

The travel of ideas: the dual structure of mobilized knowledge in the context of professional learning networks

The dual structure of mobilized knowledge

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Abstract

Purpose – In the context of professional learning networks (PLNs), there are many studies which address knowledge mobilization (KMb). The majority of these focus on how research is mobilized by various actors. This paper explores the concepts of KMb both on an individual and an organizational level and discusses the role of PLN participants and PLNs as catalysts for institutional change (IC). To illustrate this, a model was developed which draws on a concept that depicts the mobilization processes at the various levels.

Design/methodology/approach – The model was developed by drawing on theoretical approaches to both KMb on an individual and an organizational level of schools. The strengths and limitations of the model are then assessed as part of an exploratory study. Interviews of PLN participants ($n = 7$) from two schools and detailed logbooks of two participants were used to reconstruct experiences of KMb in the PLNs and the process of KMb among schools. By contrasting two schools, the study traces how mechanisms of KMb occurred. Data sources were analyzed using a structured content analysis alongside a deductive–inductive code system.

Findings – The results of the exploratory study show that, although the model is able to map the KMb practices, some refinement is still needed. While the extension of concepts describing the work of knowledge mobilizer (KM) leads to a more theoretically differentiated perspective, the data also showed that PLN participants only partially define themselves as KMs. The connection to concepts of strategies of knowledge mobilizing on an organizational level led to an increased transparency in the theoretical model. The data showed that KMb is influenced by organizational and individual beliefs.

Originality/value – The paper adds to the current knowledge base through a theoretical model that addresses the underinvestigated topic of KMb regarding the link between the individual and organizational levels. With a special focus on individual and organizational levels, a connection between KMb and IC is provided. The theoretical framework and research findings from an additional explorative study can be used to further develop relevant insights into the actions of participants from PLNs that enable IC processes among their schools.

Keywords Professional learning, Knowledge mobilization, Institutional change, Carrier mechanisms

Paper type Research paper

Introduction

Recent research shows an increasing interest in the topics of “knowledge mobilization” (KMb) and “knowledge mobilizer” (KM) in the context of professional learning networks (PLNs) and

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their relevance for institutional change (IC) (see [Brown and Flood, 2019](#); [Pollock et al., 2019](#); [Hubers et al., 2018](#); [Philpott and Oates, 2017](#)). It becomes apparent that the different concepts can be considered on an individual as well as on an organizational level. However, research approaches have only explored this duality in terms of the role of PLNs in the context of IC in a limited way. Therefore, the central aim of this paper is to make the two levels visible and develop a useful model to better understand the effects of PLNs on IC.

PLNs are defined as any group in which professionals engage in collaborative learning with other professionals from outside of their everyday community of practice with the ultimate aim of improving outcomes for children and youth ([Brown and Poortman, 2018](#)). This definition already indirectly implies that in PLNs, new knowledge is acquired and mobilized for further use. More precisely, Brown and Flood emphasize that PLNs are the “type of long-term collaboration that enables participants to draw down on the expertise of others in order to develop new approaches to teaching and learning” (2019, p. 4). Nevertheless, in connection with PLNs, the main research focus of *KMb* or *KM* so far has been on how evidence finds its way into practice. Special attention, for example, has been paid to *educational intermediaries* who act as mobilizers ([Cooper, 2013](#)) and the question “what and whose knowledge” is mobilized by whom ([Malin et al., 2018](#)). Further studies focus on the structures of networked systems, regarding how and which processes were utilized to mobilize knowledge among such networks ([Pollock et al., 2019](#)).

The concept of *KMb* implicitly or explicitly conceptualizes the transfer of knowledge as an enabler of change within an individual person or an organization. The emergence of new ideas and approaches of organizational members is supposed to enable change processes. If these changes lead to new structures or routines, [Fullan \(2007\)](#) refers to this as *institutionalization*. In this article, this process will be defined as *IC*.

However, while some studies have investigated the mobilization of knowledge in the context of organizations in general ([Collinson, 2004](#)), there is less attention for the question which mechanisms are chosen to pass on new knowledge and initiate change, especially in the school context – in other words, the ways in which *KMb* is actualized. Furthermore, very few studies have dealt with the mobilization processes triggered by PLN members who have participated in interschool networks and in what way these processes influence the instigation and sustained change for themselves and in their schools (see [Hubers and Poortman, 2018](#)).

