

Author's accepted manuscript (postprint)

Unpacking capabilities for professional learning: teachers' reflections on processes of collaborative inquiry in situated teamwork

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Published in: Journal of Workplace Learning

DOI: 10.1108/JWL-01-2022-0008

Available online: 15 Jul 2022

Citation:

Lysberg, J. (2022), Unpacking capabilities for professional learning: teachers' reflections on processes of collaborative inquiry in situated teamwork. doi: 10.1080/17430437.2020.1840554

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This is an Accepted Manuscript of an article published by Emerald Publishing Limited in Journal of Workplace Learning on 15/07/2022, available online: <https://www.emerald.com/insight/content/doi/10.1108/JWL-01-2022-0008/full/html>



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Journal:	<i>Journal of Workplace Learning</i>
Manuscript ID	JWL-01-2022-0008.R1
Manuscript Type:	Research Paper
Keywords:	Situated teamwork, critical reflection, collaborative inquiry, professional learning

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Abstract

Purpose –The purpose of this study is to gain insight into and understand the authentic lived experience of the processes of collaborative inquiry in teamwork from the perspective of teachers.

Design/methodology/approach – Data comprises stimulated recall interviews (SRI) and semi-structured interviews. Seventeen teachers from four different teams in four schools form the empirical basis.

Findings – The analysis reveals that a shared focus on students' learning in teachers' processes of collaborative inquiry results in awareness and increased knowledge of what constitutes students' learning. Thus, teachers are potentially becoming better equipped to facilitate students' learning by offering them a richer set of learning opportunities. Findings confirm the key role of critical reflection through bringing teachers' assumptions about teaching and learning to the surface, available for common exploration. When exploring problems of practice and sharing ideas and suggestions for possible solutions, teacher teams operate in a collective zone of proximal development.

Practical implications – This analysis of teachers' reflections on the processes of collaborative inquiry supports school leaders and facilitators of school development by revealing fundamental and often hidden characteristics of teamwork collaboration.

Originality – Findings about teachers' professional learning through collaborative inquiry in teamwork enhance knowledge about how teachers learn in authentic settings, and unpack the capabilities of teachers to author their own pedagogical changes. The article thus challenges linear models of professional development and the idea of professional development as mainly delivery-based.

Keywords Professional learning, Situated teamwork, Critical reflection, Collaborative inquiry

Paper type Research paper

Introduction

Over the last decades, researchers have claimed the need for an epistemological change concerning traditional, delivery-based, professional development programs based on a structural view of knowledge (Dehlin and Irgens 2017, Pareja Roblin and Margalef 2013). Such programs for professional learning and development have proven to have little or no impact on teachers' practices due to their fragmented nature and the lack of connection to problems experienced by teachers in their classrooms (Darling-Hammond et al. 2017, Webster-Wright 2009). As a result of the prevailing perspective, previous research into the content of teachers' learning has predominantly focused on what teachers should learn, not on what teachers acknowledge that they need to learn, or how they learn (Webster-Wright 2009, Opfer and Pedder 2011, Czerniawski 2013, Admiraal et al. 2016). Demand for a more interactive approach to teachers' learning has emerged, where professional learning is school-based and integrated into teachers' everyday work (Adams and Mann 2020). Alternative

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3 approaches to professional learning acknowledge that teacher learning is a complex,
4 dynamic, situated, and dialogic process (Cochran-Smith and Lytle 2009, Putnam and Borko
5 2000, Lieberman and Pointer Mace 2009). One such approach concerns research into
6 teachers' collaborative inquiry, i.e. when teachers collectively critically question and explore
7 issues related to their practice (Pareja Roblin and Margalef 2013, Horn and Kane 2015,
8 Nelson et al. 2008). There is need for expanding teachers' views and perspectives on how
9 they learn, and examining how they experience collaborative inquiry in situated teamwork
10 (Hargreaves 2019). To develop knowledge of how teachers conceive of and constitute
11 teamwork as an arena for professional learning, a situated inquiry is necessary (Webster-
12 Wright 2009, Little 2012).

20 Research into teachers' collaboration reveals challenges that appear to not promote
21 professional learning. Collaboration can give rise to teacher cultures that involve group-think,
22 with too much homogeneity and agreement, which may prevent innovation and adaptability
23 (Vangrieken et al. 2015). Other studies portray group interactions with little likelihood of
24 promoting change, although the interactions may serve other purposes that teachers value.
25 Teachers may meet to discuss teaching or share narratives about their teaching practices, but
26 rarely challenge each other's ideas or analyze practice (Little 1990). Instead, they describe
27 events, support each other, and normalize problems of practice (Havnes 2009, Kvam 2018,
28 Little and Horn 2007). Katz *et al.* (2009) present a phenomenon called 'activity traps,' where
29 teachers move quickly to doing, being busy, feeling productive, without paying sufficient
30 attention to discussing why they should do things under the current circumstances.

