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Abstract

Many innovations in education are not completed, even if they are well thought out in advance. One of the main causes is the organization's lack of learning ability, combined with a shortage of teachers' and students' ownership with respect to the renewal of ideas and design. In communities of learners, teachers and students collaborate and learn together in order to shape innovations in their daily practice. Their ability to learn collectively is a key factor in developing a learning organization. So far, insights into how processes of collective learning can be designed effectively, and which critical factors play a role, have been based on limited empirical research. This article's goal is to contribute to the development of these insights, using the results of a study based on 48 cases of collective learning in communities of learners in primary schools and teacher education institutes. The results suggest that although collective learning rarely takes place in most cases, many outcomes are created that affect all community members. This leads to the conclusion that some participants create outcomes, not only on behalf of themselves but also on behalf of others.

Introduction

Primary schools and teacher education institutes have multiple functions as they provide an environment for students and student teachers to learn and socialize, and for teachers and teacher educators to work. These functions are closely interrelated, as the teachers' and teacher educators' main objective is to facilitate their students' and student teachers' learning processes by constantly aligning with their learner needs and by maintaining educational quality. To keep educational quality high, schools and teacher education institutes strive for their teachers' and teacher educators' improvement and therefore development. However, many innovations in education are not completed, have a limited impact or don't have the expected effect. One of the reasons might be that in these innovations, stakeholders are not participating actively and that their voices are not being heard (see Fullan, 2007; Hargreaves &

Shirley, 2009). This study is based on the assumption that stakeholders' active participation and acknowledgment of their perspectives can be realized in communities of learners that aim for the development of their common practice by learning collectively.

In literature positive findings have been reported about the effects of collective learning and communities of learners (see Cordingley et al., 2005; Stoll et al., 2006; Opfer & Pedder, 2011). However, how these communities actually are functioning in practice, how collective learning takes place and which challenges and problems the participants face, is still unclear. Bolam et al. (2005) suggest that the objective of follow-up research on collective learning in communities should be "to provide practical, self-audit instruments and tools for schools wishing to promote and sustain themselves as a professional learning community, using an enquiry-oriented approach" (p.ix). Cordingley et al. (2005) conclude that researchers need to report, at least in brief, information about the context and process of the collective learning intervention including the sample characteristics, recruitment strategies and details of the methodology. They should consider both the processes and products to ensure that practitioners know both whether and how an intervention is effective. "There is however no diagnostic or management instrument available, yet, that enables making judgements about the actual functioning of groups as a professional learning community" according to Mittendorf et al. (2006, p. 299).

The study we report on here, is part of a larger project called 'Collective learning in schools and teacher education' and builds further on two extensive case studies, one in primary and the other in teacher education (Castelijns et al., 2009). One of the project's starting points was the ambition to develop a learning climate that meets the learners' basic psychological needs. The assumption was that this would enhance their intrinsic motivation and self-regulation as well as their learning effectiveness. In this project, collective learning is understood as a process of collaborative inquiry, designed and carried out by stakeholders into their common context,

aiming for the improvement of that context. To support schools and teacher education institutes in this process, an intervention was developed. This intervention is represented by a spiral, containing repeating cycles, each consisting of six phases, namely defining an ambition, collecting information, interpreting information, deriving consequences, acting and evaluating. Added are two concepts that refer to the quality of the process of collective learning, namely 'variety in perspective' and 'shared influence' and two concepts referring to the quality of the product of the process, namely 'collective outcome' and 'shared interest'. The procedure is based on the social-constructivist concept of joint construction of meaning by members of a group (Putnam, 2010). Collective construction of meaning assumes that individual and therefore subjective members' perspectives are combined into a collective and intersubjective one (Guba & Lincoln 1989).

This study focuses on the adoption of the above mentioned intervention. It's goal is to answer the next research question: What are the characteristics of collective learning in communities of learners, both in terms of processes and products? To answer this question, three sub questions are distinguished:

1. To what extent do communities of learners in primary schools and teacher education institutes adopt the procedure for collective learning?
2. To what extent do communities of learners in primary schools and teacher education institutes learn collectively?
3. To what extent do communities of learners differ in terms of adoption of the procedure and collective learning?

Theoretical framework

Communities in which collective learning takes place are often referred to as learning communities. In this study, two concepts are central, namely collective learning and learning

communities. These concepts are relevant for teachers' professional development and the improvement of their daily practice. Firstly an overview of recent literature, in which collective learning is defined and its relevance is discussed, is presented. Next, the concept of professional learning communities will be further explored. Finally, the procedure for supporting collective learning in learning communities in educational contexts is described.

Collective learning

In defining collective learning, both 'learning' and 'collective' need to be further explored. According to Katz & Earl (2010), learning is "knowledge creation" (p. 28). Knowledge is created through dialogue or conversations and "it is in these conversations that new ideas, tools, and practices are created" (Katz & Earl, 2010, p. 28). According to this definition, learning obviously is not an individual activity, because dialogue at least requires more than one participant. Gerlak & Heikkala (2011) state that the focus of collective learning is both on the process and on the collective product:

"collective learning involves both (1) a 'collective process', which may include acquiring new knowledge through diverse actions (e.g. trial and error), assessing information and disseminating new knowledge or opportunities across individuals in a collective and (2) 'collective products' that emerge from the process, such as new shared ideas, strategies, rules, or policies." (p 623).