Therefore, the questions arise as to *how* the mobilization of knowledge on an individual and an organizational level are related and how PLNs and their participants act as catalysts for IC. This paper combines different theoretical concepts of organizational theory with concepts of *KMb* and adapts them to IC in schools. On this basis, a model is developed that can be used to study the influence of PLNs on IC. To refine and verify the model, an explorative study was conducted. Research was carried out through the University of Innsbruck and funded by the federal state Tyrol.

Conceptual framework and prior research

The ways in which *KMb* and the role of *KM* are defined, conceptually are varied in the literature. Thus, the terms will first be explained and substantiated with regards to PLNs. In the second step, they will be consolidated in a model for IC.

Facets of KMb and the role of KMs in relation to PLNs

First, the process of *KMb* has two different stages: the *activation of knowledge resources* and making knowledge mobile by *carrying it into other contexts by means of different mechanisms*. Second, the success of the process depends on how useful the new knowledge appears to

recipients or how well it can be linked to existing concepts. Here, it is useful to draw on Nonaka and Takeuchi's (1995) distinction between *explicit knowledge* and *tacit knowledge*. While explicit knowledge is more accessible, the complexity of the knowledge and/or how tacit it is determine how often it is used. Because both the process of KMb as well as its contents are dependent on situational factors (Filaster and Spiess, 2007), KMb can be understood as situated organizational change that necessitates *organizational cultures* that value learning (Hemsley-Brown and Sharp, 2003). Louis (2010) suggests that all knowledge is local and knowledge created elsewhere must be *compatible with existing belief structures* so that it becomes legitimized and has utility within the local setting.

In this paper, I am using the term KMb with reference to both processes (activation and carrying into other contexts) as they occur within and beyond PLNs. In PLNs, participants work on problems of practice in interorganizational networks. In this way, the professional knowledge of each participant is activated; participants share and discuss their knowledge and link their own experiences with the new knowledge from others. I understand this as the individual process of KMb. But there is also the aspect of KMb on the organizational level. Participants oscillate between the PLN and their own organizations; therefore, they take both organizational knowledge to the PLN and the knowledge of the PLN to their "home" organization. In doing so, they take on the role of a KM.

Jackson (2003, p. 4) defines a mobilizer in an educational environment as "a proactive facilitator who connects people, networks, organizations and resources and establishes the conditions to create something new or add value to something that already exists." Cooper (2014) specifies eight functions KMs use to engage successfully in brokerage. In particular, a KM (1) *facilitates the linkage* between different stakeholders, (2) *increases awareness of empirical evidence*, (3) *makes knowledge* for a broader community more accessible, (4) *promotes engagement*, (5) *supports problem building capacity*, (6) *helps implement* KMb plans, (7) *influences others* (e.g. policymakers) and (8) *enables them to use evidence to galvanize priorities or change*. By describing which tasks a KM takes on, the author emphasizes that KMs are responsible for processes on an organizational level, too. Furthermore, Cooper *et al.* (2019) state that mobilizers are also the ones who adapt content for local use. KMb processes do not happen automatically but require the intervention of KMs. Meyer (2010) also stresses that KMs entail various practices to mobilize knowledge. Such practices or mechanisms in turn can have an influence on how knowledge is disseminated in the sense of Cooper *et al.* (2019). In order to gain a deeper understanding, a concept from organization theory is applied to expand the mechanisms that KMs utilize.

Carrier mechanisms between PLNs and schools

As KMs, the PLN participants do not just carry (new) knowledge from the PLN back to their school or organization but also adapt it to their own understanding. The following concepts based on Scott's model (2014) were originally designed to reflect the persistence of institutional ideas and assumptions. Here, it is discussed in the context of KMb and its use by KMs. Scott (2003) describes four different carrier mechanisms, namely *symbolic carriers*, *relational* (relationship oriented) *carriers*, *activities* and *artifacts*.

Symbolic transfers (symbol carriers) are mechanisms which function by means of picture-language media. Among these symbolic transfer mechanisms are rules, values and norms, schemes and scripts that provide specific behavioral patterns (Scott, 2014). In schools this can be represented, e.g. in mission statements or learning philosophies. Such aspects are investigated in research studies of *school cultures* (Fullan, 2007).

