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Pieters, J.M.; Voogt, J.M.

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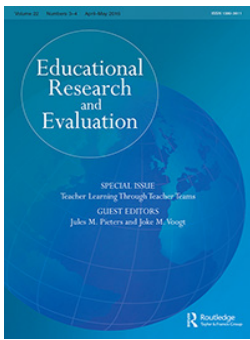
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Jules M. Pieters & Joke M. Voogt

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Teacher learning through teacher teams: what makes learning through teacher teams successful?

For several years now, teacher collaboration is considered important for innovation and improvement of curriculum. It facilitates meaningful and effective learning of teachers (Timperley, Wilson, Barrar, & Fung, 2007), and it enables sustainable development of curriculum renewal (Penuel, Fishman, Yamaguchi, & Gallagher, 2007). Collaboration, however, is not straightforward. As Little (1990) showed, interaction between teachers is not the same as meaningful collaboration. Teacher interaction can range from “story-telling” through “help” and “sharing” all the way to “joint work”. The kind of interaction will impact the benefits of the collaboration.

This special issue addresses and discusses studies that explore teacher collaboration from various perspectives and contexts with the aim to develop a better understanding of the nature of collaboration and its effects, and the conditions that influence and drive it. The papers that are brought together in this special issue represent new initiatives and seek to stimulate critical reflection on the ways in which collaboration in teacher teams contributes to professional development of teachers and teacher educators and curriculum renewal. By doing so, we intend to help set the agenda for future research directions that are informed by, and relevant to, educational practice. Each of the papers builds on research projects that were conducted in The Netherlands, Belgium, Spain, and Portugal, respectively.

In the first contribution, Voogt, Pieters, and Handelzalts have synthesized 14 studies about a specific form of collaboration – Teacher Design Teams (TDTs). By comparing studies from varying contexts, the authors derive conclusions on collaborative curriculum design across contexts. Recently, more and more studies have appeared on collaborative curriculum design in TDTs with the focus on the potential of this approach for sustainable curriculum renewal and teacher professional development (Simmie, 2007; Voogt et al., 2011). However, due to the fact that studies on TDTs are labour intensive, often only one context with a limited number of teams is examined. By analysing studies about TDTs across different contexts, countries, educational level, focus of curriculum design, on similarities and differences in effects, mechanisms in TDTs that account for the effects, and conditions that need to be in place from the perspective of sustainability, more robust and generalizable insights on TDTs can be derived. The 14 studies that have been analysed were selected from the international research programme of the Department of Curriculum Design and Educational Innovation at the University of Twente, The Netherlands. The results show that TDTs benefit from scaffolding and structuring of the process, in particular the design process and the implementation of the design in practice. The actual enactment of the new curriculum in practice is very important, because it gives input for improving the design, contributes to ownership, and plays a large role in the learning experiences of the teachers who participate in the TDTs. To be successful, external support for TDTs is indispensable. Such support involves a combination of support

activities ranging from offering part and sample materials, providing new knowledge, guiding discussion in the teams, and contributing to evaluation activities. Moreover, these studies indicate that TDTs are effective for the realization of the intended curriculum renewal in practice and for the professional development of the participating teachers, especially in the field of innovative pedagogy.

The following three papers in this special issue address the role of different actors in collaborative teacher teams. In the second paper, Becuwe, Tondeur, Pareja Roblin, Thys, and Castelein explore the roles of the facilitator in a variation of a TDT, a Teacher educator Design Team (TeDT). Although several studies investigated the role of facilitators in TDTs (e.g., Huizinga, Nieveen, Handelzalts, & Voogt, 2013), little is known about the role of the facilitator in a TeDT. Therefore, this study aimed to explore these different roles. Four TeDTs were set up in a teacher educator institution in Belgium. Each TeDT consisted of three to four teacher educators and was supported by a coach from within the institution. Data were collected through semi-structured interviews with the facilitators and focus-group discussions with the teams. The results of this study show that a facilitator in a TeDT can fulfil three different roles, (a) provide logistic assistance in the practical organization of team activities, (b) scaffold the (design) process, and (c) monitor the design process, but that team characteristics and team needs determine how a facilitator has to enact these roles in practice. In conclusion, facilitators need to be flexible and able to provide just-in-time and hands-on support to effectively help TeDTs.

