink and reflect on these activities.

In this paper, we will elaborate on supporting the development of social competences of teachers in the context of computer support collaborative learning by student teachers in a pre-service or in-service setting and experienced teachers in the workplace. We will present three examples of scenarios of CSCL in the context of teacher training and teacher learning.

Standards for the teaching profession in the Netherlands

Thinking about establishing uniform standards for the teaching profession based on social competences can be placed in the framework of professional teaching standards in general, which has generated considerable interest from various settings and contexts. Three major claims can be identified regarding the benefits of professional standards for teachers for the quality of teaching: the introduction of standards should improve the performance of teachers; it will improve the standing of teachers; and the standards contribute to the on-going professional learning of teachers (Sachs, 2003). However, if we take the first position, the improvement of teaching performance, it leaves silent the assumptions how change will occur. For example, if a bureaucratic perspective is taken, rules, mandates and requirements will impose regimes of direct supervision and standardized work upon teachers and schools collectively (Sergiovani, 1998). What is required for this position is the need to make these assumptions about the nature of profession and how to improve the profession of teaching more explicit. This is also true for teachers' social competences.

At the request of the Dutch Minister of Education, Culture and Science, the competences with their requirements were developed by a large representation of the professional group of teachers. SBL, the Association for the Professional Quality of Teachers, as a representative of the Dutch teachers' unions and of the professional associations, supervised and gave advice to this professional group of teachers during the process. The competence requirements were decided on and accepted by the government. They have been operational since August 2006, and are essential in the implementation of Professions in Education Act (Wet Beroepen in het onderwijs, BIO). The essence of this Act is that educational staff – teachers, assisting staff members and school managers – must not only be qualified but also competent. For this reason, sets of competences and their requirements (see Table 1) have been developed for teachers,

Table 1. Teacher competences

	Professional situations			
	With students	With colleagues	With work environment	With own professional development
Professional roles				
Interpersonal	1			
Pedagogical	2	5	6	7
Subject knowlegde & methodological	3			
Organizational	4			

and are being developed for assisting staff members and (primary) school managers (http://www.lerarenweb.nl/index.html). Schools are obliged to take competent staff into their employment and subsequently enable them to keep up their competences at a high level and to further improve them. Teacher training colleges use these competences as a guideline to their educational programme.

Looking first at the aspects of teacher competence indicated in the row labels down the left of Table 1, the first competence area, interpersonal competences, means that the teacher must create a pleasant living and working climate in groups. An interpersonally competent teacher gives proof of good leadership, encourages students' autonomy, creates a friendly and cooperative atmosphere, and stimulates and achieves open communication. The second competence area, the pedagogical competences, refers to a teacher's responsibility to help students become independent and responsible persons with a pretty good idea of their ambitions and possibilities. An essential difference with the first area is that the latter is focused on the development of the personality of students. The third category of competences refers to subject knowledge and methodological competences: a teacher must help students acquire knowledge of a certain subject or profession. A competent teacher creates a powerful learning environment, by, for example, establishing a link with realistic and relevant applications of knowledge in a profession and in society. The fourth category of competences in professional situations with students, organizational competences, means that the teacher takes care of all organizational tasks pertaining to the educational practice and to the students' learning process within the school and at the workplace. The other three competence areas refer to three different professional situations: competences for collaboration with colleagues (5); competences for collaboration with the work environment (parents, colleagues of work placements, other schools and institutions) (6); and competences for reflection and development (7). The latter means that teachers must permanently work on their personal and professional development. This emphasis on a competence-orientated approach in teacher education, combined with the shortage of teachers, has lead to new views on the curriculum for teacher education. For example, teacher education should offer more flexible routes, taking into account the results of prior (both formal and informal) learning. Since August 2006, the new standard has been utilized in the sometimes radically changed curricula of Dutch teacher education institutes. In addition to the national standards, insights into teacher learning have also changed the curricula. Teacher learning nowadays refers to learning in different learning and work environments, with a shared focus on knowledge acquisition, skills training and social competences.