39 In a study of primary school teachers, Kvam (2018) finds that there is potential to
40 improve teachers' learning through their conversations, but results show that this potential is
41 not realised. Kvam (2018) states that realising the potential requires teachers to move towards
42 a fellowship of inquiry, or towards exploratory talk. Horn and Little (2010) examined
43 conversations in two groups of teachers committed to improving practice and valuing student
44 learning. Despite having similar goals, one group consistently spent substantial time sharing
45 pedagogical problems, focussing on details of practice. The other group, however, steered
46 away from such issues, towards more concrete (and institutionally valued) tasks such as co-
47 planning lessons. These different approaches highlight different epistemic stances. The
48 former enacts a view that teaching problems are worthy of attention and potentially soluble,
49 while the latter focuses on the primacy of lesson planning regardless of the kinds of trouble
50 teachers face in their classrooms (Horn 2013).

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3 Recent research by Shavard (2021) examines three collaborative contexts and
4 discusses how and why different ways of structuring the contexts by way of problem-framing
5 influenced professional development. The findings revealed that the context intended for
6 school improvement offered only incidental opportunities for teachers to engage in problem-
7 framing. Contrastingly, teachers' work with student cases involved broader opportunities for
8 explorative problem-framing. The analysis emphasises the role of question-framing when
9 structuring teachers' collaborative work. In another recent study, Tronsmo (2020)
10 investigated what teachers' collaboration looks like when it is at its best. Tronsmo found that
11 when successful, the teaching team took great responsibility for the development work and
12 were active contributors and initiators in the networks they collaborated with. The study's
13 findings emphasize that productive collaborative processes allow teachers' decision-making,
14 try new things and ask questions about their existing practice (Tronsmo 2020).
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24 Building on and expanding previous work about teacher teams' collaboration and its
25 potential contribution to teacher learning, the current article analyses teachers' reflections on
26 processes of collaborative inquiry in teamwork, as experienced by lower-secondary school
27 teachers. The study illustrates how teachers experience collaborative inquiry in teamwork,
28 providing insights into the processes that support this collective endeavour. It sheds light on
29 the opportunities collaborative inquiry processes provide to improve teachers' teaching and
30 learning. Thus, the article seeks to contribute to the understanding of teachers' experiences of
31 collaborative inquiry in situated teamwork through unpacking the capabilities for professional
32 learning, leading to the following research questions: How do teachers reflect on processes of
33 collaborative inquiry in situated teamwork? What capabilities for professional learning are
34 unpacked through teachers' reflections?
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43 First, the analytical perspectives used when analysing teachers' reflections on the
44 collaborative inquiry processes are presented. Second, the methodological approach used in
45 the study is described, and finally the findings are presented and discussed.
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50 **Theoretical framework - analytical perspectives**

51 The current study is rooted in constructivist and sociocultural learning theory, and
52 Vygotskij's (1978) theory and conception of the zone of proximal development (ZPD) and
53 the social construction of knowledge. Listening to professional teachers' reflections on
54 processes of collaborative inquiry provides an understanding of how learning processes may
55 occur in teamwork. This contributes to one way of understanding how teacher teams, as a
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3 sociocultural system, render a collective ZPD that sets the stage for future learning
4 (Engeström 1987). Teamwork interactions can delineate learning possibilities for participants
5 (Horn and Kane 2015). Alternatively, participants sometimes expand their sense of what is
6 possible, something Engeström (1987) and Wells (1996) have characterized as expanding the
7 collective ZPD. Wells (1996) offers an expanded definition of ZPD that connects the notion
8 of learning to the social aspect. An expanded ZPD applies to any situation where individuals
9 are engaged in learning a new concept or practice. ZPD is a characteristic of the interaction
10 between participants who are jointly engaged in a learning activity. Most importantly, there is
11 no need for "more skilled peers" for expanded ZPD, since each participant contributes
12 different socio-culturally developed understandings to the collective learning process. Thus,
13 the potential for collective development is limited only when the diversity of individuals and
14 interaction with other groups is limited (Kilgore 1999). The work of Lave and Wenger (1991)
15 about situated learning also informs this study. Theorists with a situated perspective
16 conceptualize learning as changes in participation in socially organized activities and
17 individuals' use of knowledge as an aspect of their participation in social practices (Lave and
18 Wenger, 1991). A local perspective on teachers' learning sheds light on the fact that teachers'
19 everyday thinking and actions are intertwined with the current context in which they work
20 (Putnam and Borko 2000).

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22 The current study combines two analytical perspectives: Critical reflection and
23 collaborative inquiry. When employing collaborative inquiry, teachers are given the
24 opportunity to revise, challenge and transform their teaching practices (Lieberman and
25 Pointer Mace 2009), and the current paper investigates this in the context of teachers'
26 problem-solving during teamwork.