Relationship-oriented transfer systems (*relational carriers*) convey knowledge or institutional conceptions and expectations with the help of social positions and role-based systems (Fullan, 2007). Relational mechanisms are often depicted as organizational

structures (Scott, 2014, p. 99). In a school-related context, e.g. in the form of subject groups or informal networks.

Scott (2014) describes specific *activities* as the third form of transfer. Each organization has its own *repertoire* of certain routine actions. In schools, this kind of repertoire might, for example, include assessment strategies or the handling of absent students.

The final form of carrier mechanism is described as *artifact*. In contrast to symbolic carriers, which Scott understands mainly as communication, artifacts are objects. Artifacts on school level might be worksheets or an evaluation tool that is passed on.

Mechanisms of KMb on an organizational level

KMb processes on the organizational and the individual level are strongly linked with change. This is also underlined by Brownson *et al.* (2007), who state that KMb occurs in several phases. Specifically, they distinguish between the phases of *awareness, adaptation, implementation and maintenance*. In order to better understand the process of KMb on the organizational level and its effect on IC, the following section will present different mechanisms. As already mentioned, the KMb process is based on the concept that new ideas – from PLNs – and their logics can be linked to the existing logics of an organization (or an individual) so that new routines can be created. This means that a relationship between *new* and *old* knowledge is established. In order to highlight the intraorganizational mechanisms through which knowledge from PLNs can be disseminated and transferred into actions, I distinguish three different strategies: *diffusion, bricolage* and *enactment*.

(1) Diffusion

Diffusion is the distribution of institutional perceptions or new routines with little modification (Campbell, 2004, p. 77). Campbell, however, criticizes the diffusion concept because it does not explain what happens when new practices or principles are introduced into an organization. In the concept of diffusion, new things are adopted unquestioningly. The process of recontextualization is missing.

(2) Bricolage

With the help of bricolage, existing routines and guidelines are combined in new ways. Thus, organizations can develop new forms of reacting to, for example, claims from the outside or to new ideas that arise within the organization. In order for these new practices to be accepted, they must be interwoven with existing cultural practices. Since bricolage as a concept primarily describes a recombination of old or existing practices (Campbell, 2004, p. 77), the limitation of this concept is that the possibilities of combinations are limited.

(3) Enactment

The mechanism of enactment is based on the understanding that the actor perceives his or her surroundings as a repertoire (see Campbell, 2004, p. 72). In doing so, actors are both integrated in institutional practices and qualified to orient themselves within these structures. In contrast to bricolage, enactment is more radical as fewer old routines are adapted and more new practices are developed. Such an understanding can only be effective if actors are given a certain amount of decision-making capacity.

KMb and institutional change (IC)

How IC takes place depends on the existing circumstances (e.g. dynamics of power, structures and resources) and, as emphasized by Campbell (2004), on the attitude of organizational leaders. Campbell (2004) also states that when more than just a few new elements are introduced by actors, the change brought about is of a more revolutionary than incremental

nature. According to Campbell, bricolage – which primarily results from the combination of preexisting institutional elements – promotes incremental change, whereas enactment, which deals with new elements, encourages revolutionary change. When applying this to the context of PLNs, the knowledge that has been mobilized in the PLN could find its way back to schools in a different shape.

A framework for the duality of knowledge and IC

To further understand the KMb mechanism on individual and organizational levels, I developed a model as presented in Figure 1. This *dual structure of KMb model* illustrates the KMb process that occurs within the PLNs as well as on the organizational level. In the model, the PLN participants are understood as KMs who use the generated knowledge from the PLN and transform it into the context of their schools. For this interorganizational KMb, the PLN participants apply different mechanisms. The mechanisms are described in the model as *carriers*. Furthermore, the model displays the organizational process of KMb initiated by the PLN participants. Hereby, KMb is closely linked to school culture, which is why the mechanisms of *diffusion*, *bricolage* and *enactment* have been integrated. Following the model of Czarniawska and Joerges (1996), these mechanisms can be used to illustrate processes of IC. In this way, initiated by PLNs and their participants, new routines and processes are created which are incorporated into the school culture, that is, institutionalized. As a result, this model can be used to trace the bridge between PLNs and IC.