Teacher learning

We appreciate the claim of Shulman and Shulman (2004) that an accomplished teacher 'is a member of a professional community who is ready, willing, and able to teach and to learn his or her teaching experience' (p. 259). They present a model of teacher learning and development within communities and contexts with five elements of the individual level: *ready* (possessing vision), *willing* (having motivation), *able* (both knowing and being able to do), *reflective* (learning from experience) and *communal* (acting as a member of a professional community). Former models of teacher learning were directed to individual learning only and are mostly cognitive in nature. In their model, Shulman and Shulman distinguish three interrelated levels of analysis: the individual, communal and policy. At the individual level, the above mentioned five features of teacher learning (vision, motivation, understanding, practice and reflection) are brought together in a model of which one can say that an accomplished teacher smoothly integrates the first four and learns to improve teaching through active reflection. At the communal level, teacher communities are represented in which shared visions, community commitments, a shared knowledge base, a community of practice, and established rituals or ceremonies for joint reflection and review serve the development of community accomplishments. Shulman and Shulman (2004) relate to Merton (1967) when stating that the individual teacher contributes to the formation of the community norms, incentives and practices even as the community exercises its influences on the participating individual teachers. The third and outer layer represents the policy or the resources needed for teacher learning, such as adequate mentoring, curriculum and materials, computers, finances, etc. Shulman and Shulman have chosen to use the metaphor of 'capital' in defining the resources, and have distinguished venture capital (financial incentives and supplies), curricular capital, cultural or moral capital and technical capital.

Recent years have been characterized by extensive growth in the use of ICT in education, such as virtual learning environment, simulation software, virtual experiments, visualization of complex models as well as tools which enables students and teachers to communicate and collaborate through e-mail, electronic forums and instant-messaging systems. Thinking on the use of ICT in education has been influenced by several theories of learning, including behavioural learning theory, cognitive learning theory and social learning theory, rooted in the works of Dewey, Piaget and Vygotsky. Jonassen, Peck, and Wilson (1999), in their constructivist approach to learning with technology, described instructional principles or characteristics of learning environments, which are based on a synthesis of several theories of learning. They argue that ICT promotes meaningful learning only when learners are engaged in knowledge construction, conversation, articulation, collaboration, authentic context and reflection.

Barak (2006) derived four similar instructional principles from multiple learning theories while considering eLearning (ICT supported learning) of teachers. The first principle, *learning is contextual*, is based on theories of situated cognition (Brown, Collins, & Duguid, 1989), contending that knowledge is inseparable from the contexts and activities within which it is acquired. Learning occurs only when teachers process new information in a meaningful way that makes sense within their own frames of reference. The second principle is *learning is an active process*. As most people, teachers learn better through their own experiences than through passive acceptance of information provided by others or through technical means. Teachers actively

construct knowledge by integrating new information and experiences into what they have previously come to understand, revising and reinterpreting old knowledge in order to reconcile it with the new. Consequently, educators should see computer technologies as means of knowledge construction and discovery, rather than as means of passive acceptance of knowledge transfer (Johnson & Aragon, 2003; Salomon, 1998). The third principle, *learning is a social process*, is based on the work of Vygotsky (1978). This principle means that teacher learning is associated with the process of discourse between the teacher and other people – peers, students, school leaders, parents and casual acquaintances. Lave and Wenger (2002) combine the first and third principle as they claim social learning to be a function of the activity, context and culture in which it occurs (i.e. it is situated). Social interaction is a critical component of situated learning – learners become involved in a *community of practice* that embodies certain beliefs and behaviours to be acquired. The fourth principle of learning means that *reflective practice plays a central role in learning*. In his landmark work on reflection, Schön described the concept of reflection-in-action as consisting of 'on-the-spot surfacing, criticizing, restructuring and testing of intuitive understanding of experienced phenomena which often takes the form of a reflective conversation with the situation' (Schön, 1983, pp. 241–242). Reflection in the framework of teachers' professional development or teacher education is a concept that has been studied frequently and thoroughly for a longer time (Calderhead, 1989; Peressini & Knuthy, 1998).