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28 Dewey (1933) describes the *Theory of inquiry* in five steps, where the first step is
29 based on an existing situation, to identify a felt problem, a question, a challenge, or a crisis,
30 which is subject to further investigation. The second step is the location of "the problem to be
31 solved.". The task grows out of a current situation, and it is defined as a problem. The third
32 step comprises suggestions for possible solutions. When we define the problem, by
33 formulating it as objectively as possible, we get a better idea of how it can be solved. In the
34 fourth step, reasoning is developed to test the idea or hypothesis and its probable value as a
35 proposal for solution. Lines of reasoning that emerge through logic depend on the knowledge
36 that the individuals' consciousness already possesses. According to Dewey (1933), this
37 depends not only on the previous experience and the education of the individual conducting
38 the inquiry, but also on the current cultural and scientific conditions. Ideas must finally be
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3 tested against observed facts, and this happens in the fifth step, where a test is performed that
4 allows for acceptance or rejection of an idea. Dewey emphasizes that the order of the phases
5 is not determined, and it may be necessary to extend one phase.
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Critical reflection is the sustained and intentional process of identifying and checking the accuracy and validity of our teaching assumptions (Brookfield 2017). In her framework for critical reflection, Liu (2015) synthesizes researchers' and educators' earlier work and points out two important factors that contribute to critical reflection. Firstly, the cognitive *process* of analysing, questioning, challenging, critiquing, and acting upon the reflective insights. Related to Dewey (1933), this is a habit of critical examination and inquiry. Secondly, the *content* is being analysed, questioned, and critiqued (Liu 2015).

When teachers collaborate through teamwork, this could be viewed as *collaborative* inquiry, in line with Dewey's model referred above (1933). Collaborative inquiry implies an attitude towards 'knowledge negotiations' (Nelson et al. 2008) among the group members. Through dialogue based on shared experiences and a common focus, group members ask questions about ideas, actions, and objects (Authors, under review). The members examine varying perspectives and beliefs and work towards building a shared understanding of the focus in their collaborative work (Nelson et al. 2008). There is no claim that a group's collaborative inquiry is constant and unchangeable, or that all members are fully committed to, or impact, the teamwork in similar ways. The current study unpacks the capabilities for professional learning through studying teachers' reflections on processes of collaborative inquiry in situated teamwork.

Methods

Context of the study and participating teachers

Teacher collaboration has been a central part of Norwegian teachers' work since the National curriculum of 1987. Related to the new curriculum, a new working time agreement laid down conditions for teachers to collaborate by tying time to the workplace (Nicolaisen et al. 2006). In national regulations, expectations regarding teacher collaboration are formulated (Dahl et al. 2016). The school leader's responsibility is to organize teacher collaboration at the individual school. Formal collaboration occurs within the teachers' fixed working hours, with joint time for all teachers, and teamwork for teachers at the same grade level. In some large schools, time is also arranged for subject teams (Dahl et al. 2016).

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3 The current paper comprises data from four teacher teams in 9th and 10th grade from four
4 different lower-secondary schools in Norway. Participating teacher teams were identified
5 using an internal sampling approach (Silverman 2014), resulting in a selection of 17 teachers.
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11 -Table 1: Overview of participating teachers-
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15 Fourteen of the teachers were female and three were male. Two of the teachers had been
16 teaching for over 20 years, ten had 10–19 years of teaching experience, while four had 2–9
17 years of experience, and one teacher was newly qualified. They were all well-established
18 teams, but individual members have gone in or out based on teaching responsibilities and
19 organizational priorities. This selective choice of participants is called «purposive sampling»
20 whereby participants are chosen based on some topic of interest or criteria (Silverman 2014).
21 Together, we mapped what they defined as meetings dedicated to professional development,
22 excluding meetings focusing mainly on logistical planning. The informants were deliberately
23 chosen from schools with experience from school-based professional development (SBPD)
24 and were all qualified teachers. Although the schools were categorized as organizations with
25 experience from SBPD, they all differed concerning collective ambitions and ways of
26 organizing teamwork. Consequently, a more precise definition, inspired by Ohlsson (2013),
27 concerns a teacher team as a relatively self-managing group of teachers responsible for
28 teaching subject matters (same or different) and, as team members, are interdependently
29 responsible for a group of students.
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41 *Research approach*
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43 The study strives to investigate teachers' understanding of the potential for learning in team
44 collaboration. The focus is on how teachers reflect on processes of collaborative inquiry in
45 situated teamwork. To focus on this phenomenon, this study employed a method that
46 provided in-depth insights into teachers' views, perceptions, and reflections of the processes
47 of collaborative inquiry. Data was collected using stimulated recall interviews (SRI), and
48 semi-structured interviews (SSI) with 17 teachers, resulting in a total of 34 interviews. SRI
49 makes use of selected video sequences from teamwork sessions to support reflection and
50 dialogue between informant and researcher. SRI makes it possible to get close to concrete
51 collaboration practices and enables insight into the context and the specific situations and
52 thereby contributes to getting rich empirical data (Pomerantz 2005). Stimulating reflections
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3 with the support of video initiates recall of thoughts from the situation and links participants'
4 associations to a broader picture (Nind 2016). Included in video-stimulated interview,
5 teachers were asked to articulate what they consider to be contributions to their professional
6 learning. The teachers were asked questions such as: what happens in these meetings
7 (teamwork), does that have an impact on a) your subject teaching and development of your
8 teaching practice, c) your students' learning and development, d) yourself as a teacher and
9 your learning? A while later, semi-structured interviews (SSI) were conducted to collect data
10 related to the teachers' description and reasoning of what contributes to their professional
11 learning generally (Brinkmann and Kvale 2015). Choosing two complementary interview
12 approaches provides differing insights into the phenomenon: While the SSI gathers
13 information about a wide range of topics, including how the SBPD is organized and a general
14 and open entrance into what contributes to professional learning, the SRI is concerned
15 exclusively with selected video sequences from teachers' collaboration in teamwork and their
16 reflections regarding what goes on in the team meetings.

