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Artifacts as authoritative actors in educational reform

Routines, institutional pressures, and legitimacy in student data systems

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Abstract Educational reforms are often translated in and implemented through artifacts. Although research has frequently treated artifacts as merely functional, more recent work acknowledges the complex relationship between material artifacts and human/organizational behavior. This article aims at disentangling this relationship in order to deepen our understanding of the role of artifacts within processes of educational change. In particular, we study the implementation of a data-transfer instrument developed to stimulate care continuity between primary and secondary schools. In order to understand an artifact's authority and to unravel its role in processes of innovation, we turned to organizational routines and neo-institutional theory. Drawing on data from an artifact analysis and semi-structured interviews, this article reports how this artifact not only transfers data, but also changed the discursive interactions (routines) in the school team around care. From an institutional perspective, implementing the artifact can be viewed as an answer to institutional forces that are pressurizing organizations to conform to particular ideas of what care and care continuity should ideally look like. The use of the artifact contributed to the schools' organizational legitimacy by serving their symbolic

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needs and it enabled them to position themselves towards stakeholders, parents and other schools as a truly legitimate school.

Keywords Educational change · Primary–secondary transition · Artifact · Organizational routines · Neo-institutional theory · Case studies

Problem statement

Policy attempts to provoke educational change often enter schools in the form of artifacts: materialized representations of intentions and ideas that are both constituted in and constitutive of educational practices (Spillane et al. 2004). Forms, procedures, teaching materials, administrative tools, etc. are being designed, produced, and distributed to the educational system with the intention of influencing or improving practices in schools. Policy-related artifacts are ubiquitous and self-evidently present in the everyday life of classrooms and schools. Therefore, it is somewhat surprising to observe that their actual role and impact has been relatively little studied.

In this article, we report on a study on a data-transfer instrument developed to facilitate and warrant the continuity of educational care when pupils make the *transition from primary to secondary* education: the so-called TraPS-file in Flanders (Belgium). Both experience and extensive international research show that for a significant number of pupils this transition constitutes a difficult stumbling point, negatively affecting their learning, their development as well as their motivation and self-esteem (see for example: Anderson et al. 2000; Benner 2011; Chedzoy and Burden 2005; McLellan and Galton 2015; Qualter et al. 2007; Sirsch 2003; Symonds 2015). On an organizational level, stimulating communication and information transfer between primary and secondary schools has been identified as a strategy to improve a successful transition (see for instance, Evangelou et al. 2008; Feeney and Best 1991). As such, in Flanders, more and more schools have started to use a TraPS-file -as a data-transfer instrument- to smoothen this transition by sustaining continuity in learning and care. More specifically, the file represents a document developed to standardize effective transfer of care related data. The TraPS-file needs to be filled out by teachers at the end of primary education (sixth grade, 12 years old) and handed over to parents in order to 'move' with them to the secondary school. This data-transfer instrument aims to facilitate the primary to secondary school transition by (1) ensuring effective information transfer and use of pupil data between the two levels of schooling, (2) stimulating effective support guidance within secondary education, and (3) improving the communication between the schools and parents. Although the TraPS-file is not legally imposed, variants of this file have been widely implemented in Flemish schools.

As the case of the TraPS-file illustrates, the content and goals of educational reforms often become materialized in the implementation of artifacts or purposefully designed objects that aim to improve the practices of education and learning. In order to unravel the artifacts' role in educational change processes, an appropriate

conceptualization of the relationship between the object and its possible users is required. One way to do so is to disentangle the individual and collective sense-making processes which underlie the actual use. In another study (Vermeir et al. 2017), we have used frame analysis to unpack and understand the confrontation between the TraPS-file and its users in the school as a *process of interpretative negotiation* between the frame (meaning system) of the artifact and those of its users. Implicitly and metaphorically, we came to understand this material artifact as an 'actor' (instead of a passive tool), with whom the members of the school staff engaged in meaningful interaction. While still acknowledging the artifact's potential 'agency' (Vermeir et al. 2017), in this article we use a more structural and institutional approach. In doing so, we subscribe to the claim by several authors that sense-making processes in schools are also influenced by spatial arrangements as well as materiality, and that therefore it is necessary to include structural and material characteristics in the study of educational change (see Burch 2007; Fenwick 2011; Weber and Glynn 2006). According to Fenwick (2011, p. 116) for instance:

> (…) the emphasis on personal and social processes, as important as these appear to be in constituting the cultural, emotional, political and psychological relations at work in education, completely ignores the material presences that exert force and are entwined with what appears to be human intention, engagement, resistance and change.

With this article, we want to join this line of work and illuminate how artifacts operate as co-constitutive components of educational change. Instead of emphasizing the role of personal (e.g., intentions, beliefs, interests) and social processes (e.g., collegiality, collaboration) in understanding educational change, this article looks at the role of the material influences. Our point of departure is that the interdependency between human actors and the material world is a complex matter that needs to be disentangled -both conceptually and empirically- if we are to contribute to valid theory development about educational reform and implementation (Fenwick 2011). Rather than emphasizing artifacts as passive tools, discrete entities, as brute things to be installed or implemented, we want to put artifacts central stage by focusing on the (inter)actions and the practices that are enacted by artifacts as they achieve their (often unintended) accomplishments in use. As such, this study builds on, broadens, and deepens our former work on educational change in which agency and sense-making were more prominently emphasized (Kelchtermans 2007; Kelchtermans and Ballet 2002; März et al. 2013; Vermeir et al. 2017).

