Editorial
Forms of Collaboration in Writing

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Abstract: This paper introduces a special issue on forms of collaboration in writing. The four contributions in the issue present a range of perspectives on collaborating to produce and construct text. The studies are outcome-driven and/or process-oriented and use a range of research methodologies. Taken together, the papers in the issue confirm the complexity of collaboration in writing and show that many questions remain and much more research is needed. However, the papers also illustrate that the future research focus in collaborative writing might focus on the interactions of variables on the individual, collaborative and contextual level that count rather than the variables separately. Only an all-encompassing picture of the complex interplay between the different variables may allow us to grasp and exploit the full potential of collaborative writing both as an instructional or working method and as a research methodology.

Keywords: collaborative writing, forms of collaboration in writing

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1. Introduction

An increasingly growing body of research has been published on collaboration during writing, ranging from peer feedback to computer-supported and face-to-face collaborative writing, both in the field of learning-to-write and in the field of writing-to-learn (a language, content in an academic domain). Qualitative and quantitative studies have been conducted on writers collaborating to produce text: some compare individual writing with collaborative writing, others analyze group interaction and dynamics, still others test instructional methods for collaborative writing. Dependent variables can range from process (e.g., types of talk, language-related episodes in pair dialogue) to product outcomes such as text quality.

In these studies collaborative writing is studied from various theoretical frameworks (e.g., sociocultural theory, cognitive psychology) and with various qualitative and quantitative research methodologies ranging from a microgenetic approach to multilevel analyses.

The majority of the studies have shown the beneficial effects of learning to write (Yarrow & Topping, 2001) and writing to learn (philosophical concepts in Corcelles & Castelló, 2015; a second language in Storch, 2005) collaboratively, that is, collaboration during the writing process helps learners to emulate and learn from each other's writing and regulation processes (Corcelles & Castelló, 2015; Villamil & De Guerrero, 1996), encourages critical reflection, the pooling of resources (MacArthur, Schwartz, & Graham, 1991; Stoddard & MacArthur, 1990) and a heightened sense of audience awareness (Boscolo & Ascorti, 2004) and as a result, is believed to have a positive effect on individual writing as in for example the production of better (more accurate) text (Dobao, 2012; Storch, 2005; Yarrow & Topping, 2001).

Collaborative writing, if implemented according to the state-of-the-art, offers a solution for many challenges facing writing instructors such as increasingly larger and more heterogeneous groups and a resulting heavy marking load (cf. also Patchan and Schunn, this issue). By integrating it in the classroom, students have increased opportunities for writing and resulting texts may be of a higher quality. Additionally, it could be a valued alternative for more traditional, teacher-fronted approaches still prevalent in writing education (cf. Shehadeh, 2011) and it has considerable contemporary currency in educational policy.

Moreover, having students write collaboratively has a high practical relevance as in professional contexts (academia, policy making, administration, journalism) very frequently written documents are the end-product of a collaborative process involving multiple actors, writers *and* readers (e.g., research articles, group proposals, public policy documents, journalistic texts (Lowry, Albrecht, Nunamaker, & Lee, 2003; Perrin, 2011; Sleurs, Jacobs, & Van Waes, 2003)).

However, quite a few issues have remained unexplored and merit further attention. The picture is quite complex as collaboration in writing is not tantamount to success

(Dillenbourg, 1999). In fact, for peer collaboration to have a positive effect on either writing or learning outcomes, a few conditions need to be met. The majority of the researchers into collaborative writing agree that one of the requirements for effective and efficient collaboration is an appropriate form of scaffolding or instruction for collaborators. Another component which impacts the effect of a group outcome is peer interaction (Marttunen & Laurinen, 2012) and interaction patterns (Storch, 2002). Also group composition seems to play a role (Saddler & Graham, 2005; Sutherland & Topping, 1999) in combination with task complexity and instruction (Van Steendam, Rijlaarsdam, Van den Bergh, & Sercu, 2015). To have a full grasp of the potential of collaborative writing for education, we need to understand all the individual, collaborative and contextual components at work and the interaction between all these components and factors. Only then can we realize the full potential of collaborative writing for education and contribute to both practice and theory-building.

2. Paving the way to a special issue on collaboration in writing

This topic was one of the focal themes in a research agenda I presented at the SIG Writing Conference in Amsterdam and Utrecht in 2014 together with other researchers (Van Steendam, 2014). The talk was materialized in a call for papers for a special issue on collaborative writing in the Journal of Writing Research. More specifically, the call aimed at contributions providing an overview of the most recent findings about collaborative writing.

Both quantitative and qualitative contributions on a form of peer collaboration during or for writing (planning, drafting, revising) were invited in three domains: Learning to Write in L1 and L2, Writing to Learn and Workplace Writing (technical and professional communication). Additionally, we also welcomed studies which shed light on methodological issues. The studies could investigate one or more of the following topics in collaborative writing:

- instructional strategies and/or scripting
- interaction (interactional patterns)
- group composition
- individual characteristics
- tasks

and the effects of one, more or a combination of these topics on collaboration processes and the resulting writing product.

Ideally, we wanted the findings of the different contributions and the insights gleaned from these findings to result in a blueprint for effective and efficient collaborative writing.