In general, teacher learning and professional development – either supported with ICT or not – particularly focuses on the growth in competences in the area of pedagogy, classroom management, design of educational materials, and assessment and evaluation (Darling-Hammond & Bransford, 2005). If social competences of teachers are addressed in research on professional development, social interaction (communication as well as collaboration) is seen as a condition for learning effects in terms of acquiring more knowledge and skills in pedagogy and the subject matter. The assumption is that the more frequent, regular and shared the social interaction is, the more will be learned in terms of pedagogical skills and content knowledge. However, we argue that social competences themselves are also important in the profile of a competent and experienced teacher in secondary education. Teachers who are able and willing to interact, communicate and collaborate with peers and colleagues not only learn themselves but also stimulate a learning culture in a school. Teachers should share their knowledge and experiences with their colleagues, modelling collaboration and knowledge sharing amongst teachers. This assumption is confirmed by the work of Hodkinson and Hodkinson (2003) on the professional development of school teachers. They claim that a highly collaborative working culture is accompanied by a learning culture. Teachers learned from one another intuitively, as an ongoing part of their practice. They were happy to move in and out of another's lesson, observing the work that was going on.

Teachers' social competences and CSCL

Although definitions of social competence vary, there seems to be consensus (see Social Competences Unit, 2002) that it involves the ability to integrate cognitive, emotional and behavioural realms in order to:

- Establish, maintain and develop constructive social relationships
- Manage interpersonal difficulties and refrain from harming oneself and others

- Contribute collaboratively and constructively to peers, students, schools and the wider community.

Component areas of social competences include communication in a range of social relationships, perception and interpretation of social cues, social problem-solving, responsible decision-making, constructive conflict resolution, recognition and appropriate expression of emotion, flexible coping skills and self-management.

Applied to the Dutch standards for teaching profession as described above, teachers should have the knowledge, skills and attitude to collaborate and cooperate with colleagues and students in order to establish and maintain a constructive working and learning culture in schools. Literature on the social dimension of learning of teachers addresses either how teachers themselves develop other professional competences (see, e.g. Olofsson & Lindberg, 2006) or how they may enhance the social competences of their students (see, e.g. Torney-Purta, 2002). Documentation on research on how teachers and student teachers might develop social competences is scarce. We argue that social competences as well as community building should be significant features of the professional development of teachers. Collaborative learning seems to be a promising way to trigger this kind of social learning effects. Supporting teachers with collaborative learning will facilitate collaborative activities in a learning setting, enabling them to develop social competences in a safe environment. Tomlinson (1995) refers to this kind of processes in school-based teacher preparation with *progressively collaborative teaching*, the gradual initiation into central aspects of the activity of teaching with teacher-mentors. Technology might support the collaborative learning of teachers, as teachers not only are flexible in the time and place where they undertake the collaborative activities but also have more possibilities to reread, rethink and reflect on these activities. Therefore, we would like to explore the possibilities of Computer Supported Collaborative Learning (CSCL) for the development of social competences of teachers.

Literature on CSCL originates from both studies on collaborative learning (cf., Johnson & Johnson, 1999; Kagan, 1994; Slavin, 1995) and computer supported collaborative work (CSCW). The latter can be seen as a group of people working on a common task or team work, supported through an interface (groupware), in mostly an industrial setting and with focus on supporting the communication and collaboration of the participants of the particular group. This means that the goal of CSCW is to support the communication and productivity of a group of employees. However, CSCL has been predominantly used in an educational context aiming at the effective and efficient support of learning processes. Empirical studies of CSCL in teacher training are limited in number and in their recommendations on how to design effective and efficient CSCL in teacher training. In addition, the field of CSCL is relatively young, and Lipponen (2002, p. 75) observes that the ambiguity of the empirical studies in CSCL research 'makes it difficult to make any conclusion that a particular approach, instructional method or application would give better results than some others. One does not know exactly the circumstances in which one set of results can be extended to another context'. The small number of studies which indeed examine CSCL in teacher training focus either on how teacher collaborate and communicate or on the effects for the development of teachers' cognitive competences (cf., Lockhorst, 2004).