In relation to IC, the model helps to establish more transparency and clarity to the interaction of KMb on an individual and an organizational level. However, because there has been little research on this topic to date, an explorative qualitative research is used to complement and refine the model. In particular, the following questions lead to a reconciliation of the theoretical assumptions of the model and the actual processes:

- (1) How are individual KMb processes in the PLNs described by participants?
- (2) How do PLN participants specify their role in relation to KM?
- (3) What concrete carrier mechanisms can be observed in the practice of PLN participants as KM?
- (4) To what extent do PLN participants describe different strategies of KMb on the organizational level within their schools?

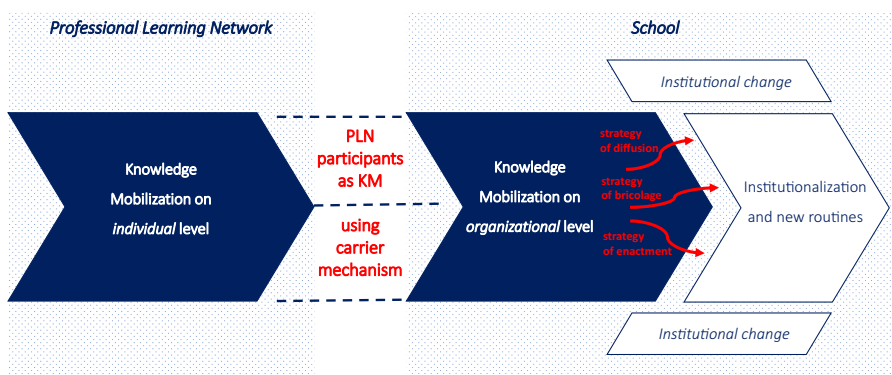


Figure 1. The dual structure of knowledge mobilization-model (adapted from Czarniawska and Joerges, 1996)

Explorative study

Research context

The context of this exploratory study is PLNs that were initiated bottom up by teachers in a model region in Austria (Modellregion Bildung Zillertal). In total, three PLN groups were formed, each with eight to ten teacher participants from eight different schools and organized according to subject area (German, mathematics and English as foreign language). In some cases, only one teacher from a school participated, in other cases several teachers from the same school attended. The PLNs met a total of four times in a school year. The PLNs started in 2017/2018 and ran for two school years in a row. The topics discussed were determined by the participants but mostly aligned with current instruction development topics (e.g. instructional differentiation or new assessment approaches). The PLNs were facilitated by external moderators who set the dates and coordinated the exchange of material from the participants. In some cases, the external moderators also provided theoretical input to requested topics. The facilitators were all teachers (subject experts) themselves but furthermore worked for the local University College of Teacher Education. Most of the teachers participated in these PLNs on a voluntary basis, with participation levels varying considerably. The participants named different motives for participating in the PLNs, as can be seen in the interviews. A special feature of the PLNs in the model region was that teachers from both lower and upper secondary schools participated. In the second year, the number of participants from upper secondary schools was higher than in the first year. This brings in an extra dynamic as institutional logics of these two school types also vary. Since it was no longer possible to finance the facilitators in the 2019/2020 school year, the PLNs were discontinued.

Study design: methods, instruments and respondents

In order to examine the developed framework in line with the formulated questions, an exploratory case study design, with use of convenience sampling, was conceived (Yin, 2017). While the processes of KMb need to be considered both on an individual and an organizational level, the study design was structured in two phases. In the first phase, each participant was seen as a case; in the second phase, each school was defined as case. First, the interview data of all PLN participants were analyzed individually to investigate their experience in the KMb process and their roles as KMs. These data were utilized to better understand how PLNs were designed and how PLN participants act as mobilizers. In the second step, I explored in-depth the processes of two of the schools as cases. For these schools, data were available in terms of interviews and (for one school) participant logbooks. Triangulation (Flick, 2004) of the individual data was used to trace the processes of KMb on the participants' schools level. The two schools were comparatively analyzed through an embedded subunit design (Flick, 2004), in which the teachers are treated as subunits of their schools.

(1) Data collection methods and instruments

The primary data source was semi-structured interviews with the PLN participants (Misoch, 2019). This was seen as an appropriate method to gain a perspective of the respondents' view of KMb and their role as KMs. Moreover, semi-structured interviews allow for an increased amount of flexibility to follow a line of conversation (Adams, 2015).