The majority of the proposals submitted were empirical papers, both quantitative and qualitative. No theoretical position papers or reviews were submitted. From the abstracts we received in a first phase, after double-blind peer review of 17 full papers by minimally two reviewers for each paper under the guidance of an acting editor other

than myself, 4 papers were included in the special issue. Of the sometimes well-conceived and carefully drafted submissions, a few were not accepted for quandaries inherent to research on collaborative writing, that is, small sample size to warrant any inferential statistics or conclusions about causality for that matter and/or design issues such as the lack of a control group quite frequently as a result of that small sample size, or due to other limitations characteristic of research on collaboration (e.g., omitting to take into accounted nested designs cf. Strijbos & Fischer, 2007). What also emerged from the review procedure in particular was the disparity in the conceptualization and definition of collaborative writing (Lowry, Curtis, & Lowry, 2004).

For this special issue collaboration was conceptualized as either pupils or students, from primary school to higher education, or adult professionals writing (planning, composing, revising) collaboratively, either in a face-to-face context or online (via e-mail, chat or electronic learning environments). We did not make any further explicit distinction between writers participating in every phase of the writing process (planning, drafting, revising) leading to a single, jointly produced text (Ede & Lunsford, 1990; Storch, 2013) or writers engaging in only a single phase of the writing process or a specific part of the final text (cf. cooperative writing Dillenbourg, Baker, Blaye, & O'Malley, 1996 or reactive writing cf. Lowry et al., 2004)

In both the submission and the blind review procedure the definition of collaborative writing proved to be an issue of significant discussion and even disagreement. In some submissions writing and text production was interpreted in a broad sense including a kind of writing, e.g., in the form of note-taking or scripting at one stage of a learning cycle or phase of the writing process, but not necessarily leading (up) to or resulting in an actual (joint) written product. Other authors and reviewers defined collaborative writing in a more narrow sense, that is, as writers producing text "together" either face-to-face or via an online system. In the latter definition of collaborative writing, writers reviewing other writers' texts asynchronously would be referred to as peer review or peer feedback and would not be regarded as a form of collaborative writing unless the final product would be a joint product (collective ownership) and following Storch (2013) the peers would also be involved at other stages of the writing process (planning, composing). The profusion in terminology is according to some researchers in the collaborative writing field "an indication of the complexity of the collaborative writing process, as has been noted by Thompson (2001) and Lowry, Curtis, and Lowry (2004)" (Bremner, 2010, p. 122).

3. General discussion of the papers

In this special issue we put forward a broad definition of collaborative writing, more specifically, it is conceptualized as the participation of others, predominantly peers, in the writing process (any phase) possibly but not necessarily leading to a joint final written product. We adhere to the definition used by Klein in this same journal (Klein, 2015) in that "the writing is collaborative in the broad sense that at some time during

the learning [or writing] cycle, writers engage with peers, and this is expected to contribute to learning or [writing]" (p. 206). Similar definitions have been given in workplace writing by Couture & Rymer (1989) who define collaborative writing as "the oral and written communication pertaining to a document during the process of planning, drafting and revising it" (p. 79) or by Bremner taking the term "to refer to all activity and communication surrounding the construction of texts by multiple contributors, whether written or spoken, and whether planned or incidental" (Bremner, Pierson-Smith, Jones, & Bhatia, 2014, p. 151).

Within this broad definition of writing, the four papers in the special issue deal with forms of collaboration during planning, composing, revising, evaluating, reviewing and reflecting. Two of the contributions deal with students writing together in a face-to-face context producing text collaboratively (Cuevas, Mateos, Martín, Luna, Martín, Solari, González-Lamas, & Martinez; Sturm). In Patchan and Schunn peers provide feedback on other peers writing asynchronously. The final contribution by Bommarito deals with distributed mentorship of graduate students, their mentor and texts. A group of graduate students join in a collaborative research project leading up to a joint publication under the guidance of their mentor. The focus in this paper is a process of enculturation rather than the genres and texts which serve as a point of reference and are the ultimate goal of the collaboration project. Thus, the collection presents different forms of participation by others in writing ranging from a relatively 'distant' asynchronous peer commenting on one's writing (Patchan & Schunn) to a peer in close proximity during face-to-face joint writing (Cuevas et al., Sturm, narrow definition of collaborative writing).

Even if the papers vary widely in approach, methodology and design, they present a limited range in target groups or age groups. Three of the four papers (e.g., the studies by Bommarito, Cuevas et al., and Patchan & Schunn) study students in higher education, both undergraduates and graduate students. One of the four studies (Sturm) deals with learning-disabled or struggling adult writers, a target group which has so far remained largely absent from research on collaborative writing.

With regard to genre, the majority of the studies deal with academic writing genres such as research papers and research syntheses. In the study by Sturm, the struggling adult writers have to write genres which have "a bearing on everyday life or participants' professional life" (Sturm, p. 308) such as manuals and replies to complaints.

The richness of this limited selection of papers is a relatively broad spectrum of different methods to study processes and products. None of the studies present a triangulation of both quantitative and qualitative methods (mixed method strategies cf. Strijbos & Fischer, 2007) although Sturm and Bommarito combine multiple qualitative data sources and methods to answer their research questions. Sturm triangulates transcripts of videorecorded collaborative writing sessions with predominantly retrospective interviews (also interviews based on hypothetical situations) and textual

analysis (complementary triangulation cf. p. 316). Bommarito complements observation of meetings with semi-structured interviews with participants and mail messages.