This means that we also have to rely on literature from other sources than CSCL in teacher training to examine scenarios of CSCL and the development of social competences of teachers. These other sources include literature on collaborative

learning of students – with or without the support of technology – and on professional development of teachers in general.

Scenarios of CSCL and the development of teachers' social competences

Collaborative learning leads to deeper level of learning, critical thinking, shared understanding and long-term retention of learned material (see, e.g. Johnson & Johnson, 1999). Social interaction appears to be the key to collaboration and collaborative learning. Amongst others, Gunawardena (1995) confirms the notion that social interaction is a *conditio sine qua non* for learning. However, CSCL also provides opportunities for developing communication and social skills, and for creating a positive attitude towards co-members building social relationships and group cohesion (cf. Johnson & Johnson, 1999). Just placing teachers into groups does not guarantee collaboration. Incentives to collaborate have to be structured within groups. Social interaction in CSCL environments must be organized, or it is unlikely to occur or be meaningful (in terms of cognitive learning effects; Liaw & Huang, 2000).

A taxonomy of elements affecting social interaction and group learning has been presented by Kreijns, Kirschner, and Jochems (2002) and is derived from a literature study on the stimulation of social interaction in collaborative learning environments. The eight factors are: (1) nature of the learning tasks, (2) goal definition: describing the purpose of the collaboration, (3) member roles, (4) task resources: knowledge or physical resources that enable execution of the task, (5) appropriate member behaviour; (6) appropriate teacher behaviour, (7) formative evaluation with feedback from peers or educators and (8) summative evaluation and reward structure.

Below, we present three examples of scenarios of CSCL in the context of teacher learning and the development of social competences of teachers. In November 2006, a joint research programme was started by a group of institutions for teacher education in the Netherlands. The four research projects in this programme focus on developing design principles for CSCL in order to effectively and efficiently enhance both social competences and community building of student teachers and teachers in various training contexts. The scenarios will be worked out and applied in the research programme.

Scenario 1. Pre-service student teachers: A fictive story on teaching

In this scenario, three to five *pre-service student teachers*, who know each other well and meet regularly face-to-face during the postgraduate programme of one year, write a fictive group story on teaching (*(1) task*). The goal of the task is to stimulate reflection of student teachers on their own teaching practice and to open up their minds for different experiences and reflections of their group mates (*(2) goal definition*). Each group member writes two parts of the story including their teaching experiences. After this, each group member discusses and changes the story of another group member (*(3) member roles*). In this way, collective knowledge (on teaching), skills (teaching practice) and attitude (perceptions on teaching) are addressed. Positive interdependence (cf. Johnson & Johnson, 1999) has been created by collective writing. A rather basic Virtual Learning Environment (VLE) such as WebCT or Blackboard is used (*(4) task resources*) as we think this is sufficient for this task and is not too complex to present barriers for collaboration (cf., Kreijns, Kirschner, & Jochems, 2003). The VLE used should at least include the functionalities of threaded discussions, options for file

exchange and annotations, and course information. Student teachers are asked to write two chapters, rewrite two other chapters and contribute significantly in the discussions (*(5) member behaviour*). The role of the teacher educator is mostly social-regulative and organizational: the discussion among student teachers is essential and the teacher educator might disturb this process, for example by providing tips and tricks (*(6) teacher behaviour*). The contributions of the student teachers in this task are evaluated by both their peers and the teacher educator (*(7) formative evaluation*). The products and reflections are included in the individual electronic portfolio of each student teacher (*(8) summative assessment*).