The interview protocol was structured into different sections: *descriptions of the individual KMb processes in the PLNs, understanding of the role as KM and used carrier systems and KMb strategies among the participants' schools*. This focus ensured that the central elements of the model were covered in the interview protocol. Particularly challenging was the design of the sequence referring to KMb on the organizational level as the terms *diffusion*, *bricolage* or *enactment* are not commonly used in schools. To avoid misinterpretations by the interviewees, I decided to ask about the respondents' understanding of their school

culture, everyday routines and how these aspects were linked to new ideas from the PLNs in their organizations.

The interviews were conducted over the telephone and recorded digitally. They ranged from 25 to 45 min in length. A total of two interviews were answered in a written form by the respondents.

In addition to the semi-structured interviews, respondents were also invited to keep a logbook (Fischer and Bosse, 2010) to capture in writing their experiences of mobilizing knowledge from the PLN to colleagues in their schools. For this purpose, a Word document containing a table with five columns was sent to the PLN participants. The first column asked about the situation in which knowledge was brokered to others in the school. The second column asked whether the situation in which knowledge was transferred was intended or not. Column 3 captures the role the PLN participant took on by brokering the knowledge (e.g. in a formal teacher leader role). Column 4 asked about the previous knowledge of the colleagues on the topic, and the last column dealt with which channel was used. Respondents were given a range of options for the last column (e.g. presentation at conference; personal conversation; via social media, etc.). Respondents were asked to keep records in this table for two weeks. This method was used to deepen the understanding of the KMb processes, the role as KM and the use of a carrier mechanism. Time limitations meant that only two of the seven teachers completed a logbook.

(2) Participants

In total, all 26 participants of the PLNs were contacted via email. Altogether nine teachers agreed to participate in an interview. The reasons given for nonparticipation were time factors and workload as the interviews were conducted at the end of the school year 2018/2019 (May–June 2019). Because the interviews were conducted as part of the evaluation of the project mentioned above, some schools were more willing to support the interview study than others, which is why the majority of the nine interviewees were from only two schools.

For the presented exploratory study, the data of seven participants ($n = 7$) from two schools were considered. As the PLN design had no restrictions in regard to who could participate, PLN members are not necessarily opinion leaders or teachers with functional roles in their schools. The professional experience of the interviewed teachers varied between five and 20 years. Of the interviewees, four were female and three were male. Furthermore, the respondents had different subject backgrounds and therefore attended different PLNs. A total of four interviewees worked in a higher secondary school and three taught in a lower secondary school. Both schools were located in the same area. The two logbooks are from participants from the same school (lower secondary).

Data analysis

Following the transcription of the recorded data, both the interviews ($n = 7$) and the logbooks ($n = 2$) were analyzed using Kuckartz' (2014) structured content analysis. This deductive–inductive analysis method can be used to verify assumptions from the theoretical framework as well as to gain new insights.

In accordance with the design, the interviews and logbooks were first analyzed to obtain data at an individual level. A deductive–inductive category system was created, which included facets of the participants' understanding of their roles. The category system was based on the theoretical assumptions outlined in the previous section – *facets of KMb and KM in relation to PLNs* – (deductive categories) and was extended by new results (inductive categories). Likewise, different categories regarding the carrier mechanism could be identified. The questions formulated by the theoretical considerations underpinning this study also guided the analytical approach.

For the second phase of the study, the data relating to the organizational level were triangulated. Triangulation in this case means the combination of the individual interview data at the school level (see [Flick, 2004](#)) complemented by the information from the two logbooks. The three interviews with PLN participants from School A, along with their logbooks and the four interviews from School B were combined and evaluated again in a cross-case analysis process. The interviews were analyzed taking a deductive approach. In doing so, categories for the different KMb processes were developed based on the theoretical framework (*diffusion*, *bricolage* and *enactment*). [Table 1](#) shows anchor phrases from the interviews.

Based on this analysis, a descriptive narrative of the two schools was generated ([Czarniawska, 2004](#)). Those narratives allowed a recontextualization of the schools' organizational cultures, which are key to the route of the KMb processes. In the next step, the two cases were compared. This contrast enriched the data analysis with further findings. The results of the analysis are presented in detail in the following section. To ensure reliability, the narratives were rediscussed with several PLN participants as well as one school leader. These queries enabled a more accurate description of the school-specific organizational culture (see [Table 2](#)).