27 28 *Ethical considerations*

29 From a research perspective, efforts were made to treat teachers as experts of their own
30 thoughts, reflections, and learning (Meier and Vogt 2015). The Norwegian Centre for
31 Research Data (NSD) approved the research project. The interviewees gave their consent to
32 participate, after being given oral and written information about the study. They were
33 informed that participation in the study was voluntary and that they could withdraw at any
34 time. When reporting the data, participants are given letters (school) and numbers
35 (teacher) to enable de-identification.

44 **Data analysis**

45 *Teachers' reflections on the processes of collaborative inquiry in situated teamwork*

46 Initially, audio recordings were transcribed into text, and an open approach to the data
47 was applied. Efforts were taken to avoid preconceived notions, and to let the
48 research questions lead the way as far as possible. Transcripts were studied to determine how
49 teachers' reflections on the processes of collaborative inquiry appeared in the data and
50 what aspects they focussed. The analysis was inductive, based on how participants reflect,
51 and is not a categorization and coding of the material into pre-selected topics or categories
52 (Derry et al. 2010, Heath and Hindmarsh 2002). The analysis was done by way of two main
53 stages. Firstly, the analysis consisted of sorting text, coding, and identifying categories in the
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3 data. The purpose was data reduction (Miles and Huberman 1994). When organizing specific
4 codes into categories, distinctions consistent with the research questions were identified.
5 Interview data were coded, first by open coding, to identify codes specific to the smaller sets
6 of data (Silverman 2014). Secondly, open coding was accompanied by questions about how
7 teachers express their stimuli for professional learning in teamwork. Examples of codes
8 related to *what* the teachers describe as stimuli for professional learning are 'critical
9 reflection,' 'joint planning,' and 'experiences; knowledge about students and teaching (Figure
10 1).' Examples of codes on *how* the described stimuli for professional learning influence their
11 teaching and learning are 'safety regarding own role' and 'exploring students' learning.'
12 Through the constant comparison method codes are refined and overarching themes are
13 developed across the entire sample to help conclude the findings (Postholm and Jacobsen
14 2018). This analysis is inspired by what Brinkmann and Kvale (2015) refer to as meaning
15 categorization. A sample of teachers' descriptions of stimuli for professional learning, and
16 how the described stimuli influence their teaching and learning, is presented in the findings
17 section below. As mentioned above, the empirical data stems from 17 teachers from four
18 teacher teams. Team membership is identified with letters A-D and numbers from 1-5, e.g.,
19 "B1" means teacher one from team B. Abbreviations mark which of the two different
20 interview forms, stimulated recall interviews (SRI) and semi-structured interviews (SSI), data
21 stem from.
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38 Findings

39 Below, findings related to the research questions are presented in Figure 1. On the left side,
40 examples from teachers' reflections on collaborative inquiry processes and 'what' and 'how'
41 they consider these as stimuli for their professional learning, are presented. On the right,
42 when teachers explain and reflect on how these processes impact their teaching and learning,
43 and students' learning, they provide descriptions of improvement and change.
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49 -Figure 1: Teachers' reflections of collaborative inquiry in teamwork-

50 51 52 *Collaborative inquiry - teachers view on stimuli for professional learning*

53 Teachers describe that *joint planning, exploration and evaluation of teaching*, and thereby
54 focus on *students' learning*, is the main content of their teamwork. Together, the teachers
55 *make decisions* about core components in teaching; the content, choice of tasks, methods,
56 learning activities and assessment. In teamwork they put into play knowledge about *students'*
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3 *basic skills, learning* and *data* from diverse tests (Authors, under review). When explaining
4 the ‘what’ and ‘how’ in their processes of collaborative inquiry, teachers describe that
5 collaboration *opens up* and makes them see more sides of, and ways to conduct, teaching.
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8 Teachers describe that they, through joint planning, exploration, and evaluation of
9 teaching, identify and define problems to be solved, related to the two first steps in Dewey's
10 theory of inquiry. The teachers claim that *input from colleagues, explaining* thoughts and
11 arguments, affect the content of the lessons. ‘*Different ideas* are brought in, and we *reject*
12 ideas, get good points’ (C4). Findings regarding what teachers view as stimuli for
13 professional learning, contain ‘*examining* own and other teachers’ existing teaching
14 practices’ (D1) as a central aspect of their collaboration in teamwork. Through their
15 descriptions of the processes of collaborative inquiry, teachers unpack capabilities for
16 professional learning. They describe teamwork as ‘a meeting where they *evaluate* what
17 worked well, what did not work well, and why?’ (D1), and as a place where they are *actively*
18 *seeking new information* and *examining* own and others’ teaching practices:
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28 R: You mentioned other teachers, collaboration with other teachers, does it help to...?