Simons & Ruijters (2001) distinguish different types of learning on the basis of a process/product and an individual/collective dimension (see Figure 1).

Insert Figure 1 here

Figure 1 shows that four different types of learning can be identified. Type 1 represents individual learning with an individual process and an individual product. Type 2 represents the

learning in a community in which tasks are divided between participants. There is no collective process, but the individual tasks together yield a collective product. Type 3 refers to a collective process with an individual product. An example of this type is a group session with discussion (collective process), yielding individual outcomes for each participant. Type 4 is collective learning. In this type a collective process yields a collective product. For example, members of a community are discussing data and together they reach a conclusion, shared insights and/or shared plans of action. Characteristic for collective learning is that new questions emerge in a context that is constantly changing. This pleads for spiralling representation of the process rather than a linear one with a fixed start and finish.

Several authors (for example Cordingley et al., 2005; Hipp et al., 2008; Stoll et al., 2006; Verbiest & Vandenberghe, 2002) emphasize the importance of teachers learning together. Based on an extensive literature search Cordingley et al. (2003 and 2005) conclude that teachers' sustained and collaborative learning is connected with a positive impact upon their teaching repertoire and learning strategies, their ability to match these to their students' needs, their self-esteem and confidence, and their commitment to continuous learning. Furthermore they conclude that collaborative learning is linked with a positive impact upon student learning processes, motivation and outcomes. All the studies found connections between the collaborative professional development and changes in teacher practice, attitudes and beliefs. Evidence is found that changes in teachers' classroom behaviors and positive changes in attitude regarding their professional development go together. A recent review study on teachers' professional development shows that collective learning through an action-oriented approach is an effective way to enhance professional development (Van Veen et al., 2010).

Learning communities

Collective learning is focused at the interplay of individuals, communities of teachers, and

specific contexts in trying to understand and improve the quality of teaching and student learning. When these elements come together, a learning community emerges in which teachers are likely to discuss problems, strategies and solutions (DuFour, 2004). Verbiest (2008) defines the concept of 'professional learning community' in terms of professionalism in the school's learning culture, teachers' professional development and mutual connectedness. According to Katz & Earl (2010, p. 31) "a habit of using enquiry and reflection to think about where you are, where you are going, how you will get there, and then turn around and rethink the whole process to see how well it is working and make adjustments" (p. 31) is crucial. An effective (professional) learning community exhibits key characteristics like: shared sense of purpose or collective responsibility; shared and supportive leadership; shared values and vision; collective responsibility for pupils' learning; collaborative activity; collaboration focused on learning; individual and collective professional learning; reflective professional enquiry and dialogue; openness, networks and partnerships; inclusive membership; mutual trust, respect and support; sharing practice (Bolam, et al., 2005; Hipp et al., 2008; Vescio, et al., 2008), Lockhorst, 2004; Lomos et al., 2011). Katz & Earl (2010) show that key factors are "strength of engagement and participation of the members, talking openly with colleagues about different views, opinions, and values, and dealing openly with conflicts" (p. 45) and "changing practice" (p. 43).

Professional learning communities are regarded to be an effective tool for improving teachers' professional competencies and students' learning outcomes (Hannay, & Earl, 2012, Wong, 2010). Professional learning communities are fundamentally about learning for students, as well as learning for teachers, learning for leaders and learning for schools (Katz & Earl, 2010). Not only teachers can be involved in this collective learning but also students (see Lundy, 2007; Cook-Sather, 2007) and the school's management (see Katz & Earl, 2010; Mittendorf et al., 2006). When not only professionals like teachers are involved, but also others, it is more

appropriate to use the term 'communities of learners' in stead of professional learning communities.

Some argue that collective learning precedes the development of a (professional) learning community (Schribner et al., 1999) whilst others suggest that learning communities are a vehicle for collective learning (Marks & Louis, 1999). Either way, collective learning (type 4 learning, see above) is likely to appear in communities of learners.

Procedure for collective learning

Although collective learning in learning communities apparently is an effective intervention for teachers' professional development, it is not a self-evident approach that emerges spontaneously in schools and teacher education institutes (Hannay & Earl, 2012). This is even more true for communities of learners in which different stakeholders (like teachers, students and managers) are involved. To support communities of learners in schools and teacher education institutes, a cyclic procedure for collective learning was developed, based on similar models by Van Strien (1986) and Dixon (2000). This cyclic procedure is regarded to be the building block of a spiral model for collective learning: in the last phase of the cycle new ambitions are defined and a new cycle starts (Castelijns et al., 2009). Each cycle consists of six phases:

1. Defining an ambition. The first step is to create a 'collective ambition' or a commonly shared drive to do or reach something. Several authors (Bolam, et al., 2005; Hipp et al., 2008; Wong, 2010; Lomos et al., 2011) stress the importance of a shared vision. "Without a defined focus there (are ...) many different initiatives, bur no core compelling ideas to focus the agenda" (Katz & Earl, 2010, p. 47). A collective ambition can be developed from different starting points. It can be derived from the organization's vision, it can follow the evaluation of a previous cycle, or after having collected information about the ambitions of the community members (Castelijns, et al., 2009).