These papers also vary in whether they study product or process or both. Two of these papers are outcome-driven with regard to the final writing (cf. Cuevas et al.) or revision product (cf. Patchan and Schunn), one of which is also process-oriented (the organization and role allocation of the collaborative process and the impact on learning) (cf. Strijbos & Fischer, 2007). Bommarito presents us with a clear process-oriented study on collaborative mentoring for doctoral writing. Sturm investigates whether collaborative writing is a suitable method to dig into the writing process of challenged writers in addition to other methods such as interviews. As such, the researcher is exploring whether verbalizations during collaborative writing can reveal and "expose" individual writing processes. None of the studies on face-to-face collaborative writing (Cuevas et al., Sturm, Bommarito) study group-to-individual transfer and include an individual posttest.

Even if the four studies are embedded in a specific national context, they could have been conducted in any (higher) education institute, that is, they do not seem to be specifically bound or constrained by that national context. As such, their findings are also not limited to the specific national context.

4.   Discussion of individual papers

In this section, I will briefly summarize each paper after which I will reflect on its merits and limitations, sporadically touch upon possibilities for future research and discuss implications for practice. In a final section, I will critically evaluate the contribution of the individual papers to the state-of-the-art on collaborative writing research for a blueprint for collaborative writing. These papers will serve as a starting point for rumination on variables in need of pursuit. Departing from them and informed by the research in the field, I will end with a research agenda for collaborative writing.

In the first contribution, *Cuevas, Mateos, Martín, Luna, Martín, Solari, González-Lamas, & Martinez* have 4th-year university students collaborate in a face-to-face setting. Collaborative writing in this paper is conceptualized in its most narrow sense (Corcelles & Castelló, 2015; Storch, 2013) as students going through the whole cycle of planning, composing, and revising together. A total of 52 Psychology undergraduates had to collaboratively write a research synthesis, a genre which lends itself *par excellence* to dialogue as in it students need to integrate (two) opposing viewpoints on a topic expressed in (two) source texts.

Students were grouped into dyads on the basis of their individual transactional beliefs measured with White & Bruning's self-report measure (White & Bruning's 2005 Writing Beliefs Inventory): students who scored below (the group) average on the Writing Beliefs Inventory, were grouped into dyads with high transactional beliefs; students who scored around the mean formed dyads with moderate transactional beliefs and the dyads with high transactional beliefs consisted of two students with

above-average scores on the transactional beliefs inventory. Students were thus grouped within the same level of transactional beliefs within the group. Students with transactional writing beliefs are said to believe that meaning needs to be actively, personally and critically constructed by writers rather than passively transmitted (cf. White and Bruning, 2005).

Next to the pretest writing beliefs which was used to group students on the basis of transaction beliefs, pretest measures included students' level of integration of arguments in an individually written synthesis. Prior to the actual collaborative writing assignment, students were also asked what their stance was on the specific topic to be able to determine potentially shared or opposing viewpoints in a dyad. These pretest measures were included in the analyses. Post-collaboration, students had to indicate in the Johnson & Johnson's 2003 Controversy Scale if they used constructive or destructive strategies to deal with the conflict and controversy that they felt arose during group work.

Results show that students in the high transactional dyads wrote texts with a higher level of organization and integration of opposing viewpoints than students in dyads with fewer transactional beliefs confirming results which were previously also found for writers writing individually (Miras, Solé, & Castells, 2013; Villalón, Mateos, & Cuevas (2015, p. 315). In addition, these students also incorporated fewer irrelevant ideas (but not more relevant ideas) in their syntheses. Second, the results show that constructive controversy resolution during collaborative synthesis writing leads to a higher text quality reflected in more elaboration and selection (fewer irrelevant arguments from the source texts). On the whole, students in all dyads reported using more constructive strategies than destructive strategies to deal with conflict and controversy. However, the students in dyads with higher transactional beliefs reported generating constructive problem-solving strategies more frequently than low-transactional dyads *if* their initial take on the debate differed. For students in the low-transactional beliefs dyads the situation was the opposite: they used more constructive strategies when they shared the same initial position on the matter. It seems that writers with higher transactional beliefs may regard (i.e., treat in this case) controversy during collaboration as less of an obstacle to come to a consensus (and good text) than writers with fewer transactional beliefs who may lack the skills to deal with both writing collaboratively and solving controversy due to opposing viewpoints during collaborative writing.

A few limitations and suggestions for future research can be touched upon which echo those pointed out by the authors themselves. First, whether (the) students who report using constructive strategies actually use constructive strategies needs to be investigated (as there may be a touch of social desirability involved when answering questions about which conflict resolution strategies one uses). Secondly, the presence of multiple levels of coding and analyzing (individual, collaborative) and the nested design of collaborative writing calls for sophisticated forms of data-analysis using either structural equation modelling or multilevel modelling depending (Strijbos & Fischer, 2007). That sample size remains an issue in research on collaborative writing also

emerges from the contribution by Cuevas et al. for whom it precluded the use of a statistical model taking into account the interrelatedness of the variables, the different interactions and the nested design (structural equation model or multilevel model). Additionally, sample size to a certain extent also did not allow the aggregation of data to the collaborative level. Finally, a follow-up study in which dyads were not grouped a priori on the basis of similar transactional beliefs (homogeneous grouping) but randomly, would yield potentially intriguing insights with regard to group composition and/or the transfer to collaborative and individual writing. This study is a valuable contribution to the special issue and to the field of collaborative writing as 1) to the best of our knowledge it is one of the first research studies which looks into writing beliefs, conflict-resolution strategies and grouping with research synthesis tasks and 2) it shows that it is the combination of variables on the individual and collaborative level and the interaction between them which need to be studied in collaborative writing.