The third contribution addresses the roles of facilitators in Professional Learning Communities (PLCs). Margalef and Pareja Roblin start with the notion that facilitators are central for developing effective PLCs, yet their specific roles and the strategies they use remain still largely underexplored. To address this gap, a multiple case study examined the roles of four university PLC facilitators in a Spanish university, the strategies they used to stimulate teacher learning and change, and the challenges they experienced in their work. Data were collected through in-depth interviews and document analysis of facilitators' quarterly reports and reflective logs. Findings reveal that the role of facilitators was dynamic: It had to continuously adapt to the needs of the PLC and its individual members. To accommodate the specific needs, facilitators adopted diverse roles to support the PLCs in its development; from an emphasis on coordinating the work (e.g., through communication and keeping focus) and supporting community building (e.g., through developing trust and nurture collaboration) in the beginning of the PLC to promoting teacher learning (e.g., continuous feedback and opportunities for reflection) at later stages. The main challenges associated with these roles were time, avoiding the image of being the expert, and keeping a critical stance whilst building a close relationship with the members of the PLC.

In the fourth paper, by Willegems, Consuegra, Struyven, and Engels, the focus is on broker roles for teacher educators in so-called collaborative teacher research teams in a study conducted in Belgium. The authors address a growing consensus that in order to accomplish their task in the preparation of teachers, teacher education institutions should create spaces for academic and practitioner knowledge to come together in non-hierarchical ways and foster an inquiry stance toward teaching (Zeichner, 2010). Collaborative teacher research in communities of pre-service teachers, experienced teachers, and teacher educators can serve this need, because such partnerships can improve the quality of pre-service teachers' preparation, and create opportunities for experienced teachers to enhance their professional growth and for teacher educators to deepen their understanding of (pre-service) teacher learning. Several studies found that an important role for teacher educators in such teams is that of a broker (Lunenbergh, Dengerink, & Korthagen, 2014; Reynolds, Ferguson-Patrick, & McCormack, 2013). Teacher educators need to cross boundaries between research and practice to keep the three-partner relationship in balance and focused. The broker role is new and not yet well

understood, and therefore this study aimed to contribute to more in-depth insights into this broker role. Ten teacher educators were studied, who participated in nine teams. Data were collected through audio-taped group sessions, video diaries of the teacher educators, and field notes of the researcher. From this study, four roles for teacher educators as brokers emerged: researcher, coach, mentor, and learner. Relations were found between the school and team cultures and teacher educators' role perception, role behaviour, and coping strategies.

Boundary crossing was also a major theme in the fifth paper. Mazereeuw, Wopereis, and McKenney studied teacher teams in vocational education in The Netherlands. The connections between student workplace learning and formal education are a source of frustration for both vocational teachers and workplace supervisors (Onstenk, 2009). Insufficient coherence between work and school contexts, due to multiple causes, results in communication problems between the two contexts, which hamper effective learning of students. Extended Teams (ETs), in which vocational teachers and workplace supervisors share responsibility for the quality of education, are seen as a potential solution for these problems (Nieuwenhuis, Nijman, Kat-De Jong, De Ries, & Van Vijfeijken, 2011). Because vocational teachers and workplace supervisors collaborating in ETs cross the border between formal education and workplace learning, they can be viewed as "boundary crossers" who connect both contexts (cf. Akkerman & Bakker, 2011). The paper reports on a study of six extended teams, how the teams performed, and the ways in which individual team members have been influenced by their involvement. The theoretical framework used to underpin the investigation is based on literature concerning teacher professional growth (Clarke & Hollingsworth, 2002) and the development of a community of practice (Wenger, 1998). Although other communities of practice have been studied in the field of education, specific knowledge about the performance of ETs is lacking. Since ETs constitute a promising solution to problems between the world of work and the world of education, and because knowledge about them can be used to support future ETs, this study sought to derive such knowledge. It focused on the 1st year of ET collaboration in order to determine the performance of the teams and their members. Two ETs from Dutch vocational education from the education, technical, and economic sectors, respectively, were monitored during the 1st year of a 3-year collaboration. The results showed increases in ET mutual engagement and development of a shared repertoire. Differences between team member concerns and expertise were recognized and accepted. However, most teams experienced setbacks in their development when ETs were perceived as a joint enterprise between vocational education and the workplace. Further, participation in discussions and performance of tasks seemed to be context bound and, as a consequence, unevenly distributed within the teams. The individual team members showed changes in their knowledge, attitudes, and beliefs in relation to workplace learning and the connections between formal education and workplace learning. Even after the short period of 1 year, positive effects of "boundary crossing" were visible in terms of individual team member growth and team performance in general.

In the sixth paper, Bolhuis, Schildkamp, and Voogt examine the depth of the conversations in a data team of teacher educators in The Netherlands. To improve teaching and learning practices in higher education, the use of data is becoming increasingly important. Studies show that decisions based on data are more likely to lead to the desired results than decisions based on intuition. Therefore, it is crucial that teacher educators possess the knowledge and skills needed for data-based decision making. In this case study, a team of teacher educators at a teacher training college were supported in the use of data through the data team method (Schildkamp & Poortman, 2015). The team used data to analyse the reasons why students dropout and to investigate the effects of measurements taken based on their analysis. The depth of inquiry in the team's conversations impact the generation of new knowledge

(Henry, 2012). For this reason, factors affecting the depth of inquiry in the data team's conversations were analysed. Data were collected from the (audio-taped) conversations of the team, documents, and artefacts. The findings of this study show that depth of inquiry was related to data and data systems (such as access to relevant data), individual and team factors (such as belief in data usage and being able to handle cognitive conflicts), and organizational factors (support of data coach).