Scenario 2. In-service student teachers: A pedagogy of collaborative learning of pupils

In this scenario, *in-service teachers* work together. These are people from professions other than teaching and although most of them have had some experience in teaching, this tends to vary considerably. In the Netherlands, they can follow a customized one-year full-time training programme. The student teachers work in small groups (a maximum of four students) on the design of collaborative learning of pupils in different subjects (*(1) task*). The goal of the task is to stimulate the feeling that collective work has positive effects on the individual teaching plans (*(2) goal definition*). Each group member brings in his or her teaching experience in the context of collaborative learning of pupils and provides feedback on the experiences of other group members. After this, each group member works out one issue of collaborative learning in secondary education (task, group composition, VLE, assessment, interaction and communication, teacher's role, etc). The results should be used in the individual teaching plans for their own subject (*(3) member roles*). The electronic environment can be similar to the one in the first scenario, but is more used as these student teachers are usually dispersed (*(4), task resources*). Student teachers should bring in their own teaching experiences, provide feedback to others, write a part of the common teaching plan and design their own teaching plan on the basis of the group work (*(5) member behaviour*). As these students come mostly from professions other than teaching, input from the teacher educators' in the area of subject knowledge and pedagogical expertise might be essential, although teacher educators should show only a moderately active position (*(6) teacher behaviour*). *Formative feedback (6)* has the form of providing feedback by both peers and the teacher educator on messages in the discussion room of the VLE as well as on the group and individual products. As the issue of formerly acquired competences is important here, a digital portfolio is used for *summative assessment (8)*, including all messages and products of the particular student teacher.

Scenario 3. Experienced teachers: Plan for implementation of ICT in school

In this scenario, four to eight *experienced teachers* are addressed, working in different schools. Their *task (1)* is to write a plan for implementing ICT in their own school. The goal of this task is that the teachers learn to share valuable ideas with colleagues from other schools, and create a community of practice as a result of their of collaboration (Wenger, McDermott, & Snyder, 2002). These goals can be seen as indirectly related to the actual achievement of the learning gains of students (*(2), goal definition*). Each teacher is asked to provide feedback to others and contribute significantly in the discussion room. One of the teachers will be the moderator of the

discussion and group work. This role can alternate (*(3, member roles)*). For starting up the group work, a regular VLE can be used. However, in order to maintain the community and keep it 'living', a social software is necessary (Kreijns *et al.*, 2003, *(5), task resources*). *Member behaviour (5)* should show a constructive attitude towards each other's ideas and input. The role of the teacher educator will be passive, if present at all (*(6), teacher behaviour*). As in The Netherlands, the professional development in terms of teachers' social competences is, in most cases, not formalized; *formative assessment (7)* will include only peer feedback and *summative assessment (8)* will be absent.

Future research

In the projects of the joint research programme on CSCL and the development of teachers' social competences, various scenarios will be worked out. As the development of social competences of teachers is under-researched, we will follow the principles of design-based research set out by, for example, Akker, Gravemeijer, McKenney, and Nieveen (2006), and Design-Based Research Collective (2003) on design studies, and Cobb, Confrey, diSessa, Lehrer, and Schauble (2003) on design experiments. These principles include:

- holistic perspective on design and research;
- innovative learning interventions;
- subsequent cycles of design, implementation, evaluation and redesign;
- collaboration between designers, researchers and teachers and
- focus of practical relevance and authentic learning environments.

In addition to the set-up of these design-based research projects, a major effort in the near future will be on the conceptualizing and measuring of teachers' social competences. As argued earlier, literature on the measurement of effects of CSCL is limited and incomplete; effects on the growth of teachers' social competences and community building are generally not taken into account. In the research programme, the social competences are not measured as part of teachers' classroom practice, but as the ability to collaborate with colleagues and to contribute to the school as a learning organization. A Delphi method will be developed in order to measure these social learning effects, described as 'a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem' (Linestone & Turoff, 1975, p. 3). A Delphi method seems to be especially useful to assess social processes in CSCL in teacher training confronting various professionals from the field and judging effects from various disciplinary perspectives. Participants in the Delphi method are teacher educators, teachers, school heads and educational researchers on CSCL. They will assess the effects, both on individual teacher and community levels, in order to reach an acceptable degree of intersubjectivity in their assessment. They will review the complex set of tasks, individual characteristics as well as groups' dynamics, and the educational environment and context, along with the process of social interaction.

In this way, we think we can contribute to the under-researched area of teachers' development of social competences and, in the long term, to a positive working and learning culture in schools.

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