Theoretical framework

In line with our interest in the material and structural aspects of educational change and the role of artifacts, the theoretical framework of our study was primarily informed by organizational routines theory and neo-institutional theory, their concern with legitimacy and the link with educational care.

Organizational routines

Following Feldman and Pentland (2003), we define organizational routines as "a repetitive, recognizable pattern of interdependent actions, involving multiple actors" (p. 96). Organizational routines refer to patterned activity rather than unique occurrences (see also Spillane 2012). Being repetitive implies that these patterns are maintained during each enactment of the routine. Routines further always involve multiple actors (and artifacts) and their interdependent actions: "they [organizational routines] are carried out by sociomaterial ensembles of actants that include artefacts" (Pentland et al. 2012, p. 1486). Together, actors and artifacts, make up a pattern that others recognize or acknowledge as a routine. This conceptualization of routines in terms of recognizable and repetitive patterns of action, interrelatedness, and interdependence, provides the conceptual tools to study both the social aspects of reform implementation and artifacts in (inter)action: "Organizational routines are a useful unit of analysis (…) they focus our research on standard ways of doing things in the school and how, if at all, these standard ways of doing things change" (Spillane 2012, p. 5). Feldman and Pentland (2003) have further opened the black box of routines and started to conceptually disentangle their dynamics by distinguishing three interrelated aspects: the ostensive and the performative aspect of routines (which are recursively related) and artifacts.

The *ostensive aspect* of a routine refers to the so-called script or the description of how the routine should be performed. Feldman and Pentland (2003) define it as "the ideal or schematic form of a routine. It is the abstract, generalized idea of the routine, or the routine in principle" (p. 101). This ostensive aspect has several functions. In its referring function, it allows actors to describe and refer to particular actions, as part of a whole. Its accounting function permits actors to explicate and justify particular actions. And, finally, routines also offer guidelines for human behavior, without really specifying the details of the specific performance (i.e., guiding function). The ostensive aspect is not per se about written rules or procedures -since for many routines they simply do not exist- but encompasses actors' understandings regarding this routine. This understanding may differ somewhat among different actors, for example regarding the starting and ending point of a routine, the necessary actions to include, and who should be involved: "the ostensive incorporates the subjective understandings of diverse participants" (Feldman and Pentland 2003, p. 101). This script of the routine needs to be enacted in order for the routine to actually exist and operate.

The *performative aspect* of a routine embodies the "specific actions, by specific people, in specific places and at specific times. It is the routine in practice" (Feldman and Pentland 2003, p. 101). The actual enactment also inevitably entails a level of improvisation, as it needs to adapt to the particularities of a specific situation. The definition of routines in terms of repetitive patterns of collective action, creates the image of routines as being rigid or fixed. Yet, since they need to be enacted in order to operate and be effective, those repeated enactments constitute opportunities for modification or change. Routines change as a result of "people doing things, reflecting on what they are doing, and doing different things (or doing the same thing differently) as a result of the reflection" (Feldman 2000, p. 625).

Artifacts, then, operate as physical manifestations or indicators of either the ostensive or performative aspects of the routine. Whereas in Feldman and Pentland's view artifacts are considered to operate 'outside' organizational routines, others have argued that the actual materiality of artifacts may influence the design and performance of organizational routines (see a.o., D'Adderio 2011; Volkoff et al. 2007). This implies:

> moving beyond the dominant characterization of artifacts as opaque, lifeless 'objects' that lie outside the routine. It also involves moving past their extreme characterization as either fully prescriptive objects that deterministically influence and constrain actions, or as simply descriptive, infinitely malleable and often inconsequential entities, which depend upon the agents' willingness to include them as part of their performances. (D'Adderio 2011, p. 199)

Hence, we take as our point of departure that artifacts not only influence or represent routines, but they are themselves a fundamental aspect of organizational routines and organizational change.

Neo-institutional theory

While routines theory allows us to conceptualize artifacts as constitutive elements of repetitive patterns of organizational interactions (routines), the question remains how artifacts can successfully call on organizational members for action. How can we understand artifacts' actual impact on educational practices, since they make actors change their usual ways of working? Or, to stay with our central metaphor: how can the artifact as 'actor' speak with authority, 'demand' changes in practice or effectively alter existing practices or routines, or establish new ones? Since changing educational practices is a central purpose of innovation, this matter is highly relevant for theorizing educational change.

To answer these questions, we have turned to neo-institutional theory, as it addresses the processes through which rules, norms, and routines provide organizations and their actors with meanings, values and scripts that may direct individual and organizational behavior (Scott 2008). The actions of social actors and organizations are guided -both enabled and constrained- by cultural norms that are constructed and reconstructed in the institutional context in which they operate.