Results

As shown in the previous section, the data analysis was divided into two parts. Therefore, when presenting the results, the findings on an individual level are discussed first. Here, the focus is on the KMb processes among the PLNs, the participants' roles as KM, as well as how the carrier mechanisms were applied.

KMb processes and activities among PLNs

In most cases, the newly acquired knowledge was tested by the PLN participants in their own lessons and discussed at follow-up PLN meetings (e.g. new assessment approaches). Some participants stated that the methods or approaches could be well combined with their previous teaching methods. Others felt that the discussed formats were not very suitable for their teaching.

It was shown how this approach works in the lower secondary school, for the upper secondary school the approach was only partially suitable (PLN_B_4).

PLN topics were suggested by the PLN participants and prepared by the moderators using short input sequences. Participants also stated that the PLNs had been less about developing

KMb strategy	Phrases from the interviews
<i>Diffusion</i> : spread with little modification; missing process description of set actions	"We receive information from the school management. They forward it to us and we implement it" (PLN_B_1)
<i>Bricolage</i> : a recombination of existing practices; new routines are legitimized by existing assumptions	"We have our school subject group, in which we discuss updates and align them with the practices we have" (PLNP_B_3) "We notice with some concepts that we are already doing this anyway, we just name it differently" (PLN_A_1)
<i>Enactment</i> : new elements are activated	"...for major developments the team of subject teachers works together. Everyone is responsible for a certain part and afterwards we coordinate and agree on a procedure" (PLN_A_2)

Table 1.
Codebook–anchor
examples for KMb
strategies

products, such as worksheets, and more about reflecting on teaching processes. Some interviewees also mentioned that through the PLN exchange, aspects that were already known but no longer consciously practiced were reactivated (e.g. goal-oriented lesson planning).

PLN participants as KMs

All respondents stated that their participation in the PLNs had been a personal enrichment for them; for many, it had presented the possibility to focus in-depth on certain aspects of teaching. Nevertheless, the majority of the respondents pointed out that their intention of attending a PLN had not been to take on the role of a KM in their school.

I visited the PLN for personal interest and the new knowledge I gained was mostly beneficial for myself (PLNP_A_3).

During the interviews, the participants were asked whether they had held certain functions in their schools. A total of three of the participants of School B had special functions, like subject coordinators, while only one participant of School A had special responsibilities at their school.

Some of the respondents emphasized that they had had a problem with exposing their new knowledge because they did not want to be seen as experts or as someone who knows it better.

I have had bad experiences with putting my skills too much in the limelight—this has led to conflicts. So, I prefer to keep my knowledge to myself (PLNP_B_3).

I have noticed that it is better to talk about new knowledge in one-on-one conversations. Just explaining in front of everybody—that's new, that's good and we will do this from now on, isn't a way that works (PLNP_A_1).

Finally, almost all respondents agreed that it was not their role to initiate change through their participation in PLNs within their schools. Nevertheless, they indicated that they had discussed in the PLNs how to deal with resistance to new knowledge among their staff members at school.

Diversity of used carrier mechanisms

Respondents reported that in total, relational carriers and action-oriented carriers were used the most. The teachers stated that they had mainly exchanged information in informal conversations, especially with other teachers from their school who had participated in PLNs as well.

I often exchanged ideas with my colleagues who participated in a PLN as well. Mainly information about the PLNs' contents (PLNP_B_2).

When asked to what extent the participants would differentiate and with whom they would exchange new content, most of the respondents stated that they deliberately talked to colleagues who were open to innovation. It played a subordinate role whether these colleagues taught the same subject.

At one school, the PLN members were asked to present insights or excerpts from the work in the PLNs within a school conference or a subject group meeting. These presentations were initiated by the school leader or the subject coordinator and not actively set by the PLN participants. As a result, mainly symbolic carriers (verbal presentation of the PLN content) were used.

Regarding the fourth mechanism – artifacts – only a few participants ($n = 2$) indicated the use of this mechanism.

I forward new findings and material through a platform provided by our school (PLNP_B_3).