2. *Collecting information.* In order to realize a collective ambition it is necessary that uncertainties, unknown facts or questions related to the ambition are answered (Dixon, 2000). Together, the community members phrase questions and think of ways to get to the answers by collecting information. Some authors (see Vescio et al., 2008) formulate this process as collective inquiry. The collected information is derived from empirical data collection within the community's context and includes consultation of experts, research and literature.
3. *Interpretation of the information.* The community members jointly interpret the information they have collected. They link the data with existing knowledge and discuss what the data mean to them. According to Ponte et al. (2004) an important aspect of action research is an ongoing dialogue with colleagues, both within and outside the school.
4. *Deriving consequences.* This phase derives from the former phase, as the community members start thinking about consequences for their daily practice, based on the outcomes of the interpretation. Together they decide what actions might be useful in order to meet their collective ambition and together they make a plan for action.
5. *Acting.* In this phase the planned actions are carried out and monitored.
6. *Evaluation of product and process.* This phase explicitly aims at reflecting on the outcomes of the process (how did we learn collectively?) and the product (did our actions succeed and did we realise our ambition?). The evaluation completes a double-loop learning process (Argyris & Schön, 1978) that challenges community members to learn from their collective process and its products. The outcomes of this phase serve as input for a new cycle in the spiral of collective learning.

Although this procedure may offer some hold to community members, solely applying these six phases will not lead to collective learning (Castelijns et al., 2009). As Katz & Earl (2010) and

Bolam et al. (2005) stated, some other characteristics like collective responsibility, community members' participation and openness for each others views and values are essential for an effective learning community. Therefore, the learning cycle is completed with two elements essential for establishing a collective process, namely: 'variety in perspective' and 'shared influence' and two elements for reaching a collective product, namely 'collective outcome' and 'shared interest'. We will discuss those elements briefly.

Variety in perspective

In a collective learning process, participants put forward their views, ideas and knowledge. Brown & Danaher (2008, p. 147) emphasize that multiple viewpoints and competing interests, result in dissonance and the potential for conflict.

To create knowledge it is helpful to make use of these different views, for variety may lead to 'constructive frictions' (Vermunt & Verloop, 1999) which are beneficial for the process, because in the collusion of two or more ideas, new concepts can emerge. In this context, Engeström & Sannino (2010) use the term 'expansive learning' to indicate that tensions and contradictions in a community can be the starting point for change. The importance of variety in perspective is also mentioned by Katz & Earl (2010) and Lockhorst (2004). The latter states that "old knowledge structures are reconstructed into new knowledge when confronted with other (conflicting) perspectives (p. 25).

Variety in perspective asks from participants to step outside their own perspectives and to broaden their view. Opening up for other perspectives is essential for constructing new knowledge or as Van den Bossche et al. (2010) argue:

"the role of constructive conflict is critical: only if there is a critical stance regarding each others contributions, if there is thorough consideration of each others ideas and comments, and if team members address differences in opinion and an speak freely, will there be really construction of a shared mental model" (p. 296).

Shared influence

In order to learn collectively, it is essential that the community members' voices are being heard and that their views count. It is far from self-evident that all participants in a collective process have influence, especially when differences in power play a role. As for the involvement of students, special attention is required, because of the hierarchical distance between them and their teachers. Lundy (2005) is concerned about childrens' rights, especially the right to have their views given weight in all matters affecting them. She distinguishes four types of participation for children: voice, space, audience and influence. Voice refers to the right to speak. Lundy argues this is not enough, because this is still no guarantee to be 'heard'. The optimal situation according to Lundy is to have 'influence', which means having a voice, being heard and being involved in the process. Influence means that community members fulfil an active role in each phase of the process.

Fielding (2001) explores the students' role as 'radical change agents' by discussing three problems regarding student voice: speaking *about* others, speaking *for* others and problems about getting heard. For Fielding, the solution lies in dialogue or speaking *with* others. If teachers and students are learning collectively, it is important that both are able to express their views. In more traditional inquiries, students are often regarded as 'data-source' (Fielding, 2004). In collective learning, students act as co-researchers, who not only express their views, but also exercise influence in each phase of the process.

Although Lundy and Fielding focus at childrens' and students' participation, they also offer useful concepts for the participation of community members in a broader sense. To ensure that all members play an active role, they should be able to act as co-researchers, because this role enables them express their voices and to exercise influence in matters they have an interest in.

Collective outcome

Participants in a collective learning process are involved in a process of knowledge creation through exchanging and combining views, ideas and thoughts. The outcome of this process is collectively shared knowledge, consisting of shared ideas, common interpretations of collectively gathered information and derived consequences. Garavan and McCarthy (2008) state that collective learning involves “the development of shared understanding and meaning’ (p. 452). It requires that “individuals not only simply learn from each other but also develop a shared understanding and meaning about the learning process and the learning that is derived’ (p. 467). New meanings, previously not available to the community are the result of a process of collaborative construction of meaning by refining, building on or modifying the original meanings in some way (Van den Bossche et al., 2011). Collaborative construction of meaning is not static but can be seen as a continuous process (Hannay & Earl, 2012). Thus the process of putting forward and discussing ideas is important to reach a collectively shared outcome. Besides shared understanding, also collectively developed documents, tools and instruments can be regarded as collective products (Mittendorf et al., 2006, p. 302). Products not only involve knowledge or ideas but also collectively shared plans or activities. Engeström & Sannino (2010) use the term ‘conceptual artefacts’, referring to the products of a collective learning process.