In the second contribution *Patchan and Schunn* investigate the influence of author and reviewer ability (and the interaction between these two) during peer review of writing. The authors developed a theoretical model of relative ability effects for writers reviewing peers' writing drawing on Flower and Hayes revision model (1981) and on prior research evidence supporting reviewer and author ability effects (Allal, Chanquoy, & Largy, 2004; Patchan, Charney, & Schunn, 2009, Patchan, Hawk, Stevens, & Schunn, 2013). The model puts forward a number of hypotheses about author ability and reviewer ability during peer review which were tested in a 2x2 between-subjects experimental design study with 189 undergraduates writing papers for a Research Methods course. The peer review did not involve students meeting face to face. Instead students submitted drafts which were reviewed by either high-ability or low-ability peer writer-reviewers.

   The results mainly show significant reviewer and author ability interaction effects. High ability reviewers' criticism comments exceeded those of low-ability reviewers in number. More of their comments included a high-level problem definition, especially in low-ability authors' writing (interaction reviewer ability*author ability) which can predominantly be explained by the lower quality of low-ability writers' texts. However, low-ability authors did not implement more feedback from high-ability reviewers, which considering the specificity of the latter's comments could have been expected. Instead, they acted more upon the high-level feedback of their low-ability reviewers counterparts, both with regard to problem detection and solution. The quality of the implemented revisions low-ability authors made in response to the high-level comments and solutions suggested by low-ability reviewers were significantly better than the quality of those made following high-ability reviewers' high-level comments. In contrast, with regard to implementation of the feedback and the quality of the implemented revisions, high-ability reviewers did not make a significant distinction in feedback provided by low- or high-ability reviewers, neither in high-level problem detection nor high-level solutions. These findings seem to suggest that the relative

(ability) distance with the peer may be more of an issue for the low-ability authors for whom that (cognitive) distance to the high-ability reviewer may be too wide, that is, they may not understand the feedback they receive from high-ability reviewers as well as the feedback by low-ability reviewers (Mugny & Doise, 1978; Webb & Palincsar, 1996). For high-ability authors the distance with the reviewer seems to play less of a role as high-ability authors benefited equally from feedback by high- and low-ability reviewers as predicted by the model. The latter finding may corroborate what studies on group composition found, that is, that high-achievers benefit irrespective of the ability level of the partner (Hooper & Hannafin, 1988; Leonard, 2011). Contrary to what is expected on the basis of the bulk of the literature on grouping effects and Vygotsky's proximal zone of development (Vygotsky, 1978), however, the results also show that low-ability writers quite frequently benefit more from comments and feedback by low-ability reviewers than from high-ability reviewers. Hence, the general advice in peer review does not necessarily have to be 'the better the reviewer is, the more their (high-quality) feedback will be implemented'.

There is much to be liked about this study. First of all, it provides researchers and teachers alike with valuable insights into the benefits of peer feedback for writing and into the specific conditions for these benefits to materialize. Secondly, it does so in a relatively large-scale study with a bachelor student population from different majors covering "the full range of writer ability" (Patchan & Schunn, p. 10). The insights are informative for collaborative settings in which peers have to detect problems in each other's written work and suggest revision possibilities, not only asynchronously as was the case in the study itself but also in face-to-face settings. However, it remains to be seen if these findings can be extrapolated to collaborative settings in which both the feedback provider and the feedback receiver co-author a single, shared text. Finally, the finding that whether authors act upon feedback by reviewers depends on complex interaction patterns defined by ability level of both author and reviewer suggests yet again that to study the impact of collaborative writing one needs to study the interaction between the different variables underpinning it rather than (evaluate) the variables independently.

A few limitations need to be mentioned which largely correspond to caveats considered by the authors themselves. First, reviewer and author ability alike were defined on the basis of self-reported results (e.g., SAT- scores and final grades in first and second semester composition courses) instead of actual scores. That the authors included a composite score of several measures of verbal and written ability also spread in time (cf. first and second semester composition course grades), on the other hand, is commendable as ability may not be captured by a single score. The researchers further increased validity and generalizability by rating students' first draft and by comparing the quality of that draft between the high- and low-ability writers. Notwithstanding the added evidence of validity, future studies could base themselves on direct rather than indirect measures of writing and/or reviewing performance. Whereas following Flower and Hayes' cognitive writing process theory, the ability to review was now defined by

the ability to write, future research could experimentally verify this hypothesized relation or include a separate quality measure for reviewing ability. Additionally, a continuous ability measure instead of a median split score or an additional measure of ability distance is preferable especially because the results suggest that it is the relative ability distance between author and reviewer which plays a role, especially for the low-ability writers (Van Steendam et al., 2015). Finally, as recommended in studies on peer feedback (Min, 2005; Van Steendam, Rijlaarsdam, Sercu, & Van den Bergh, 2010), the reviewers in the study were provided with guidelines for feedback. Researchwise, however, it would be interesting to also compare groups of reviewers with and without guidelines as author and reviewer ability interaction effects could differ.