29 A3: Yes, I think so fifty-fifty there that you can get practice assessing yourself and your own
30 practice. However, just as much also the fact that you actually evaluate, because you evaluate
31 yourself together with others. However, then you get to participate in evaluating others or see
32 others’ (perspectives) and that you can talk about it. So just as important these two things, I
33 think (SSI).
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36 Teacher D2 mentions that you must *defend* and *argue* if you propose changes:
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38 D2: We must discuss, and if you think that something (a suggestion) is good, you have to
39 defend why you think it is good. And then, you can ask questions about what the others say
40 works or does not work (SSI).
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42 Here, teachers describe that in teamwork they examine and explore ideas and proposals
43 through reflecting, explaining, and arguing. They question and actively seek new knowledge
44 in ways that open up for new considerations and possibilities when they explore problems. If
45 you present an idea or proposal, you must *argue and explain* why it is worth accepting.
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47 Dewey's third and fourth steps frame the findings. The third step consists of suggestions for
48 possible solutions. The fourth step of reasoning is developed to test the idea and potential
49 value as proposal for a solution. Parallels to these steps are Liu's factors of critical reflection,
50 related to analysing, questioning, challenging, critiquing, and acting upon the insights gained
51 through the examination. Teachers report that they learn from their *own and other teachers’*
52 *knowledge and experience about students and about teaching*. And, if a teacher presents an
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3 idea or proposal, he/she must *argue and explain* why it is worth accepting. *Responses and*
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5 *reactions from the students on their lessons* are also elements they highlight:
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8 C4: We are quite open when something [in the lessons] has not gone well. Right, you also
9 learn from that. If we see that, oh no, now we must find another strategy because this lesson is
10 so dull, they [the students] fall asleep in the lessons. (...) We have the same annual plan to
11 pursue, and we are so coherent and agree that we run very similar schemes. (...) It is very safe
12 to have such close and tight collaboration (SRI).
13

14 As described by Teacher C4, the teachers practice a close dialogue and *openness* about
15 teaching that was unsuccessful. When they work closely together and *coordinate* their
16 teaching, they can, both in their formal and informal dialogue, discover things about the
17 jointly planned teaching that did not work well. In the example above, one of the teachers
18 experienced that their joint lesson planning did not engage their students. Here, the light is on
19 new problems related to teachers' joint planning of teaching. This could be the start of a new
20 process of collaborative inquiry, starting with a felt difficulty. Below, Teacher D2 also
21 reflects on *transparency and openness* in their teamwork:
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28 D2: If we do something [in the lessons] that works very well, we like to talk to each other
29 about it. However, at the same time, if we come back from teaching and it has gone really
30 bad, then we also tell it (...), we smile a little then, and then we get to discuss a little why it
31 was like that. I think we have, regardless of subject, i.e., the whole team that we can go in and
32 say that this did not work, and then we can think a little about why it did not work. Yes, I
33 definitely think we get better from each other. To sit and plan alone, because you do not see
34 when you sit planning such a task, you get like tunnel vision, and then it is essential that
35 someone comes in and opens so that you can see more perspectives. And we do that for each
36 other (SRI).
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39 This shows teachers' perceptions of what they consider stimulate their professional learning
40 in these processes. They emphasize (Figure 1) that through joint planning, exploration, and
41 evaluation of teaching, they benefit from the knowledge of the group. They describe how
42 they examine their own and others' teaching practices in teamwork. Getting and giving ideas,
43 examining and exploring ideas through reflecting, explaining, and arguing, questioning and
44 actively seeking new knowledge are crucial elements in their collaborative inquiry. They
45 expand their sense of what is possible, which could be characterized as expanding the
46 collective ZPD. These reflections express an understanding of their own professional
47 learning. They put into words a meta-reflection about what about these processes they
48 consider essential. It also reveals that through their collaborative inquiry they can reflect
49 critically by analysing, questioning, and criticizing the content by challenging their
50 assumptions about teaching and learning in the classroom. The teachers also describe striving
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for transparency and openness for things that did not go well in these processes, which could form a starting point for new inquiry processes.

Teachers' descriptions of the impact from processes of collaborative inquiry

In teachers' explanation of how processes of collaborative inquiry in teamwork influence their teaching and learning, and students' learning, they provide descriptions of improvement and change (Figure 1). Teachers describe the main content of their teamwork as joint planning, exploration, and evaluation of teaching, focusing on students' learning.