Shared interest

For collective learning it is not only important to create collective outcomes but also that community members have a *shared interest* in these products . Shared interest refers to Guba & Lincoln’s (1989) concept of ‘stakeholdership’. Guba and Lincoln argue that those who are affected by the outcomes, should have the right to exercise influence in that process. But the reverse also holds true: those exercising influence should take responsibility for the outcomes. The outcomes should lie within their ‘circle of influence’. Dixon (2000) mentions that only if participants have been involved and feel responsible for collectively reached decisions, they will

act accordingly. She stresses the importance of involvement in the collective process in order to reach responsibility or 'ownership' for the collective product. Others like Tengland (2008) refer to 'empowerment', a term which is used to express that participants take "control over the change process, determining both the goals of this process and the means to use" (p. 77).

The cycle and the four elements discussed, provide a framework for collective learning in communities of learners and is represented in Figure 2. The four elements are placed on the outside of the cycle, indicating that these apply to each phase of the cycle.

Insert Figure 2 here

Method

Type of research

For this qualitative study an educational design research method has been chosen. Educational design research is used for systematic study of designing, developing and evaluating educational programs, processes and products. Design-based research may be characterized as (Van den Akker, et al., 2006, p. 5):

- interventionist (the research aims at designing an intervention that solves a real world problem)
- iterative (design-based research incorporates prototyping: a repeated approach of designing, evaluating and revising)
- process orientation (design-based research aims on understanding how the intervention works)
- utility oriented (the merit of the design is measured by its practicality for users in real contexts)

- theory oriented: the design is based upon theoretical notions and contributes to theory building.

Prototypes of the cyclic procedure were designed, evaluated and revised between September 2006 and July 2008. In this part of the project separate aspects of the procedure and instruments were developed and applied. These aspects and instruments were assembled into a last prototype which was applied as an intervention and evaluated between September 2008 and July 2010 in new teams and classes. This part of the research project is reported on here.

Research population

The procedure was adopted by communities of learners in the primary schools and institutes for teacher education in the Netherlands that participated in the project 'Collaborative innovation in schools and teacher education institutes' from September 2008 to July 2010. Adoption, which usually took a full school year, was studied in four different contexts in teams and in classes, both in primary schools and teacher education.

In the project, five teacher education institutes and 12 primary schools participated. Some of these organizations were located in cities and had mixed populations regarding culture and native language, some were situated in rural areas and had more homogeneous populations. The procedure was adopted 48 times by communities in four different contexts. Table 1 gives an overview of the number of cases in which the procedure was adopted, distinguished by context. As Table 1 shows, the procedure was adopted 16 times in teams of primary school teachers, 16 times in primary school classes, eight times in teams of teacher educators and eight times in classes in teacher education. Primary school teams consisted of four to 15 teachers; primary school classes consisted of 20 to 30 students (age 8 to 12 years); teacher education teams consisted of five to eight study coaches and teacher education classes had 10 to 20 student teachers.

Insert Table 1 here

In this project collective learning was conceptualized as an ongoing spiral, consisting of multiple cycles. Therefore schools and teacher education institutes were challenged to apply the cycle twice, the second time building on the results of first cycle. In fact the majority of the schools applied the cycle only once. They decided to participate in the project for just one school year. Since application usually took a full school year, no data about a second cycle could be collected. In a few schools and most teacher education institutes however, the procedure was applied several times during two school years. But this happened in different teams and/or different classes. Therefore these cases are considered as independent ones.

Unlike teams, classes started the adoption of the procedure with the phase 'collecting information'. This was done deliberately because defining an ambition seems rather complicated especially for students and student teachers who lack the experience and the collective frame of reference that enables them to have meaningful discussions about a collective ambition they would like to realize. By first discussing relevant information, classes can choose a common direction for the process which is specific enough to serve as an orientation for the activities of the group. Teams are supposed to be more familiar with defining collective ambitions or setting common goals than classes.

On behalf of the adoption of the procedure, and to enhance creativity as well as to diminish hierarchy between the participants, some instructional formats designated for that purpose were introduced. Therefore, a variety of instruments was developed, qualitative as well as quantitative ones. Some of these instruments were adapted to the specific situation and the users' needs for instance a collective storyline and a so called placemat procedure (see www.lectoraat.nl and Castelijns, et al., 2009). A frequently used instrument was the 'chalk talk' (Coalition of Essential Schools, 2012). For the collection of data in classes for instance, two

questionnaires were constructed, one for primary school students and one for teacher students (Basic Psychological Needs Scale – BPNS). Their goal was to collect information about the students' and student teachers' perception of basic need fulfilment in school and teacher education respectively (see Vermeulen, et al., 2012 for the construction and validation of the student teacher version of the questionnaire). The broad focus for the data collection in classes in terms of basic psychological needs was part of the procedure. Basic psychological needs are supposed to be universal (Deci & Ryan, 2002). Questionnaires for students and student teachers respectively, that placed these basic psychological needs in an educational context, were supposed to be relevant irrespective of the context they were used in. Furthermore these instruments explicitly challenged communities to add items on the basis of their own needs, preferences and priorities. In that sense, communities had the opportunity to narrow the focus for the data collection.