A very specific context of collaboration during writing is doctoral research writing as the penultimate contribution by *Dan Bommarito* demonstrates. In this qualitative study the researcher follows a group of 5 doctoral students in Applied Linguistics and Composition Studies embarking on a collaborative research project together with their mentor, an experienced professor in the field. The project should result in a joint publication. A forte of the study is its richness in data accumulated over a time span of a year. The researcher combines observations of a total of 15 team meetings with semi-structured participant interviews and the analysis of a collection of written text (email correspondence, drafts of disciplinary genres). Inherent to doctoral writing is a double complexity ('paradox'): doctoral students have to acquire knowledge about the research process that is largely tacit and implicit in the research community, ànd new at the same time as these students have to make their own unique contribution to the field. A detailed qualitative analysis of the data illustrates how team members grapple with this paradox in research writing and with positioning themselves. Through collaboration both with their peers and their mentor the PhD students learn how to negotiate research objectives, to construct new knowledge claims and to acquire data-driven insights. The distributed mentorship thus emerges as a productive and insightful enculturation process in the disciplinary community.

The study is process-oriented and mainly deals with the organization of the collaboration and dialogue. Text is omnipresent: peers collaborate with each other face-to-face and via mail, they discuss their writing and negotiate genres as an outlet for their work, which incidentally involves a writing project. The resulting texts stand high on the agenda during collaboration both as a point of reference and as the ultimate goal. However, there is no immediate link to the actual text and we do not see the reflection of the process or the knowledge acquired through it in the final text. Future research could link the collaboration process to the emerging or final text and move the learning-to-write dimension to the forefront more.

From the study emerges that in addition to group composition on the basis of ability or writing beliefs, spontaneous role allocation and group dynamics can be equally important in collaborative writing. The insights gathered could inform future studies looking into teams of doctoral students with regard to installing support structures in or

in addition to distributed mentorship. Another focus could be group dynamics and group composition. The study for example shows that in larger teams of doctoral students the presence of more experienced and novice peer researchers could cause tension which is not necessarily present in other novice-expert collaboration patterns. Finally, also the impact of cross-cultural influences in this mixed team of L1 and L2 speakers on role allocation, on the writing process and the written product could be an important issue for further work.

The final contribution to the special issue by *Afra Sturm* deals with learners writing collaboratively in a face-to-face setting but it does so with struggling adult writers, a target group which has largely remained under-researched in collaborative writing. In the paper collaborative writing is used as a research method to shed light on struggling adult writers' writing process (higher-order skills, knowledge about writing and about themselves as writers cf. p. 300) as individual think-aloud protocols or interviews may not yield rich or even sufficient data in that respect. The authors propose a combination of (video observations of) collaborative writing with structured retrospective interviews and text analyses. This 3-part approach could potentially preclude or compensate for cognitive difficulties that struggling adult writers may experience when having to think-aloud while writing.

For collaborative writing to yield useful information about struggling adult writers' writing processes, great care has to be given to both the construction and selection of the writing task itself and to student scaffolding and preparation. First, it is delineated in the paper that suitable collaborative writing tasks need to have a clear communicative purpose and relevance and a manageable complexity level sufficient to trigger problem-solving and dialogue and to avoid demotivation. These tasks require little topical knowledge. The tasks in the study were also highly constrained: participants were explicitly told to reread the writing task at the end of the session to avoid premature completion of the writing process. Secondly, students were familiarized with collaborative writing via modelling (a short video clip).

Providing a fine-grained coding and analysis on both the collaborative and individual level, Sturm shows how collaborative writing sessions can uncover individual writing approaches, weaknesses of writers and their struggle with thinking and writing. Additionally, the protocol data can shed light on role allocation during pairwork. However, the case study also illustrates that such a collaborative writing session does not always yield (sufficient) information about the writing knowledge of pair members. That is where the individual interviews come into play. From the collaborative writing session and subsequent individual interview of two writers in a struggling adult writer dyad with a clear knowledge-telling approach (Bereiter & Scardamalia, 1987), also emerges that adult struggling writers may benefit from the assistance of a peer.

The detailed account of the three-way, multi-method casestudy does not pretend to provide a conclusive answer to the question whether collaborative writing sessions

provide an accurate and full picture of individual writing processes and writing knowledge or the extent to which the information about collaborative writing sessions can be transferred to individual writing processes. The aim of the account is to illustrate the richness and complementarity of the information that is gleaned from the combination of (videorecorded) collaborative writing sessions, (individual) interviews and to a lesser extent text analysis of this specific group of writers. At the very least the analyses show that collaborative writing experiences offer a concrete starting point and frame of reference for individual writers, especially struggling ones, to discuss and reflect on their writing process and on the knowledge that they have about writing in for example subsequent interviews.

Even in the light of some limitations, the contribution of the paper to the special issue is an initial exploration of a relatively novel approach to collaborative writing as a data-collection method to gather information about specific groups of learners and writers rather than as an instructional method. Analyzing collaborative writing sessions can not only provide researchers with rich information about writers but also educators and teachers with relevant inside knowledge about the individual writers in their composition classes. Future tightly controlled studies are needed to determine the viability and validity of collaborative writing as a data-collection method about students' writing processes and writing knowledge in itself and compared to other methods. After all, what writers verbalize during collaboration may be subject to social desirability and is influenced by interaction. Further work could for example combine these collaborative writing sessions with individual writing sessions recorded with keystroke logging software. It also needs to be stressed that the (video) model of collaborative writing, even if commendable for this group of students (as without it, they may have been at a loss), could also be a confounding factor.