Collaborative inquiry - impact on teaching and students' learning

Teachers mention that their teaching is *better prepared* because of the focus on students' learning in their collaboration. Together, they develop a *common foundation* for their teaching when planning the teaching together. Teacher C4 describes that their teaching becomes *creative* and *funny*, and that they manage to *motivate* their students:

C4: I think that because we are four heads who think together, we manage to make the teaching more creative and fun. Moreover, it also makes me a little more confident and almost a little prouder, or what can I say, that I manage to motivate the students more. So, it is clear that it affects the students (SRI).

When the content of teamwork is centred around teaching with a focus on *students' learning*, teachers comment and reflect on how collaborative inquiry in teamwork influence students' learning indirectly, through teachers' *awareness* and *increased knowledge of what constitutes learning*.

B3: You become aware of how many things lay the ground for learning (...). For example, if a student has challenges in one subject, you can hear that in another subject, they get it done (...) And then I can think: «Is there something I can do for this student to make it work in my subject as well?», or I can feel that then I am not the one who makes mistakes or maybe we can do something together and how we will solve this to help that student. When planning the lessons and after the lessons, you reflect: Why did not the student get what I presented on the board? (SRI)

When questioned about what they mostly collaborate about, Teacher B2 states:

B2: The students. Definitely. It's about the students all the time, and when we look back on this year, look at the relationships with the students. It's all about the students. That's what it's all about. (...) Students' learning, development, and challenges. (...) We are constantly looking for what affects the students. We must get hold of that and do something to get the best out of the students (SRI).

Teacher B2 explains that their collaboration centres around their *students* and their *learning, development, and challenges*. In their teamwork, they *explore* what *affects* their students because, as teachers, they are responsible for finding adapted tasks for their students,

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3 to *bring out their potential*. Teacher B1's utterance confirms that they see their students in a
4 more *nuanced* and *detailed* way through collaboration in teamwork: "I feel that we see the
5 students better, more nuanced, or more detailed if you can use that word" (B1, SRI).
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8 These findings indicate that through a shared focus on students' learning in
9 collaborative inquiry in teamwork, teachers experience greater *awareness* and *increased*
10 *knowledge of what constitutes students' learning*. Teachers describe how they, through their
11 collaborative inquiry, use the wisdom of the group and together explore what affects their
12 students, and then become better equipped to facilitate students' learning and create rich
13 learning environments. These findings give insight into the "how" and offers descriptions of
14 improvement and change. Critical reflection enables teachers to expose and make explicit
15 their assumptions about teaching and learning. Through a focus on students' learning in the
16 collaboration, they gain access to each other's experiences and knowledge of the students'
17 learning, which can be related to Vygotskij's ZPD when they function as each other's more
18 competent others.
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28 *Collaborative inquiry - impact on teachers' learning*

29 In the interviews, teachers highlight personal and emotional aspects of their learning and
30 development. The analysis shows how teachers, across the four teams, experience that
31 collaboration contributes to *confidence* in their role as teachers. They describe that
32 collaboration contributes to how they teach and get *well prepared*, leading to a feeling
33 of *mastery*. The teachers describe why and how they experience *safety*:
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40 C2: (...) The engagement in the lessons that I get in there [classroom] and... yes, I know what
41 to say and what to do, and I know that the others [teachers] support it and that it happens. It is
42 kind of like, safety. (...) You get a feeling of mastering something and getting to know where
43 to go. And then we have different strengths. I am not very structured in my head. I am very
44 impulsive and come up with many things, and then some others put it in a system and a third
45 who designs and remembers to get it. That is why it is nice to see each other's strengths (SSI).
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48 Teacher C2 above states that their collaboration contributes to *safety* and *engagement* in the
49 lessons. Some of the teachers mentioned that they *feel significant* and *proud*, *receive*
50 *recognition*, and get *responsibility*, and that the collaboration contributes to '*standing steady*'
51 *in the subject*. Teacher C2 also mentioned that their *different strengths* are positive for their
52 collaboration. Others mentioned how support from the other teachers made them *better*
53 *equipped* to deal with and support students with social or behavioural challenges.
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3 A1: When reading strategies are addressed as a topic [in teamwork], you become more aware
4 of how other teachers think about reading strategies in different subjects. Then you can come
5 up with thoughts that you have had before but forgotten and therefore go into habits that you
6 did not have before. In other words, being a teacher, I realized after a few years, is a dynamic
7 profession where you must be willing to change according to what is happening. Various tests
8 and various focus areas, either locally or centrally, can be helpful. I think trying to do things
9 differently or focusing on new areas is good for me.
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12 In the excerpt above, teacher A1 reflects that when they in teamwork have a *shared focus* on
13 reading strategies this leads to *awareness* of how other teachers think about reading strategies
14 in different subjects and how they relate it to students' learning. Teacher A1 describes that
15 these processes lead to awareness of earlier thoughts which could challenge today's habits.
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20 Teacher A1s reflects that the teaching profession is a dynamic profession requiring one to be
21 willing to change teaching strategies related to focus areas.
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24 B2: It's not fun if there is success in everything we try, there must be a chance of failure. It's
25 exciting, and it makes me want to work here [at school], it makes (...) yes, that I like my job. I
26 do that, and I think it affects the students and that I become stronger, academically, in other
27 things [literacy] than mathematics and science, it affects my job. We [the team] try to work on
28 making use of each other's knowledge as well, and I think that's fine.
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32 Teacher B2 gives insight into how focus areas (e.g., literacy) for school development affect
33 teachers' learning and teaching and affect students' learning. Through their teamwork, they
34 exploit the fact that they possess different knowledge and can learn from each other. Below,
35 teacher D2 explains what the process of collaborative inquiry could look like and how they,
36 in teamwork, move from an idea to describing how they, through collaboration, can develop
37 and explore the idea:
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43 D2: A new lesson planning often starts with an idea. And then you must have someone to play
44 on before it becomes something. And if you are then entirely alone, then it is not sure that the
45 idea will come anyway. So, I think that's where the development lies, that when we start with
46 a thought, we help each other to make it bigger, and then it becomes something in the end.
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50 This description can be related to phase three in Dewey's theory of inquiry, where a guiding
51 idea or hypothesis emerges. By defining the difficulty or problem as objectively as possible,
52 you better understand what kind of solution is needed. These data make you aware of the
53 problem, and insight into the situation allows you to correct, modify and expand the original
54 idea. Both utterances for teachers B2 and D2 above could be related to extended ZPD, where
55 teachers reflect that they are jointly engaged in learning a new concept or practice through
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3 teamwork. The findings support the interpretation that each teacher has different socio-
4 culturally developed perspectives and understandings to contribute to the collective learning
5 process.
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9 These responses indicate (Figure 1) that teachers, in their explanations of how they
10 through collaborative inquiry claim that developing a well-prepared common foundation for
11 their teaching, leads to creative, funny, and motivating lessons. Regarding processes of
12 collaborative inquiry's influence on *students' learning*, the teachers experience a
13 greater awareness and increased knowledge of what constitutes students' learning, thus
14 becoming better equipped to facilitate students' learning. Through these processes teachers
15 claim that teaching is well prepared, and they describe that they experience mastery,
16 engagement, pride, and safety.
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23 24 **Discussion**