Consequently, a proper understanding of how organizations (and organizational members) operate is not possible without taking into account the wider institutional environment in which they are embedded. DiMaggio and Powell (1983) introduced the concept of *organizational field:* "those organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products" (p. 148). Schools are, for instance, embedded in an organizational field that encompasses government agencies, universities, parents' associations, professional development providers and textbook publishers, which all have their own perspectives, interests and values (Burch 2007). Through the concept of organizational field, neo-institutional theory has rightfully broadened the

attention to include a wide range of relevant external actors, in understanding the functioning of an organization (Burch 2007; Coburn 2005).

A second useful concept from neo-institutional theory is *institutional logics,* referring to macro belief systems that specify legitimate goals and values, define appropriate structures and govern organizational sense-making and cognition, constitute identities and provide meaning and order to action in institutional sectors (Scott 2008). In other words, they define the social space within which actors can understand themselves and to which organizations must conform to maintain or gain *legitimacy* (März et al. 2016; Scott 2008; Thornton and Ocasio 2008). Thornton and Ocasio (1999) argue that institutional logics

> are both material and symbolic—they provide the formal and informal rules of action, interaction, and interpretation that guide and constrain decision makers in accomplishing the organization's tasks and in obtaining social status, credits, penalties, and rewards in the process. (p. 804)

According to this definition, institutional logics are on the one hand the symbolic construction that bounds or guides the way actors make institutions meaningful and on the other the material practices that represent and enact meaning.

We can further link this to Scott's (2008) argument that institutional logics are embodied in various *institutional carriers*. In particular, institutional elements can be transmitted from place to place and from time to time through various types of institutional carriers or repositories, including symbolic systems, relational systems, routines, and artifacts: "They [carriers] point to a set of fundamental mechanisms that allow us to account for how ideas move through space and time, and who or what is transporting them" (Scott 2008, p. 79). More specifically, artifacts, as one particular institutional carrier, embody and instantiate institutional logics or knowledge that can be viewed as elements of material culture, as such exerting pressure on school organizations to act in a particular way.

This pressure has been conceptually elaborated by DiMaggio and Powell (1983). They distinguish three different types of *institutional pressures* or mechanisms. *Coercive pressure* refers to the internal and external forces exerted in the form of laws, rules, sanctions, and incentives to introduce certain structures or systems. *Normative pressure* (e.g., values and norms) describes the effect of professional standards and the influence of professional communities on the organizational characteristics. *Mimetic pressure* encompasses the pressure to copy or imitate activities, systems, processes, practices, or structures of other organizations, even when no real evidence exists that this copying will improve performance. While each type of pressure represents a separate process, they act simultaneously and yield results where the specific effect of one or the other of the types cannot easily be distinguished. This conceptualization is helpful in understanding the various forces or motives for adopting new organizational forms or practices.

Legitimacy and educational care

Our discussion of organizational routines and institutional logics has already pointed to the vital importance of legitimacy in organizational and institutional

theory. This concern goes back as far as the work of Talcott Parsons and Max Weber, as Scott (2008) demonstrates in his historical overview. Suchman (1995, p. 574) defines legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions". This broad definition explicitly acknowledges the role of the social audience, the 'others' in the dynamics of legitimacy. It is through their evaluation, acknowledgement and approval that social actions—in our study around the implementation of a particular artifact- get legitimacy. This implies that legitimacy needs to be obtained, that it is granted and therefore can be withdrawn. In other words, obtaining and maintaining legitimacy is a central concern for organizations like schools, operating in the institutional environment of the educational system at large.

In the case of the TraPS-file, the central artifact in our study, the ultimate source for its legitimacy is related to the idea of educational care, to doing justice to the pupils' interests and needs (see e.g., Noddings 1984; Oser 1994). The purpose and justification for the file is to provide care continuity and in doing so meeting the particular educational needs of individual students (see further). This clearly normative idea, calling on a moral obligation towards one's students, constitutes a very powerful source of authority and normative pressures, as well as of justification and legitimacy for organizational actions (as we have demonstrated in other work: see Ballet and Kelchtermans 2009; Vermeir et al. 2017).

To sum up, we chose to study the actual implementation practices of a policy related artifact -the TraPS-file- in order to further our understanding of the role and impact of material and structural elements in changing organizational practices. The actual impact of purposefully designed artifacts to steer and provoke changes in schools is a fundamental concern in almost any educational policy. In order to understand an artifact's authority (how it 'forces' people to change or modify their practices) and to unravel its role in processes of innovation, we turned to organizational routines and neo-institutional theory. More specifically, we used the notions of organizational routines and institutional carrier in relation to the three forms of institutional pressure. The notion of organizational routines, offers a useful lens with which to examine planned change in work practices in schools through the design and implementation of artifacts, and the role artifacts fulfill in (re)configuring organizational change. By focusing on how configurations of artifacts and people come together and are stabilized in recurrent patterns of interaction (i.e., routines), the article contributes to advancing our understanding of routine dynamics and organizational change. Focusing on artifacts as carriers of institutional logics helped us to unravel the relationships between school organizations and their organizational field, illuminating how and why an administrative artifact could successfully impact and (re)direct practices and behavior in schools through particular pressure mechanisms (Scott 2008). In line with this conceptual framework, we specified the following research questions:

RQ1: Which organizational routines can be identified in the implementation of a data-transfer instrument?