Logbook documentation of used carriers

The two logbooks confirmed the statements made in the interviews. The relational carrier was used most frequently with a total of four mentions. Only one entry described how a rubrics model from another school was shared for instructional assessment settings; this form of carrier was classified as artifact. The PLN participants also stated that they had different roles while sharing their knowledge from the PLN, for instance, as an “expert” during a lecture in front of the staff (symbolic transfer) or as a team-teaching partner in class (action-related carrier). Mostly the situations in which the knowledge was passed on were incidental. Settings in which the PLN participants were asked by the school leader (mentioned twice in the logbook) were described as *intended*. In each case, a presentation was given to colleagues (*symbolic carrier*, see [Scott, 2014](#)”).

KMb on organizational level

The data revealed that those who had a clearer understanding of routines and structures articulated in more detail the extent to which the given structures favored the dissemination of knowledge.

We have team teaching at our school. This routine requires a joint practice in preparing lessons. I assume this promotes knowledge transfer (PLNP_A_1).

Moreover, the data showed that PLN participants from the same school described different KMb processes. In School B, for example, one PLN participant (PLN_B_1) described the process of KMb as a process in which knowledge was passed on without further explanation or recontextualization (*diffusion*), while others (PLN_B_3; PLN_B_4) perceived it more as an active engagement with a new approach, drawing conclusions from existing routines (*bricolage*). Respondents from School A described more consistency in the KMb processes, by using the personal pronoun *we* more often. While one participant tended more toward an understanding of bricolage, others described the introduction of new approaches more in the sense of enactment:

... for major developments the team of subject teachers works together. Everyone is responsible for a certain part and afterwards we coordinate and agree on a procedure (PLN_A_2).

For School A, the interviews revealed that the understanding of the KMb process was also related to the content being disseminated.

As shown in the theoretical section, school culture and school-wide routines also influence KMb processes. In the ensuing cross-case analysis, a range of school cultural characteristics could be identified.

School A had a clear vision, displayed in every classroom and communicated among the teachers. Nevertheless, the respondents did not perceive any connection between this vision and their work in the PLNs. In School A, team teaching was a regular component of instruction with many colleagues in a process of professional exchange. There also were monthly meetings with all teachers. In this school, leadership functions mandatory for all schools were assigned to teachers, but there was no active middle management. The principal supported participation in PLNs but did not, for instance, offer structures to support KMs in terms of including them in implementation processes. The participants from this school often argued that exposure as an individual would lead to conflict.

In School B, a common vision was not clearly visible and staff members were organized in subject units. These teams had a high degree of autonomy in terms of instructional

approaches and professional learning. There was another group of teachers including the school leader that dealt with school improvement responsible for setting a specific developmental direction. Although PLN participants were members of this group, they were unable to establish direct links between the PLN content and the school's developmental goals. In this school, the teachers seemed to act more independently of each other. The PLN participants of this school were requested to participate by the principal. Participants stated that due to school size, aligning practices across the school was hardly possible. In School B, the subject groups were particularly highlighted.

Table 2 presents the inductive categories that were formed by using a structured content analysis approach (Kuckartz, 2014). The aggregation of the interview data at school level has revealed various characteristics that were related to processes of the dissemination of knowledge. The first category includes the *link* that was established between the content of the PLNs and the topics of the school's development goals. The second category describes the *daily routines* participants experienced in collaboration. In particular, it highlights how and when teachers worked together. A further category examines *leadership support structures* and contains interview passages that included support from the school management. The last category contains information on *awareness for common actions* that were maintained at the schools. The results show that the organizational cultures of the two compared schools differed considerably.

Discussion and limitations

This study explored theoretical assumptions which were merged into a practical model I called *dual structure of KMb*. First, I examined how KMb processes occur in PLNs. I also explored how PLN participants function as KMs. In this context, the study looked at the mechanisms used by PLN participants to carry knowledge from PLNs. In order to identify how KMb processes work at school level, participants were asked about KMb strategies. The analysis of the data showed that schools have different characteristics that can influence this process, which were analyzed and are discussed below. Special attention will be paid to where the model corresponds to practice and where extensions or changes are necessary.

Individual process of KMb among PLN

Results show that specific characteristics of KMb were initiated through the activities in the PLNs. For example, participants indicated that they had adapted the knowledge for their local environments by applying new approaches in their classrooms and reflecting on them.