Since the project's focus was on collective learning, only phases in which members as a community exchanged perspectives were monitored. In the 'Acting' phase, in which community members carry out the plans they made (individually or in small groups), no such collective interactions were planned. For that reason, no information on this phase was collected. Application of the 'Evaluation' phase implied that actions were actually taken. If no evaluation took place, it is still possible that the community took actions, but data could not be gathered in these situation.

The process in each community was facilitated by one or more community members. They initiated, monitored and directed the process, prepared meetings, stimulated community members to take an active role and introduced relevant tools, instruments and practices (see above). Figure 3 gives an overview of the community members and facilitators in each context. It shows that in primary school teams, the community consisted of teachers, one or two co-

ordinators (teachers with the specific task to co-ordinate the curriculum in certain classes), the principal and one or two researchers. The process was facilitated by a small group mostly consisting of the principal, the co-ordinator(s), and the researcher(s). In primary school classes, the community consisted of the students and their teacher. The process was facilitated by the teacher. In teacher education teams, the process was facilitated by one or more teacher educators who were also part of the research group. In teacher education classes, the community consisted of student teachers and their teacher educator, mostly their study coach, who also played the role of facilitator.

Insert Figure 3 here

The researchers were teacher educators who worked at the institutes that participated in the project. From each institute, two or three teacher educators worked in the project during one day a week. They played three different roles. Firstly, they were researchers who collected data and studied the process in the communities. Secondly, they were facilitators of collective learning in primary school and teacher education teams. Thirdly, they were also community members in primary school and teacher education teams who had an interest and who participated in the process and contributed to its outcomes.

The researchers were trained for these roles in research group meetings, which took place six to ten full days a year. In these meetings, the research group leaders offered a theoretical framework for collective learning, introduced the procedure, relevant instruments and tools, challenged the researchers to reflect on their experiences in the communities, discussed collected data and developed a website where relevant concepts and instruments could be found and the experiences could be shared (www.lectoraat.nl). The researchers trained the principals and the co-ordinators in primary school teams by working together and coaching on the job.

Data

Given the explorative nature of the research questions, mainly qualitative data were collected. Field notes were kept, relevant documents were collected and reports of meetings were made. On the basis of these data, extensive case study reports about the implementation processes were written, using a format containing the phases of the procedure.

The description of each of these phases, answers four questions: whose perspective(s) were discussed, who exercised influence, what outcomes were reached and in whose interest were these outcomes? All written case studies were peer reviewed by other members of the research team and consequently revised on the basis of the feedback they provided. Once the case studies had been completed, they were send to the school or teacher education institute, where the studies were discussed face to face and finally authorized.

Coding

The authorized case studies were analyzed by trained researchers, assigning codes to each phase of the procedure from a set of three or four alternatives. These codes refer to:

1. The actual adoption of the phase (No = code 1; Yes = code 2; Not applicable = code 0);
2. The perspective discussed (Community members' perspectives only = code 3; Facilitators' perspectives only = code 4; Community members' and facilitators' perspectives combined = code 5; Not applicable = code 0);
3. Influence exercised (Community members' influence only = code 6; Facilitators' influence only = code 7; Community members' and facilitators' influence combined = code 8; Not applicable = code 0)
4. Outcomes created (No = code 9; Yes = code 10; Not applicable = code 0). Each phase of the procedure has its own outcomes, like an explicitly phrased collective ambition, decisions on what data are to be collected, conclusions and interpretations of the collected data, derived consequences and actions to be taken.

5. The interest of the outcomes (Community members' interest only = code 11; Facilitators' interest only = code 12; Community members' and facilitators' interest combined = code 13; Not applicable = code 0).

The code 0 (not applicable) is used when the no code could be assigned as a result of missing data or unclear reports.

The coding system is illustrated by the next example (see Castelijns et al., 2009). A team of primary school teachers and their principal were invited by a researcher for a meeting about the project. After an intensive discussion, facilitated by the researcher, the teachers and the principal defined "Challenging students to reflect on their work" as their collective ambition. They decided to collect information on how they stimulated reflection in their daily conversations with students, by keeping log books. In a next meeting the researcher facilitated a discussion by the teachers and their principal about the data, resulting in an explicit ambition to improve the quality of the daily teacher-student conversations about work. The facilitator also invited the teachers and the principal to phrase one or more questions for further inquiry. One of those questions was "To what extent do students experience daily conversations with their teacher as helpful for their learning at school?" To answer this question, the researcher suggested to video tape an interview with a small sample of students. The teachers and the principal agreed. Later, these data were discussed in a second meeting. Supported by the researcher, the teachers and the principal found that most students found the daily conversations helpful for their learning at school, but not all. Some students preferred planning and evaluating their own work and not to have conversations about this with their teachers. The teachers and the principal concluded that they needed to improve the quality of their daily conversations. They planned mutual classroom visits during daily conversations in which they observed each other and provided feedback to each other, using video. After a few months, initiated by the researcher, a third meeting took place in which the actions the teachers and the principal took, were evaluated. On the basis of data, using a self-developed questionnaire and

three semi-structured group interviews with students, the teachers and the principal concluded that significant progress was made. Both student motivation and the quality of their reflections had improved. Most students appreciated their teachers' support. There were also students who seemed to need more intensive coaching by their teacher. The codes assigned to each of the phases 'Defining an ambition', 'Interpretation of information', 'Deriving consequences' and 'Evaluation' were Actual adoption 2, Perspectives discussed 3, Influence 6, Outcomes created 10 and Interest of the outcomes 11.. The codes assigned to the phase 'Collecting information' were Actual adoption 2, Perspectives discussed 4, Influence 8, Outcomes created 10, and Interest of the outcomes 11.