RQ2: How does a data-transfer instrument shape the ostensive and performative aspects of the routines?
RQ3: Can the authoritative impact of a data-transfer instrument be explained in terms of institutional pressure mechanisms?

Study design and methodology

Presenting a data-transfer instrument for care continuity: The TraPS-file

In its material appearance the TraPS-file is a printed paper document, created using an electronic platform, and containing in a pre-structured way the information that is considered relevant to warrant continuity of educational care in the transition from primary to secondary education for a particular student. The document is to be filled out by staff members of primary education at the end of the sixth and final grade, to be printed and then handed over to the parents. Legal restrictions of privacy limit the permitted exchange of pupil information between schools without parental consent. As such, parents become the owners of the TraPS-file and can hand it over to the secondary school as they enroll their child. All schools in a district, as well as all parents, are strongly advised (for example through information sessions, a website, etc.) to provide and use the TraPS-file, but the decision to do so is ultimately left with them. The procedure is not compulsory, nor enforced by any authority. Filling out the TraPS-file is done through a computer program: one has to perform a series of chronological steps around five content topics. Properly filling out one step is required before the program allows continuing to the next one. The program uses tick boxes, drop down items and text boxes with a word limit as to reduce to the maximum the time required for filling out the file. Schools using the file are required to do so for every individual pupil in the final grade and not just for the pupils with special needs. Table 1 shows the five topics of the file content (see also Vermeir et al. 2017).

Data collection and analysis

Data were collected through artifact analysis and multiple interviews to build a qualitative multiple-case study of four schools (principals and teachers).

Artifact analysis

We started by an analysis of the artifact, both in its content and form and also thoroughly read through the user's manual that was provided on the developers' website. First, we wrote a detailed account of the specific features of the artifact, focusing on both the material characteristics and the underlying cultural meanings (i.e., representations of educational care and support; Ramduny-Ellis et al. 2005). This way we identified the rationale (goals and justifications) represented by the artifact. This reconstruction was checked, refined and completed through interviews

Table 1 Overview content TraPS-file

General information (demographics)	Formal identification data of the student like name, date of birth, mother tongue, school career (changes of school, study trajectory, …)
Strengths	List of positive characteristics to be ticked off if considered applicable (for example: leader type, persevering, talented for music, sociable, …). With the optional box 'other' it is possible to extent the list. Selecting at least one strength was required before being able to continue
Learning progress	The pupil's overall study progress through the curriculum as well as in particular subject areas: language (Dutch), Mathematics and French
Overall development and participation in school life	The pupil's attitude towards learning and school work in general, socio-emotional development, motoric operations and health
Specific care-related information	Several subsections: general care (documenting supportive interventions by the classroom teacher); special care (diagnosed learning disorders; provision of inclusive care; other supportive care initiatives provided by members of the school staff) and school external care (care provided by professionals outside the school like speech therapy, physiotherapy, etc.)

Table 2 Overview respondents: developers TraPS-file

David	Expert-educational consultant of the LEP; supporting schools in the implementation of the TraPS-file
Danny	President of the LEP
Douglas	Part-time webmaster of the LEP; contact person for teachers and principals with questions; part-time coordinator of the school cluster to which elementary belongs

with three key informants who had been involved in the development and promotion of the file, as well as in its implementation (see Table 2). All of them are members of the Local Exchange Platform (LEP, a structure at district level to facilitate exchange and collaboration between schools in implementing policies on equal opportunities and educational care for all students) (see for a more detailed account of the artifact analysis: Vermeir et al. 2017).[1]

Multiple case study: Respondents, data collection, analysis

For the study of the implementation practices, we set up a multiple case study (Bryman 2008; Yin 2014) in two primary and two secondary schools in Flanders (Belgium). Using purposeful sampling, we looked for schools located in one LEP-district (one geographical region) to ensure that the policy environment and more in

[1] The LEP's gather all the school boards from a region as well as a wide range of organizations that find themselves confronted with inequality in education. The LEP ensures the right of enrollment, acts as an intermediary in case of conflicts, and co-operates in implementing a local policy on equal opportunities in education.

particular the messages and initiatives on the implementation of the TraPS-file would be the same in all cases. Furthermore, in order to study the co-constitutive role of an artifact during an educational change process, we purposefully selected schools that were actively using the same TraPS-file in their daily practices (i.e., extreme cases). Or, as argued by Flyvbjerg (2006):

> When the objective is to achieve the greatest possible amount of information on a given problem or phenomenon, a representative case or a random sample may not be the most appropriate strategy. This is because the typical or average case is often not the richest in information. Atypical or extreme cases often reveal more information because they activate more actors and more basic mechanisms in the situation studied. (p. 13)