5. Educational implications

What can be concluded from the studies discussed above with regard to forms of collaboration in education? First of all, collaboration seems to be highly contextualized (i.e., dependent on interactions with individuals and the specific type of task) and for it to be productive several conditions need to be met. The contributions in the special issue illustrate that effective collaboration depends on a number of intricately interwoven variables on the individual and collaborative level. Patchan and Schunn show that for peers to provide feedback on other peers' writing, that is, to act as reviewers, not only reviewer ability level plays a role but also the ability of the peer whose writing is being reviewed. In fact, the two depend on each other. So many variables could play a role here influencing the impact of the feedback such as tone, confidence, performance goals and self-efficacy of the peer implementing the feedback for example. That not only ability effects may play a role but also beliefs, preferences and opinions, is shown by Cuevas et al.

When the writing task subject to collaboration involves reconciling and integrating different viewpoints on an issue as in so-called "two-sided reasoning tasks" (p. 301 referring to Nussbaum & Schraw, 2007), students' transactional beliefs, their initial take on a topic and heterogeneous or homogeneous grouping with regard to that stance, are of crucial importance, as the combination may determine the subsequent interaction process (use of conflict-resolving strategies) and resulting text quality. Consequently, writing beliefs, conflict-resolving and perspective-adoption strategies need to be integrated in the writing classroom.

Grouping students with low transactional beliefs who do not agree with each other leads to poorer research syntheses. It follows then that grouping students with low transactional beliefs who have a shared viewpoint is a better idea. However, grouping students with higher transactional beliefs results in texts of a higher quality. The students with higher transactional beliefs are at best grouped with students they disagree with initially as this leads to more constructive conflict-management and a contentwise better text as a result. However, grouping students on the basis of transactional beliefs and/or taking into account students' stance on a matter does not seem to be a feasible or even productive undertaking in the classroom. Consequently, reserving a prominent place for discussions about writing beliefs and for the teaching of conflict-resolving strategies seems to be a good alternative. Teaching pair members to deal with issues constructively may lead to higher-quality products as the use of constructive strategies in homogeneous groups of low, high and moderate transactional beliefs leads to better texts.

Following the finding by Patchan and Schunn that the quality of low-ability writers' revisions were better in response to high-level feedback from low-ability reviewers, possible conclusions could be that (1) grouping low-ability writers with other low-ability writers (reviewers in this case) or high-ability reviewers within their zone of proximal development may have a more optimal effect than grouping them with high-ability reviewers. For the high-ability writers and reviewers, grouping seems to play less of a role; (2) that especially high-ability reviewers should be taught how to tailor their feedback to the ability level of the author (e.g., with regard to clarity, degree of complexity or understandability of the feedback). Overall, the study confirms the crucial role support (guidelines), instruction or training play in peer feedback and peer review.

The study by Bommarito further shows that the picture becomes more complex when more than two students collaborate to produce a joint text but a team of students and their mentor. Tensions may arise with regard to role allocation, responsibility and the sometimes messy research process with shifting objectives. Having students engage in an authentic collaborative research project working towards a shared publication alongside individual dissertation tracks could be a powerful support structure for them to make sense of the process and to acquire procedural knowledge.

Finally, the contribution by Sturm indicates that collaborative protocols can yield interesting data not only for researchers but also for teachers to understand the writing

and learning process of their students. Integrating the observation of students writing collaboratively should thus not only be integrated as an instructional method (cf. (self-) modeling or worked examples) but can also be a form of feedback for teachers to inform and adapt their instruction (Bandura, 1986).

6. A Concise Research Agenda

As this special issue offers a limited overview of research on collaborative writing considering its scope of four contributions, it is self-explanatory that a multitude of target groups, contexts and variables have remained unexplored. Nevertheless, the research agenda that I present below takes into account a thriving body of research on collaborative writing.

Three of the four studies in this special issue deal with students writing in their mother tongue, either Spanish (Cuevas et al.), English (Patchan & Schunn) or Swiss German (Sturm). In the contribution by Bommarito we have a mix of first language (L1) and second language (L2) graduate students (native speakers of a Taiwanese and Mainland variety of Chinese). However, possible challenges for these L2 speakers and writers of Chinese with the L2 or the impact of the different native languages on group interaction and/or the resulting text is not the focus of the study. Hence, none of the contributions deal with writers writing in a foreign language or compare writing processes in a first or second language.

A relatively large body of research exist on L2 collaborative writing from a language learning perspective (writing to learn the language cf. Manchón, 2011) (Dobao, 2012; Kuiken & Vedder, 2002; Storch, 2013; Yang, 2014). Research on face-to-face oral collaborative writing focuses on self-directed (private speech) and other-directed speech in peer interaction (Swain, Brookes, & Tocalli-Beller, 2002; Swain & Lapkin, 1998), on interaction patterns in collaborative writing (Storch, 2002), on different types of tasks (De la Colina, & García Mayo, 2007) and on the comparison of text accuracy by pairs and by individuals. Computer-mediated collaborative writing, especially wiki projects, has become a major area of interest in the field of L1 and L2 collaborative writing (for an overview cf. Storch, 2013). A somewhat smaller body of research studies investigate collaborative writing "as a vehicle for developing good writing skills" (Storch, 2013, p. 4) and for learning to write in a second or foreign language (Manchón, 2011; Ortega, 2009). Some of these studies look into instructional methods for foreign language writers writing and revising collaboratively (Van Steendam et al., 2010, 2015). However, much more research is needed comparing *writers writing collaboratively in their first and second or foreign language* and on L1 heterogeneous and L1 homogeneous groups (cross-cultural groups) of writers writing in an L2 both in educational and professional settings.