In the seventh paper, Sousa investigates the collaboration between a team of elementary and secondary school teachers with university staff in the Azores, Portugal. The focus of the collaboration was the lack of interest shown by some students with regard to school and the curriculum. Between 2007 and 2012, an action research project "Researching for a Relevant Curriculum" (RRC) was implemented by the team. This paper examines two forms of teacher collaboration observed in the context of RRC: a weaker form, based on the provision of suggestions for new teaching strategies and related aspects of the colleagues' work, and a stronger form, based on assistance and joint work. For example, one teacher took notes of a colleague's behaviour in the classroom in order to help her identify aspects that needed improvement, and other specific research tasks – like interviewing children and writing research papers – were sometimes done together by school teachers and by researchers from the university. The findings of the study show a variance in the intensity of the collaboration in the team as well as issues connected to the difference between collaboration and contrived collegiality in the team. Overall, collaboration increased in the last year of the project's implementation, which is discussed in terms of (a) the possible relation between this fact and a reorientation in the team's approach to the action research process and (b) the distinction between collaboration and contrived collegiality.

This special issue intends to address and discuss effects of teachers and teacher educators collaborating in teams on design and research activities. A main outcome of the various studies presented is that collaborative design and research in teams supports participants (teachers and teacher educators) to update their knowledge, in particular (technological) pedagogical content knowledge or subject-matter knowledge. In addition, they have developed practical skills related to design, research, and technology. Participants further developed curriculum design expertise, including understanding the relevance and effectiveness of involving stakeholders in designing and implementing newly designed curricula. A theoretical implication derived from the accumulated outcomes of the studies is that teams concurrently develop knowledge and skills from various perspectives and in diverse contexts and together generate a better understanding of the nature of collaboration and its effects, and the conditions that influence and drive it.

Although the studies differ with respect to the research methodology, all of them took a qualitative approach to collect evidence about the mechanisms that contribute to knowledge about the various ways that effects of teacher learning through designing in teams can be revealed. The dependent variables in the studies are either the teacher learning outcomes or the sustainability of these outcomes. Although the findings of these studies do not permit statistical generalization, the diversity of the studies on teacher learning through teacher teams in different settings allow for analytical generalization of the findings by means of theoretical replication (Yin, 2008). For example, the studies that Voogt et al. analysed for this special issue show that teacher learning in collaborative design teams is taking place in a variety of contexts and that the overall outcome of sustainability in the various studies is positive.

Another interesting outcome of these studies is that they contribute to the knowledge about the details of successful learning of teachers in teams. In particular, team type, the kind of leadership role that is needed, and the role of the management have been studied in several of the contributions. Various studies supported the benefits of heterogeneous

teams. In general, heterogeneous teams with a variety of expertise demonstrated effective performance. As far as the composition of teams and the role of informal or formal leaders is concerned, studies in this issue clearly indicate that the effectiveness of team performance is dependent upon expertise imported through support or brokerage. In addition, the studies in this special issue reveal that support by the management is relevant and important, but the management does not need to actively participate in the teams.


The practical implications pertain to the effects of curriculum design teams (Voogt et al., this issue) with learning outcomes for teachers in areas such as (pedagogical) content knowledge and design knowledge and skills, which became manifest in the outcomes of the curriculum design process, and in the appreciation by the stakeholders. Other studies in this special issue (Becuwe et al.; Willegems et al.) demonstrate that the same counts for teacher educators. The studies by Margalef and Pareja Roblin and by Willegems et al. emphasize the role of facilitators or brokers to be relevant and effective when teachers or teacher educators are collaboratively working in teams to support effective teacher learning. The effects are also pertinent in collaborative research teams (Willegems et al.) and in data teams in which teacher educators are professionalized while carrying out research activities through working with data (Bolhuis et al.), whereas the kind of cooperation in teams that are involved in research may vary, dependent upon the curriculum effects intended (Sousa). And, not only in an educational setting but also in the transfer to the workplace, effects of teacher teams as border crossers are demonstrated (Mazereeuw et al.).

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Jules M. Pieters
Teacher Training Institute ELAN, University of Twente, Enschede, The Netherlands
 j.m.pieters@utwente.nl

Joke M. Voogt
Department of Child Development and Education, University of Amsterdam, Amsterdam, The Netherlands
 j.m.voogt@uva.nl