These four school cases were particularly interesting because of the fact that both primary and secondary schools in this district had already developed their own information transfer practices prior to the implementation of the TraPS-file. In order to further stimulate more intensive collaboration regarding care continuity, a more standardized system for data transfer between primary and secondary schools was required. For that purpose, a task force was set up during the school year 2007–2008, including representatives from primary and secondary education, the Center for Pupil Guidance (CPG),[2] and the Educational Consultant Service.[3] During the school year 2009–2010, the LEP got involved in order to introduce the TraPS-file in all primary schools in their district. The four school cases were thus chosen because of their explicit commitment to the concept of inclusive education and to meeting educational needs of all students, their strong culture of creating facilities for students' needs, as well as their active use of the TraPS-file 1 year prior to data collection. Limiting our study to four schools allowed for the depth of inquiry necessary to capture the subtle processes by which teachers and schools implement a new artifact.

Data collection occurred over two consecutive school years in order to 'follow' the artifact when it made its move from the end of primary school to the first year of secondary school. We primarily used semi-structured interviews to collect the data, capturing the perspectives of the different groups of implementers (Kvale 1996). In the school year 2010–2011, data were collected in both primary schools—we call them with pseudonyms Primary and Elementary- by interviewing the principal and two teachers of the final grade. This way we were able to achieve triangulation (different structural positions, multiple respondents, in a shared context). During the next school year (2011–2012), we interviewed three teachers from each of the secondary schools -with pseudonyms Secondary and High-, as well as a staff member involved in educational care for the first grade and the principal. In total 16 participants were interviewed in these schools, during interview sessions lasting about 1 ½ hour on average. Table 3 provides an overview of the school participants.

[2] The staff of a Center for Pupil Guidance (CPG) is made up of a number of permanent offices, such as a physician, psycho-pedagogical counselor, and social worker.

[3] The Educational Consultant Service ensures professional development support to schools. Schools can call upon them for educational and methodological advice.

The interviews focused on reconstructing the actual use (implementation practices) of the TraPS-file in the school as well as the participants' perceptions, appreciations or questions and comments on the file. The semi-structured character of the interviews ensured that, on the one hand, the data collection was sufficiently similar and standardized for all respondents, while on the other, allowing enough flexibility to capture the individual stories and perceptions, the particular conditions in the schools, as well as to incorporate new topics in the course of the study.

Two members of the research team, one of whom had also been responsible for collecting the interview data, conducted data analysis. All interviews were audio-taped, transcribed verbatim, and interpretatively coded. After reading the transcripts individually, codes were generated, which were discussed during meetings of the research team and modified based on group consensus. More specifically, we divided the transcription protocols in text fragments and coded them through strategies of open and axial coding (Strauss and Corbin 1990). First, in order to break down the data, we started with assigning initial codes to the data, labelling the issues addressed in the text fragments (open coding). Second, we grouped the open codes (by comparison and relationships among them), to generate specific categories and themes derived from the conceptual framework (axial coding). From this, the research team developed a coding structure and then further refined the list of codes as additional transcripts were coded and discussed.

After coding the data, we performed a vertical analysis for each individual participant, followed by a horizontal analysis, comparing the findings for all participants of the same school for systematic similarities and differences (Miles and Huberman 1994). This resulted in an interpretative case-report at the level of each school (structured by the three research questions). Next, a cross-case and comparative analysis was performed, in which systematic similarities and differences between the four case reports were discussed. In the cyclical process of reading, interpreting and checking, we focused on interpreting and understanding patterns and mechanisms of how the TraPS-file was actually implemented in the schools, in order to refine or verify preliminary conclusions. Tentative interpretations were shared and critically discussed among the research team in a process of *constant comparative analysis* (Strauss and Corbin 1990).

Results

To answer to the first research question, we start with describing how the artifact was implemented in the four schools, followed by a presentation of the different routines that have been developed in that process. Next, we illuminate how the actual materiality of the artifact impacted its enactment and implementation in the schools, as well as its consequences for the social interactions in the organization. Finally, we explain the authoritative action of the artifact in terms of the different institutional pressure mechanisms.

Table 3 Overview of the participants

School	Participant	Role	Years of teaching experience
Primary	Paul	Principal	>15 as teacher; >5 as principal
	Patricia	Teacher 6th Grade	>10
	Petra	Teacher 6th Grade	>25
Elementary	Eddy	Principal	>15 as teacher; >10 as principal
	Evelyne	Teacher 6th Grade	>5
	Erica	Teacher 6th Grade	>5
Secondary	Sonja	Vice-principal (instructional leader)/ chair local task force on educational care	>20 as teacher >5 as vice-principal
	Steffi	Care coordinator 1–2st grade/teacher 1st Grade	>30 as teacher, of which >10 part-time care coordinator
	Scarlett	Care coordinator 3rd grade/teacher 1st grade	>20 years, of which <5 as coordinator
	Sylvia	Teacher 1st grade	>10
	Sandra	Teacher 1st grade	>35
High	Homer	Principal	<5 as teacher <5 as principal
	Helen	Vice-principal and coordinator; former staff member school cluster (during development of TraPS-file)	>15 as teacher >10 coordinator dyslexia support <5 staff member school cluster <5 vice-principal <5 coordinator
	Holly	Teacher 1st grade/remedial teacher	>10 teacher >5 coordinator dyslexia support <5 remedial teacher
	Harry	Teacher 1st grade	<5
	Hilda	Teacher 1st grade	<5

The implementation of the artifact

Implementation practices

Primary Even before the implementation of the TraPS-file, student care and continuity of care were central concerns in Primary. The school used the information of the Pupil Follow Up System[4] to structure their conversations with parents in order to prepare them for the pupils' transition to secondary education.