Another group which has remained fairly under-represented in the literature on collaborative writing is the group of *younger learners* (cf. Rojas-Drummond, Albarrán, & Littleton, 2008; Sutherland & Topping, 1999; Yarrow & Topping, 2001). Interesting

research on collaborative writing as a component in a strategy-oriented instruction package for *primary-school children* is currently conducted by De Smedt and Van Keer (2016). Herder (2014) uses discourse analysis to study the group interaction and knowledge construction of primary school children writing collaboratively in rhetorical and non-rhetorical task conditions.

Third, both the papers in the special issue and the submissions to the original call predominantly dealt with students in higher education. Studies on primary- and secondary-school children as well as on writing groups in the workplace were few and far between. Nevertheless, much more research in *workplace writing* is needed. There is some research on professional development in vocational education especially from a writing-to-learn perspective (Cattaneo & Boldrini, 2015; Ortoleva & Betrancourt, 2015). However, a significant disparity exists between writing in education and writing in the workplace (Bremner, 2010; Bremner et al., 2014; Hollis-Turner & Scholtz, 2010). As writing is a ticket to "professional opportunity", both for recruitment and promotion (National Commission on Writing, 2004) and as a significant proportion of the text construction in the workplace is either done collaboratively or the result of a form of collaboration (according to Burnett (2001) about 75 to 81%, cf. Bremner, 2010), it is imperative to study different forms of collaboration leading to text in authentic (mono- and multilingual) corporate and institutional settings. The need for such research is especially conspicuous in the current globalized and essentially multimodal and "textually mediated" business and professional world (cf. Barton & Hamilton, 1991 as cited by Louhiala-Salminen, 2002, p. 214) in which employees from different linguistic backgrounds communicate with each other in writing via various media. In such research collaborative writing essentially needs to be interpreted in a broad sense, that is, as ranging from professionals actually sitting together to produce joint text to texts sequentially or iteratively being handed down from one individual to another via various channels of communication (cf. Bremner et al., 2014; Couture & Rymer, 1989). Particularly in workplace settings, the interplay between individuals with their individual attributes and their position and status in the company on the one hand and (c)overt workplace writing guidelines, organizational and corporate culture on the other hand can yield interesting research material. Especially worthwhile exploring is the interaction with the medium of communication and the multimodal aspect of the writing situation. Self-evidently, the study of workplace writing has unique challenges, confidentiality and sample size prominently featuring among them. That is why it seems the study of collaborative writing in authentic workplace settings will in the first instance require a predominantly qualitative approach (casestudies, ethnography) (cf. Palmeri, 2004).

Bommarito offers us an insight into how distributed mentorship can support *graduate students* in what the author refers to as the sometimes 'messy' research process (p. 290). The author illustrates how collaboration can contribute to an enculturation process in a community of practice (Wenger, 2000) of PhD students. In addition to qualitative explorations and fine-grained in-depth analyses (cf. Maher,

Fallucca & Mulhern Halasz, 2013; Ferguson, 2009), also more tightly controlled quantitative studies on graduate or doctoral students co-authoring research articles or edited volumes is required both with regard to the learning and writing process and resulting written product. Also some research would be welcomed on the complex nature of *researchers* collaborating to produce research articles or the multi-layered interaction process between authors and reviewers in a double blind journal peer review process.

In addition to multiple target groups and audiences which have not been included in this special issue, *different types of writing and genres* should be subject to further study. The genres in this study ranged from research papers to manuals but interestingly could have been extended across different modes of writing and across image and text (multimodal writing cf. Archer & Breuer, 2015, 2016). For generalization purposes, it is recommended that future research on collaborative writing with different genres and tasks also has a long-term perspective.

For all these target groups and different types of tasks and genres, the effect of forms of collaboration during writing needs to be studied on writing processes, group dynamics and interaction and on the resulting writing or learning-through-writing product to find out what works best for whom in a specific setting. Particularly intriguing when doing so is the interaction between individual student characteristics and the characteristics of the group. These characteristics can be found in Figure 1, which is a global representation of some of the key variables involved in collaborative writing. Individual variables (cf. Individual level) have not been explicitly added to the model but could for example be ability, writing beliefs or stance on a matter or self-efficacy to name but a few. In the middle of the figure, the collaborative and contextual variables can be found. Instruction is included in Instructional setting. In workplace settings instruction could for example refer to support structures in a disciplinary or professional community.

None of the contributions in this special issue test the effect of instructional methods for collaborative writing on writing process or product or disentangle the effect of forms of collaboration in an instructional package for writing. Nevertheless, from the literature emerges that to generate productive or effective collaborative writing sessions, instruction or support on both the individual and collaborative level (Järvelä, 2016) may be quintessential. Also in three of the four studies in this special issue some form of support is present in the collaborative process. Patchan and Schunn provide their reviewers with feedback guidelines, whereas Sturm models reactive collaborative writing sessions via a video-clip. In Bommarito distributed mentorship involves next to peers (both more experienced and novice PhD students) also an expert mentor.