Intersubjectivity

The case descriptions were carefully read and coded. Each code was underpinned with a piece of 'evidence' consisting of a selected piece of the written case study. Four researchers carried out the coding. First, several cases were coded individually by all four researchers and discussed afterwards. This enhanced the development of a collective focus, which served as a frame of reference in the coding process. After that, each case was read by two researchers, one of them coded the case according to the previously reached collective focus. If there was any problem in assigning codes, the second reader was consulted and the code was discussed until agreement was reached.

Scoring

Next, per case, all the same codes were added up, resulting in a set of 13 scores, one for each coding alternative. Each score referred to a case characteristic, for example, the number of phases in which learners' and others' perspectives were combined (code 5). The thirteen scores for each of the 48 cases made up a data set which was imported in SPSS.

Method of analysis

On behalf of the analysis, first the (absolute) scores were transposed into proportions. This was necessary because cases differ with regard to the number of phases, that were actually adopted. Each proportion referred to the number of phases in which a specific code was assigned, divided by the number of phases that were actually adopted. This transposition resulted in a set of 13 variables.

To answer the first sub question, 'To what extent do communities of learners in primary schools and teacher education institutes adopt the procedure for collective learning?' the variable 'number of phases' was created. If this variable was 1, then all the phases were adopted. A score between 1 and 0 expresses the percentage of the phases that were actually adopted.

To answer the second research question 'To what extent do communities of learners in primary schools and teacher education institutes learn collectively?' two different process variables were operationalized. Analyses were based on the scores for the variables 'Community members' and facilitators' perspectives combined' (code 5) and 'Community members' and facilitators' influence combined (code 8). A score between 1 and 0 expressed the proportion of the cases in which the phase was actually adopted and to which the codes 5 or 8 had been assigned.

With regard to answering the second sub question, it was not only important to look at process but also at product variables. Two different product variables were operationalized, namely 'Collective outcome created' (code 10) and 'Community members' and facilitators' interest combined' (Code 13). A score between 1 and 0 expressed the proportion of the cases in which the phase was actually adopted and to which codes 10 or 13 were assigned.

With regard to answering the third research question 'To what extent do communities of learners differ in terms of adoption of the procedure and collective learning?', the mean ranking of the cases on the basis of proportions were compared and the differences that were found between contexts were tested. Because of the relative small number of cases (48) divided over

4 different contexts, non-parametric tests (Mann-Whitney U and Kruskal-Wallis) were used. The Mann-Whitney U test was used to compare two related samples or repeated measurements on a single sample to assess whether their population mean ranks differed (Mann-Whitney U is a paired difference test). This test can be used as an alternative to the paired Student's t-test when the population cannot be assumed to be normally distributed or the data is on the ordinal scale. Both was the case in our sample. Kruskal-Wallis test is the non-parametric alternative for ANOVA and is used to compare the differences between the four different contexts.

For a complete analysis, differences between proportions for all variables, the collective as well as the (remaining) non-collective ones were tested.

Results

In Figure 4 an overview is presented of the percentages of the phases adopted in the four contexts that were distinguished in this study. The figure reveals that primary school classes started the procedure by collecting information. The figure is constructed with five phases instead of six, because no information was gathered about the 'Acting' phase (see Method). Figure 4 shows that at the beginning the procedure was adopted to a large extent. However, in the course of the process, gradually more phases were missed. Almost every team, given an opportunity to do so, defined an ambition, (96% n=24), in 85% (n=48) of the cases information was collected, in 71% (n=48) the information was interpreted and in 56% (n=48) consequences were derived. The evaluation phase was adopted in only half of the cases (n=48). Not adopting the 'Evaluation' phase can mean that communities skipped the 'Acting' phase, so there was nothing to evaluate. However, some communities applied the 'Acting' phase, but did not evaluate (see Method).

Figure 4 indicates that sometimes phases were skipped. For instance, the percentage of teacher education teams that applied the phase of evaluation, were higher than the percentage

of teacher education teams that applied the phase of deriving consequences. Reasons why communities stopped the cycle before completing it were lack of time, a gradual loss of interest and the emerging of other priorities. Reasons why they skipped phases but still went on in the cycle were lack of time and other priorities and adaptation of the cycle to their own needs. An example coming from a face to face discussion of the case report concerns a teacher education institute in which study coaches administered the BPNS in their classes, but decided to interpret the data in their study coach team, instead of in their classes. The main reasons for this adaptation were lack of time for extensive discussions in classes and their need to make sense of the data first, before doing that with student teachers.

Furthermore Figure 4 shows that adoption of the procedure in teacher education was most complete in classes. Those communities adopted more phases than teacher education teams did. In primary schools this was the other way around. Teams adopted more phases than classes did.