[4] The Pupil Follow Up System is used in all grades of primary education to monitor pupils' academic achievement over time. The test results from the various measurement occasions are calibrated on a common scale. Therefore, the progress of an individual pupil can be followed systematically during his or her school career.

Both the principal and the teachers referred to the TraPS-file as a material incarnation of the school's vision on care. Despite the positive attitude towards this new artifact, a frequently mentioned side-effect was an intensification of teachers' workload. Several teachers reported that its implementation involved an increasing amount of paperwork and organization (meetings). Furthermore, because the TraPS-file did not only serve their internal care policy, but was eventually printed and handed over to the parents, who in turn were expected to pass it on to their child's secondary schools, teachers in Primary indicated that they felt more 'visible' since information was made public beyond the classroom walls (i.e., to colleagues, parents, and the secondary schools). This triggered feelings of vulnerability and exposure, as a result of which they developed protective coping strategies, such as self-censorship (e.g., very careful phrasing) when filling out the document. Despite these reactions, however, the TraPS-file was implemented in Primary. The assumption that students' wellbeing would benefit was cited by teachers to explain and justify their commitment. Respondents in this school were additionally motivated because they were convinced that the file would improve educational care practices in secondary schools, as it would allow them to take more informed decisions about pupils' needs, and as such to work more effectively with their new pupils.

Elementary In Elementary School, the policy on care and the transfer of pupil data did not only focus on pupils' shortcomings, but explicitly acknowledged pupils' talents and positive characteristics. The Pupil Follow Up System was used as the main instrument to inform parents and secondary schools about the strengths and weaknesses of a pupil. Care -and in particular care continuity- were defined as a collective responsibility of parents and staff in both primary and secondary schools. Despite the fact that the introduction of the TraPS-file was read as a confirmation and continuation of the school's policy and mission on student care, teachers did experience several practical difficulties, an increased workload and feelings of vulnerability and exposure. Difficulties involved the need for additional meetings, consulting, and collaboration, as well as developing strategies for making parents actually pass on the file when enrolling their child in a secondary school, etc. Nevertheless, teachers also perceived the artifact as a recognition of Elementary's efforts to promote care and care continuity. This added to their job motivation and work satisfaction. The participants in Elementary were very pleased by the fact that the file made their sustained efforts for educational care explicit and visible for colleagues and parents, and even to the wider public. Furthermore, they saw the file as an additional vehicle to pass on their knowledge and expertise to the secondary schools, in order to ensure that their efforts on special needs would be continued in the pupil's next school and would not have been in vain.

High High School offers the first and second grade in secondary education (i.e., for pupils aged 12–14). The school has the profile of a real middle school with a rather heterogeneous pupil population in terms of ethnicity and class. The school also aims to provide a broad educational basis for all pupils, postponing choices for

specialized study courses until the age of 14. Because of High School's large and diverse pupil population, the school is divided in four units. Each unit has its own special needs coordinator and is led by a unit coordinator who operates as the link between the principal and the teachers. The staff members think of their school as innovative and with a lot of expertise on educational care and special needs. Before the arrival of the TraPS-file, High School had successfully developed its own student registration procedure (aiming at the efficient collection of information on pupils' educational, emotional and socio-economical background) on enrollment. Given the alignment between the existing practices in the school and the purpose of the new artifact, its introduction was not experienced as a 'big change'. High School integrated it in the existing registration procedure and as a result produced for every student an 'integrated file' consisting of three parts. Part A involved mainly practical questions and was filled out prior to the final registration. Part B was filled out for pupils without a TraPS-file and was identical to the school's original registration form. Part C was completed for pupils who had a TraPS-file but included additional questions (i.e., on family situation and health care of the child) since, according to the principal, the TraPS-file did not provide all information they considered necessary. Upon completion of the registration procedure, the principal and the unit coordinators were responsible for summarizing and communicating this information to the head teachers of each unit and to the relevant internal and external school actors (for example, when a pupil needed specific guidance or had socio-emotional problems). Within High School, teachers differed in their actual use of the TraPS-file. Holly, for instance, was rather critical about the file, which she considered as too superficial. Therefore, she only used it as a guideline for an in-depth conversation with parents. As such, Holly still invested a lot of time talking to the parents during the registration process. Harry, on the contrary, felt that the TraPS-file covered all the information needed and just accepted and xeroxed the file without much further conversation.