25 The aim of this study is to gain insight into and seek to understand the authentic lived
26 experience of the processes of collaborative inquiry in teamwork from the perspective of
27 teachers themselves. The analysis contributes to understanding how professional learning is
28 constituted in teachers' teamwork. The current article unpacks capabilities for professional
29 learning through listening to teachers' reflections of processes and situations where they
30 experience that they have learned (Shulman and Shulman 2004, Webster-Wright 2009).
31 These insights into teachers' authentic lived experiences contribute to a nuanced
32 understanding that challenges the prevailing epistemology of teachers' professional learning,
33 focused on what teachers should or need to learn, not on what teachers acknowledge that they
34 need to learn, or how they learn (Webster-Wright 2009, Opfer and Pedder 2011, Czerniawski
35 2013, Admiraal et al. 2016). Encouraging teachers to articulate their professional learning
36 and share the reasoning that informs their collaboration inquiry processes, is crucial to
37 understanding how teamwork enhances teaching and students' learning, and teachers'
38 professional learning.
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50 The analysis reveals that a shared focus on students' learning in processes of
51 collaborative inquiry in teamwork results in greater awareness and increased knowledge of
52 what constitutes students' learning. Thus, teachers become better equipped to facilitate
53 students' learning through offering them a rich set of learning opportunities and rich learning
54 environments. These findings underline the key role of critical reflection in teamwork by
55 bringing teachers' assumptions about teaching and learning to the surface, available for
56 common exploration (Liu 2015). Teachers describe that collaborative inquiry processes in
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3 teamwork influence students' learning indirectly, by teachers' awareness and increased
4 knowledge of what constitutes learning. When exploring problems of practice and sharing
5 ideas and suggestions for possible solutions, teacher teams operate in a collective zone of
6 proximal development (Engeström 1987, Dewey 1933). In the current study, teachers
7 describe that through critical reflection in their collaboration they gain access to each others'
8 experiences, ideas and knowledge about the students' learning, which can be related to
9 expanded ZPD (Engeström 1987, Vygotskij 1978, Wells 1996).

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15 Results from this study contrast former research (Havnes 2009, Katz et al. 2009,
16 Horn and Little 2010, Scribner et al. 2007, Kvam 2018) where teacher teams tended not to
17 engage in conversations that questioned their established practices. Moving teamwork from
18 being limited to describing existing practices and supporting and normalizing the chain of
19 events (Havnes, 2009, Kvam, 2018, Little, 1990), we need this type of insight from the
20 teachers' point of view. If the goal is professional learning, teamwork must go beyond
21 "activity traps" (Katz et al. 2009) and avoid being limited to "tips and tricks" (Horn et al.
22 2017). The analysis in this study revealed that examining their own and other teachers'
23 existing teaching practice is a central aspect of their collaboration in teamwork. Through
24 processes of collaborative inquiry and critical reflection, teachers bring their basic
25 assumptions of teaching and learning to the surface and make them available for joint
26 exploration (Dewey 1933, Liu 2015).