Finally the differences between the number of phases that were actually adopted were not significant, neither between the four contexts, nor between primary schools and teacher education, nor between teams and classes.

Insert Figure 4 here

With regard to the second sub question "To what extent do communities of learners in primary schools and teacher education institutes learn collectively?". Table 2 presents the mean proportions of all collective variables. This table shows that the means for 'Community members and facilitators perspectives combined' and 'Community members' and facilitators' influence combined' were low (.09, and .12; n = 48). No significant differences were found between (combinations of) contexts, except for one, namely 'Community members' and 'Facilitators' perspectives' combined', when primary schools and teacher education institutes

were compared. The mean proportions were .15 and .07 respectively, $p = .017$ (see Table 4). So cases in which collective learning took place, in the sense that all community members (including facilitators) exchanged their different perspectives and had shared influence, were rather rare.

Insert Table 2 here

Furthermore, Table 2 shows that the means for 'Collective outcomes created' and 'Community members' and facilitators' interest combined' amounted to .32 and .34 ($n = 48$). The means for these outcome variables were higher than those for the process variables. However, as counted for the process variables, no significant differences were found between (combinations of) contexts (see Table 4).

Table 3 provides information about the mean proportions of all non-collective variables, differentiated by (combination of) context ($n=48$). By means of non-parametric test it was determined whether these differences were significant (Table 4). On the basis of these results, the third sub question 'To what extent do communities of learners differ in terms of adoption of the procedure and collective learning?' was answered. Table 4 reveals that between primary schools and teacher education institutes, one significant difference was found, namely between the mean proportions for 'Facilitators' influence only' ($p = .007$, mean scores were .16 and .31). Comparing primary school teams and teacher education teams, significant differences were found regarding, 'Community members' influence only' ($p = .021$, mean scores are .42 and .17) and 'Facilitators' influence only' ($p = .034$, mean scores were .15 and .29). Apparently, in primary school teams, community members' influence is more and the facilitators' influence is less frequent. In teacher education teams it is the other way around. Comparison of two cases may illuminate this point. In the first one (Castelijns et al., 2009; see example of the coding system, in the Method paragraph above), the facilitator was the member of the research team

who was also working as a teacher educator. She was not a member of the primary school team. In a meeting, she challenged the school community members (consisting of all teachers including the principal) to define their collective ambition. The community members decided that they wanted to challenge their students to reflect on their work by improving daily teacher-student conversations. For that purpose the facilitator suggested them to keep a log book for a couple of weeks, in order to collect data on their current practice regarding teacher-student conversations. The collected data were discussed in a next meeting, in which the facilitator challenged the community members to make sense of the data by putting yellow post-it notes on a white board. She invited them to explain their remarks and interpretations and to underpin these with data from the log books. Finally she asked the community members to put green post-it notes on the white board, each containing one characteristic of “the ideal student-teacher conversation”. As the members had put their notes on the white board, the facilitator categorized their remarks, constantly asking for the teachers’ agreement. Finally she rephrased the characteristics in terms of a collective ambition (“In daily teacher-student conversations, we want to motivate students by challenging them to plan their learning activities and to reflect on their work”) and again asked the members if they agreed.

In the second case, the team consisted of study coaches, working at a teacher education institute. Facilitators were two members of the research team, who were also study coaches at the same institute. Earlier, these facilitators agreed with their management team about the projects’ focus, which was defined as “adapting the teacher education to the student teachers’ needs”. This focus connected closely to the institutes vision and ambition. In the meeting with the study coaches, the facilitators introduced the project and the ambition they defined with the management team. They stressed the importance of adapting education to the student teachers needs. The study coaches all agreed. One of them said: “I think this is very relevant to me. I want to learn how we can adapt the curriculum to the student teachers’ needs in a more systematic way.” A colleague remarked: “I am curious if the student teachers will put forward

other concerns and needs, than I think they will. I think this project can help us to avoid prejudices about them". And another one said: "I really hope that the management team will take the outcomes of this project seriously". Next, the facilitators asked their colleagues to make the ambition more specific. In the discussion that took place, the study coaches (including the facilitators) phrased a detailed ambition, containing elements like adapting study coach meetings to the students teachers' needs and considering students as an important source of information for improving quality of study coach meetings.

In the first example, the member of the research team facilitated the process in which the teachers and the principal defined a collective ambition, without putting forward her own ambitions or influencing the outcomes. In the second example, the members of the research team introduced the ambition they defined with the management team and asked the study coaches for their commitment. Not only did they facilitate the process, they also put a significant mark on the outcomes (the collective ambition).

Comparing primary school and teacher education classes, significant differences were found with regard to 'Community members' perspective only' ($p = .032$, mean scores were .16 and .39), 'Community members' influence only' ($p = .048$, mean scores were .18 and .35) and 'Facilitators' influence only' ($p = .023$; mean scores were .18 and .33). Apparently, in primary school classes, community members (students) didn't put forward their perspectives and didn't exercise influence as frequent as community members (student teachers) in teacher education classes did. On the other hand, teachers' influence in classes was less frequent than teacher educators' influence in theirs. This may be due to the fact that in teacher education in the Netherlands, student teachers are more familiar with discussing quality of the courses they take with their study coaches. In fact student teacher evaluation is obligatory for teacher education institutes (Vermeulen et al., 2012). Comparing teams and classes a significant difference was found regarding 'Facilitators' perspective only' ($p = .040$, mean scores were .17 and .20).