Secondary Secondary offers both lower and higher secondary education (i.e., for pupils aged 12–18). The school serves a heterogeneous student population (in terms of ethnicity and class) and attracts high numbers of pupils with all kinds of special educational needs. This diverse population was the main reason why Secondary had previously developed an extensive care program that is enacted by several special needs coordinators closely collaborating with the teachers. As in High School, Secondary already had an extensive registration procedure before the introduction of the TraPS-file with a strong emphasis on careful and extensive communication with parents. When enrolling their child, parents were interviewed about four topics: (1) the pupil's learning and study competencies, (2) family background, (3) health, and (4) behavior.

The school principal had been involved in the task force that had developed the TraPS-file, so it felt natural to the staff to integrate this artifact in their work. Secondary integrated new artifact in its enrollment procedure, while still maintaining their own former instrument, as not yet all parents would bring the TraPS-file. Hence, the file was here mainly considered as a guideline for completing the

registration, without, however, replacing the conversation with parents. Yet, since the file contained a lot of information, in practice some teachers did no longer engage in in-depth conversations with parents.

Routines in the implementation practices

When more formally analyzing the implementation practices in terms of repeated patterns of social interactions, four routines could be identified.

A first routine includes the interactions around the filling out of this data-transfer instrument in the primary schools. The routine spans the school year and engages multiple actors. The classroom teacher of year six is the main responsible for filling out this file, but in order to do so s/he needs to interact and meet with other school actors, parents and external partners in the pupil's guidance in order to get all the necessary information.

The second routine concerns the transfer of the file to the parents at the end of primary education and focusses on motivating parents to properly appreciate the file and actually pass it on when enrolling their child in secondary education. As a consequence, several strategic interventions were set up: giving parents a voice in the draft phrasing of the file, organizing information sessions, explicitly encouraging parents during parents' meetings to use the file etc. Thirdly, the data-transfer instrument impacted and modified the enrollment procedures in the secondary schools. Parents used the file in their communication about the support and attention their child might need. The schools adapted their enrollment procedures, in order to integrate the file.

Finally, the actual use of the TraPS-file in the secondary schools is a fourth organizational routine. In this routine, the content of the file is communicated to several actors in order to provide the appropriate care and support for the pupil. After the enactment of this routine, when all information is transferred or included in other artifacts, the TraPS-file has completed its function.

The artifact as 'actor'

The descriptive account so far has shown how the TraPS-file as an artifact actually became a constitutive part of the routines and had an impact on their establishment or modification. It literally became part of the en-act-ment of the routine, interacting with the human actors involved. As such, it also impacted the so-called performative aspect of the routine: its actual enactment and implementation, as well as the implications for the social interactions in the organization. In other words, the arrival of the artifact 'did' more than simply waiting to be filled out and transfer information. Our data provide evidence for at least three instances of the artifact doing more than just fulfilling the script of its designers (see also Vermeir et al. 2017).

Positioning and repositioning actors

With the arrival of the TraPS-file, the existing practices of informally exchanging data on pupils between schools were replaced by a more formalized procedure. In this procedure, the artifact got a central role as it literally imposed itself as the 'go-between' primary and secondary education. It presented itself as a legitimate transporter of the pupil data and by doing so imposed particular roles, positions, and actions on the other actors involved, both within the school and related to its organizational field: different teachers and the principal in primary schools, the parents, staff members of the secondary schools, and also the Center for Pupil Guidance and the educational counselors.

The use of the file not only required interactions or involvement of those actors with the file itself, but also (re)positioned the different users among themselves. Both within and between primary and secondary schools, the introduction of the TraPS-file installed a chain of data transfer interactions. In order for classroom teachers in the primary schools to fill out this file, they had to exchange data with the remedial teacher, the special needs coordinator, the administrative staff, and even parents. For example, in Elementary the secretary was made responsible for filling out the first part. Next, since the arts teachers were thought to be particularly knowledgeable on the positive qualifications of the individual pupils -because of their subject and the different contacts with pupils it implied-, they were given an active role in the process. That was a new position and responsibility for them, as before the introduction of the file they had no part at all in the data transfer (only the classroom teachers were involved as informants). Furthermore, the classroom teachers started to use existing routines and structures to collect the relevant information (for example, the so-called multidisciplinary team meetings or MDT, involving the principal, a psychologist from the CPG): 'During a meeting of the MDT, we spend time to analyze the situation of every pupil. We discuss what goes well, or wrong, or what kind of help is needed. We use this information to fill out the TraPS-file' (Evelyne). Similarly, the introduction of the data-transfer instrument both consolidated existing relationships as well as created new interactions between (groups of) people in the secondary schools. More in particular, after the registration procedure (enrollment), the information from the file was passed on to different school actors such as the classroom teacher, special needs coordinator, remedial teacher, CPG, etc. The various interactions demonstrate an increased interdependence of different actors, who found themselves 'forced' to meet and to negotiate, new forms of collaboration and negotiation among each other.