Inductive categories	Narratives of School A	Narratives of School B
1 Linkage between PLN content and schools' development goals	<i>clear school vision, but not connected to PLN work</i>	<i>no common school vision visible, and not connected to PLN work</i>
2 Daily routines, structures and processes enabling KMb	<i>team teaching and monthly meetings promote exchange</i>	<i>strongly organized subject teams promote exchange within subject groups</i>
3 Leadership support structures for KMs	<i>Informal support of the PLN participants</i>	<i>PLN participants were requested to participate</i>
4 Awareness for common action for KMb	<i>School-wide collaboration facilitated by the principal</i>	<i>Little school-wide collaboration, school improvement committee or specialist groups: Logic of multiplier concept exists</i>

Table 2. Comparative narratives of the two schools

Some statements suggest that the KMb process in the PLN had made implicit knowledge explicit (again). This seemed a random result of the PLN work rather than an intended one. Another aspect that was not considered in the theoretical model was the role played by the PLN facilitators. Short inputs by facilitators reported by the respondents were in themselves KMb processes in which the moderator became the KM. This aspect should be integrated into the model.

PLN participants as KMs and used carrier mechanisms

The data showed that PLN participants did not automatically understand themselves as KMs. Although the interviews have shown that the participants used different mechanisms to disseminate their new knowledge, they often lacked characteristics that would distinguish them as KMs.

According to Jackson's (2003) general definition, PLN participants in this study provided gateways to information, but they often did this unintentionally. The interview data highlighted how the respondents had no intention of putting their head above the parapet *vis-à-vis* their colleagues. The active role of KMs in *promoting engagement, supporting building capacity and helping implement* (Cooper, 2014) was not confirmed in the interviews. For the model, this could mean that PLN members can only be described as KM to a limited extent. However, it could also elucidate that PLN participants must be strengthened in their role as KMs. The importance of leaders is supported in the literature (e.g. Brown, 2020).

A particular focus was placed on the carrier mechanisms in the model. The results actually showed that PLN participants used different carriers. The extension of the model with this element therefore would seem beneficial because it helps to provide more transparency in the process.

Individual and organizational norms and beliefs

The results of the exploratory study showed that not only the organizational norms and culture seemed to influence the KMb process but also the individual beliefs of the respondents. Participants also stated that different KMb processes were identified depending on content (cf. Fliaster and Spiess, 2008). Hence, different KMb mechanisms can be applied simultaneously. The integration of individual beliefs as well as the appearance of different KMb mechanisms at the same time is highly relevant for the further development of the model.

The difference between participants' experiences can also be explained by certain organizational structures. As the cross-case analysis and comparison of the two schools showed, actors from School B tended to act more individually. School A provided more structural exchange opportunities through team teaching and monthly staff meetings. Against this background, the analysis of organizational structures would be a further potential extension for the model.

From the PLN to IC

The findings suggest that different levels of awareness prevail in organizations. Only if routines and ideas behind concepts are made explicit, it is possible to adapt innovations accordingly or to spread changes through different KMb processes (cf. Ganguly *et al.*, 2019; Nonaka and Takeuchi, 1995). These phases cannot be managed by the PLN participants alone; awareness and the willingness to change are required within large groups of the organization. This insight leads less to an extension of my developed model than to practical implications for PLN work. If KMb is to lead to planned change, it is

important that (new) content is consciously reconciled with existing concepts. However, this requires *explicit* knowledge of the ideas behind the existing concepts in order to be able to make decisions.

Limitations and further research

While the strengths and weaknesses of the model have been outlined, the limitations of the exploratory study also need to be addressed. With a small number of participants, only limited conclusions about the model can be developed. The fact that the data collection was part of a larger evaluation project may also have had an impact (e.g. in the sample). Furthermore, the process of KMB is often characterized by implicit knowledge stocks, and interview studies have reached their limits here. The study is based on retrospective data. Thus, using an *in situ* method could provide the potential for direct participation in the KMB processes on the organizational level. Finally, a more detailed and triangulated study of the different components of the model is needed to further generate useful and useable knowledge for schools interested in the potential of PLNs.

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The dual
structure of
mobilized
knowledge

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