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36 Teachers' joint planning leads to a coordinated and common foundation for teaching,
37 potentially offering students a more creative, funny, motivating learning environment and a
38 richer set of learning opportunities. Simultaneously, greater awareness and increased
39 knowledge of what constitutes students' learning helps teachers facilitate students' learning.
40 By preparing teaching well, teachers claim that they experience mastery, engagement, pride,
41 and safety and become more confident in their role as teachers.

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The teachers question and actively seek new knowledge in ways that open new
considerations and possibilities when they explore problems in teamwork. If you present an
idea or proposal, you must argue and explain why it is worth accepting. These findings could
relate to Dewey's third and fourth steps of reflective thinking (Dewey 1933). The third step
comprises suggestions for possible solutions. The fourth step of reasoning is developed to test
the idea and potential value as a proposal for a solution. Liu's factors of critical reflection are
central in all the steps and deal with analysing, questioning, challenging, critiquing, and
acting upon the insights gained through the examination (Liu 2015).

The current study contributes with new knowledge in the epistemological shift in the

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3 understanding of professional learning that acknowledges teachers as knowledge creators,
4 equipped with the means to reflect on and renew their own practices (Webster-Wright 2009,
5 Paavola and Hakkarainen 2005, Appova and Arbaugh 2018, Helstad and Lund 2012).

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8 Analysis reveals that examining own and other teachers' existing teaching practices is a
9 central aspect of their collaboration in teamwork. The article thus contributes to challenging
10 linear models and the idea of professional development as mainly delivery-based, and
11 underlines the importance of professional learning experiences that involve teachers in
12 authoring their own pedagogical changes. This embraces a dialectic epistemology that sees
13 knowledge as arising from a contested interaction among a community of inquiries rather
14 than from a single source of expertise. Professional learning materializes among teachers as
15 they are collectively engaged (Raelin 2015, Wells 1996). Findings emphasize not only the
16 contributions of the individuals in terms of cognitive experience (i.e., what they know and
17 through which they experience), and the interests and intentions that shape that experience.
18 How experiences of processes of professional learning in teamwork are conceptualized, is
19 central to gaining insight into how learning experiences are thought about, designed, enacted,
20 and appraised (Billett 2009). The findings may also be relevant for collaboration in other
21 professions and settings.
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32 A possible reason for this study's results can relate to the methodological approach
33 used. Using SRI, exploiting selected video sequences from teamwork sessions to get close to
34 practice while supporting teachers' opportunities to recall what happened in the meeting, and
35 through that stimulating reflection, proved fruitful for gaining teachers' perspective. Another
36 possible reason why these results challenge previous studies may be that inservice training
37 for leaders and teachers has raised awareness and expectations of learning through
38 collaboration. Data in this study concerned a purposive sampling of teacher teams with
39 experience from SBPD. Self-reporting of teachers might reflect teacher satisfaction and runs
40 the risk of social bias. Data collection is limited to a situational picture as the study does not
41 follow teachers' professional learning over time. In further research, it could be interesting to
42 follow teachers over a longer period, alternating between team meetings and teaching.
43 Potential gaps regarding knowledge about relations between the teams' proposals for change
44 and individual teachers' interpretations and performances still exist. Forthcoming studies on
45 processes of professional learning in situated teamwork should consider and further clarify
46 these complex relations.
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This analysis of teachers' reflections on processes of collaborative inquiry is valuable, providing a detailed tool for empirical analysis of professional learning in the context of teamwork. Additionally, it supports school leaders and facilitators of school development by revealing fundamental and often hidden characteristics of collaboration in teamwork and its potential for teachers' professional learning.

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School (letter) Teacher (number)	Age	Gender	Years of professional experience	School (letter) Teacher (number)	Age	Gender	Years of professional experience
A1	39	M	10	C1	26	M	0,5
A2	36	F	8	C2	44	F	18
A3	35	F	11	C3	42	F	17
A4	45	F	20	C4	44	F	18
B1	35	F	10	D1	36	F	10
B2	52	F	25	D2	37	F	8
B3	43	F	18	D3	28	F	2
B4	38	M	14	D4	32	F	8
B5	45	F	18				

-Table 1: Overview of participating teachers-

Collaborative inquiry	Impact on
<p>“What”: Joint planning, exploration and evaluation of teaching: examining own and each other’s teaching practice sharing and benefit from each other’s knowledge</p>	<p>Teaching Coordinated, common foundation for teaching well prepared creative fun motivating</p>
<p>“How”: Examining and exploring: Actively seeking new knowledge Knowledge negotiation: Reflecting explaining and arguing questioning ideas and proposals Decision-making</p>	<p>Students’ learning Exploring awareness of what constitute and affect students learning Adapted/differentiated tasks for students learning bring out students’ potential</p>
<p>Transparency and openness</p>	<p>Teachers’ learning safety, pride, mastery ‘Stands stable’ in the subject feels significant, gain recognition and responsibility didactics, handle challenges students meet</p>

-Figure 1: Teachers’ reflections of collaborative inquiry in teamwork-