When comparing primary school teams and classes significant differences were found with

regard to 'Community members' perspective only' ($p = .013$, mean scores were .39 and .16) and 'Community members' influence only' ($p = .013$, mean scores were .42 and .18). This means that both the community members' perspectives and influence were more frequent in teams (teachers and principals) than in classes (students). Comparing teams and classes in teacher education, a significant difference was found regarding 'Community members' influence only' ($p = .031$, mean scores were .17 and .35). This means that in teacher education, teacher educators' influence in teams was less frequent than student teachers' influence in classes. Finally, comparing all four contexts, significant differences were found regarding 'Community members' perspectives only' ($p = .028$), 'Community members' influence only' ($p = .014$) and 'Facilitators' influence only' ($p = .024$).

Insert Table 3 here

Insert Table 4 here

Conclusions and discussion

The main research question in this study is 'What are the characteristics of collective learning in communities of learners, both in terms of processes and products?'

The data showed that in each case the collective learning cycle was started, but in the course of the process, communities gradually skipped one or more phases, because of lack of time, other priorities or their need to adapt the procedure to their own needs and context. This applied to many cases both in primary schools and teacher education. In this regard, the pace of the process and the time communities took to work through the whole procedure seemed to be relevant. As mentioned above, application of the procedure was adapted to the yearly rhythm of activities and holidays in primary schools and teacher education institutes.

Communities usually took a full school year to apply the procedure, which means that they arrived at the evaluation phase just at the end of the school year. In the educational system in the Netherlands, classes move up after summer holidays and teachers and teacher educators get new classes. This system characteristic made it less meaningful for teachers to evaluate the process and its products with their classes, because they would take no part in the implementation of the actions resulting from the evaluation. This characteristic does not apply to primary school teams. These communities adopted the evaluation phase more frequently than communities in which classes were involved do. Because primary school teams will still be together after summer holidays, it makes more sense to them to evaluate the process and its products at the end of the school year.

The fact that both the community members' perspectives and influence were more frequent in teams (teachers and principals) than in classes (students), probably due to the condition that teams of primary school teachers are more familiar with directing and regulating their own learning processes than classes do.

The finding that in teacher education, teacher educators' influence in teams was less frequent than student teachers' influence in classes can be explained by the more prominent role, facilitators take in teacher education teams and the fact that student teachers are used to evaluate and discuss the quality of the courses they take.

The results suggested that a lot of learning took place in the 48 communities that were studied, for example community members exchanged perspectives and created new collective ones. To answer the question whether that learning was collective, a closer look at both process and products was necessary. The results indicated that to some extent collective products were created by the communities and that these were in the community members' and facilitators' combined interest. In that sense, the products can be regarded as collective ones. The data showed that outcomes were created in about one third of the cases, irrespective of context. However, many of these outcomes were created in a process in which not all community

members (community members and community members/facilitators) had a say or influence. In that sense, the variety in perspectives and the shared influence were limited. Therefore, many of the created outcomes cannot be regarded as collective ones.

There was a difference found between primary school and teacher education teams. In primary school teams teachers exercised influence more frequently than teacher educators did in teacher education teams. This finding can be explained by differences in the setting of both contexts. In many primary school teams, a researcher who was no member of the school team, facilitated the process, while in teacher education teams, the process was facilitated by a researcher who was also a teacher educator at the same institute. This allowed researchers in teacher education, more than those in primary school teams to put forward ideas and suggestions and exercise influence on the outcomes. In fact they were not merely researchers or facilitators who could keep aloof, they also had an interest in the outcomes of the process. In other words, unlike in primary school cases, the researchers in teacher education cases could be regarded as stakeholders. This specific characteristic explains why they took a prominent role in the process of knowledge creation in teacher education cases. The conclusion can be drawn that the context and the facilitator's position mattered for the process of collective learning.

Furthermore, the results indicated that in primary school classes, students did not put forward their perspectives and did not exercise influence as frequent as student teachers did. This result can be explained by the fact that taking student teachers perspectives into account is more or less institutionalized in teacher education in the Netherlands. Every year teacher education institutes are obliged to collect data on student satisfaction with regard to the education they get, as part of their quality policy. This does not apply to primary schools where a culture of exchanging perspectives on an equal basis with students in order to improve daily classroom practice on a systematic basis, is rather uncommon.

An other conclusion is that in primary schools teams community members (teachers and principals) put forward their perspectives and exercised influence more frequently than students did in classes. Students probably are more used to teachers playing a prominent role in the regulation of their learning process. In teacher education, this is the other way around. This finding can be explained by the more prominent role the facilitators take in teams and the fact that student teachers are used to evaluate the quality of the courses they take.

Apparently, exercising influence together is easier said than done. Whether looking at teams or classes, primary school or teacher education, the pattern was the same. Collective learning with people who have different interests appeared to be far from self-evident. Further research can provide more insights on why these processes are so difficult, which factors are important for improving the educational practice and how to stimulate combining perspective and influences in communities of learners in educational contexts.

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