The special issue provides further support for the hypothesis that *group composition* (included in Figure 1 as 2) should be taken into account. The contributions by Cuevas et al. and by Patchan and Schunn illustrate that group composition in collaborative writing could be operationalized in many different ways, that is, on the basis of writing beliefs (as in Cuevas et al.) or on the basis of ability (Patchan and Schunn, this issue;

Van Steendam et al., 2015). Many more studies are needed exploring the effect of grouping possibilities on the basis of a (usually pretest-generated) single dimension or a cluster of dimensions in both homogeneous and heterogeneous groups. Ideally, grouping should be based on continuous measures rather than dichotomous (e.g., median- or mean-split) scores to be able to study relative (ability) distance to the peer(s).

In science and mathematics collaborative learning, Fuchs, Fuchs, Hamlett, & Karns (1998) and Webb, Nemer, & Zuniga (2002) reason that the effect of group composition may also be mediated by *task complexity* (Figure 1: 3). When studying collaborative revision, Van Steendam et al. (2015) show that the effect of group composition for complex tasks on (collaborative, individual) revision and (individual) writing quality is mediated by *instruction* (included in Figure 1 as 1). The picture that emerges from these results is complex and many questions remain. That is why the interplay between group composition, task complexity and instruction is an important topic for further research. Following studies on collaborative writing both in L1 (Corcelles & Castelló, 2015; Marttunen & Laurinen, 2012) and L2 (Storch & Aldosari, 2013; Storch, 2002), it may not (only) be group composition in interaction with task complexity and instruction which determine the outcome of collaborative writing, but also or perhaps even more so *group dynamics, interaction patterns and regulation of the collaborative activity* (Included as 4 in the collaborative process in Figure 1). Marttunen and Laurinen (2012) show that "participant profiles are not individual roles but are dependent on the discursive interaction through which collaborative groups approach the writing task" (p. 53). Hence, the effects of group composition may not only change depending on the task and the instruction offered but may be altered during interaction or vice-versa.

To conclude, it speaks for itself that the aim of our special issue of drawing up a blueprint for effective and efficient collaborative writing cannot be met on the basis of four papers. Much more research needs to be conducted to come to a blueprint for collaborative writing or to an inclusive, all-encompassing theory. However, taken together, the findings of these four papers against the backdrop of an increasingly growing body of research make it clear that a blueprint for collaborative writing should include group composition, task design, instruction and group dynamics. Especially the studies by Cuevas et al. and Patchan and Schunn in this issue show it is not only the individual factors (e.g., beliefs, ability, viewpoint on a topic) or the collaborative factors (group dynamics, interaction, strategies used for conflict resolution, shared viewpoint) that need to be studied but rather the complex interplay of different (individual, collaborative and contextual) factors. Quite a number of studies exist on the role and/or impact of these factors separately but following Dillenbourg (1999) we argue that it is the interaction and the combination of these interrelated factors which need to be studied in different contexts (media), and with different writers at different stages of the writing process. These interactions need to be firmly established by conducting new, tightly controlled studies ànd by conducting replication studies, at least conceptually (Arts et al., 2015). *A full, evidence-based theory on collaborative writing should outline*

and specify salient factors (on different levels) and the relation between them. Only then can effective instruction be designed and the potential of collaborative writing for education be fully 'exploited'.

A more complete and thorough understanding of the variables affecting collaborative writing, will enable us to determine the full potential of collaborative writing talk (in translation research referred to a 'dialogue protocols' Pavlović, 2013) as a research method to tap into individual writers' writing process and/or knowledge about writing. A future methodological focus should be the comparison of collaborative or dialogue protocols as compared to other methodologies to tap into writers' writing processes and writing knowledge such as individual think-aloud protocols or keystroke logging (Leijten & Van Waes, 2013). Only then can the full methodological potential of collaborative writing be assessed.
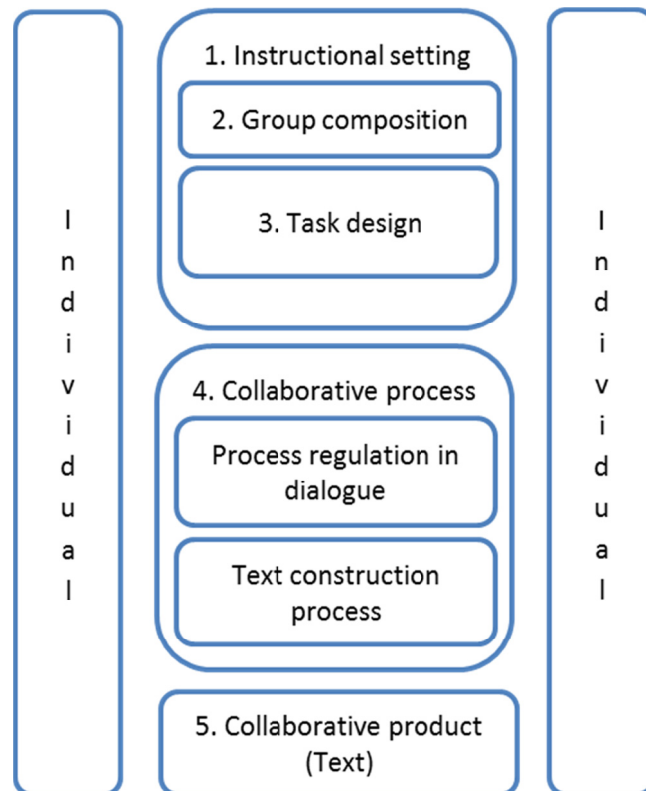

Figure 1. Model of Collaborative Writing.

Papers in this issue in alphabetical order

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