Furthermore, care became a collective responsibility of both schools and parents. The exchange of pupil data between primary and secondary schools without parental consent had become legally restricted (privacy legislation). Hence, the introduction of the TraPS-file reframed the role and responsibility of parents, making them key figures in a successful transfer of pupil data. The primary and secondary schools developed several direct and indirect strategies to convince parents to hand over the file to the secondary schools: they organized information sessions, were very thoughtful and careful in their phrasing (e.g., avoiding expressions with negative connotations; self-censorship), and discussed and

negotiated the specific content of the file with the parents. According to Patricia: 'We have a draft version of the TraPS-file which we use during parental meetings. We ask parents if they are OK with the content of the file. Some parents ask to reformulate or modify and then we do so. It is not that we simply write down what parents want, it is a story of both parties together'. These meetings were established as a new structure because of the artifact, creating new opportunities for teachers to ask for additional information as well as for both teachers and parents to possibly edit or modify the wording.

Strategic practices: Power and vulnerability

The (re)positioning of actors by this data-transfer instrument was not neutral, but had several strategic consequences. Because they had been informed about its existence, secondary schools started to ask for the TraPS-file, thus forcing the primary school to actually provide it. At the same time, however, primary schools also saw the file as a tool to both demonstrate their educational expertise to the secondary schools, to see their efforts acknowledged as well as stimulate or even force the secondary schools to more explicitly engage in care-related practices. 'Thanks to the TraPS-file, we can tell the secondary school: here, look, this is what we have already achieved, build on it, use it!' (Eddy). Vice versa, the secondary schools became dependent on primary schools and parents in order to develop an appropriate policy to avoid discontinuity in the special needs care for their students: 'Since the introduction of the TraPS-file, we do not longer have to search for relevant student information. We can rely on what is mentioned in the TRAPS-file' (Homer). Because of the key role of parents in handing over the file, schools exerted pressure on parents to actually pass it on, for example by organizing information sessions and individual conversations with parents.

However, the strategic and power aspects of the artifact were also found to have a downside. Since the file made relevant information on educational care visible for colleagues, parents and the secondary schools, care became a public issue. Because it not only served their internal care policy, but was printed and handed over to the secondary schools, teachers in Primary for example, indicated that they felt more 'visible' since information was made public beyond the classroom walls (i.e., to colleagues, parents, and the secondary schools). 'We feel pressured to justify in a detailed way what we write down on this file. I am really self-conscious about this. If I write 'this pupil needs extra help with spelling', then I need to justify how I have determined this and what I or we have already done to solve this problem' (Patricia). This visibility triggered feelings of vulnerability and exposure for the teachers, leading to the development of protective coping strategies, such as self-censorship (e.g., very careful phrasing) when completing the document.

Changing mindsets and imposing normative ideas

The final, yet probably most pervasive and lasting achievement of the artifact was its impact on the normative ideas and beliefs on educational care and 'good education'. A detailed content analysis of the normative messages in the TraPS-file

goes beyond the limits of this article (see Vermeir et al. 2017), but it became very obvious that the use of the TraPS-file promoted and imposed a very particular normative way of speaking and thinking about care in the four schools. As such, one particular concept of educational care got more recognition and legitimacy than others.

The practices and routines established by the artifact reflect normative scripts on educational care, calling for particular ideas and actions from the actors involved, with the promise of providing legitimacy and justification for their actions. Those scripts (ostensive aspect of routines) were being referred to by the actors when accounting for their actions as well as used to guide them on their enactment of the agenda on educational care it represents. Our analysis showed that implementing the file actually required mental changes in normative beliefs on three levels: the conceptualization of educational care, the target population, and the width of the care continuum.

Firstly, in its very material form (i.e., the categories it contains or the type of information it seeks to document), the TraPS-file reflects an explicit and particular view on educational care that goes beyond the predominantly remedial approach to take a more holistic view on pupil development. Instead of focusing on pupils' shortcomings, it envisions a system of care continuity built on the idea that pupils have talents, qualities or positive characteristics, and that these strengths should also be acknowledged: 'A child is not only his head, but also his heart and hands. I believe that it is important that this full picture of the child is portrayed in the TraPS-file' (Eddy). Also Patricia stated that the artifact is more than a 'care-file': 'We definitely want to include positive elements in this TraPS-file, instead of only focusing on special needs, because the TraPS-file is not a remedial care-file. That's why we complete this file for each and every student. And not just for so-called 'problem children''. This quote also illuminates how the introduction of this data-transfer instrument contributed to a renewed debate and awareness on who was considered to be the target population for educational care (and how to guarantee it). Instead of focusing on particular pupils, it became the norm that care continuity matters for all pupils: 'What is care? I believe it is really broad. It is about learning disabilities, learning difficulties, but also about talented children…. Instead of care, I prefer to use the word 'learning challenges'. Like, also creating specific learning opportunities for the 'fast' learners, so care is definitely not just remedial' (Homer). Finally, the discussion on care is also framed in terms of the width of the care continuum. Care and in particular care continuity are not defined as an individual responsibility of classroom teachers nor of the individual schools. Rather, they are framed as a collective responsibility of parents and staff in primary and secondary schools: 'A TraPS-file is not only representing the primary school, it is a file demonstrating the collective responsibility of primary and secondary schools' (Eddy). In High School, parents were asked for the file, prior to the registration: 'We communicate this to parents, thus expressing our expectation for them to bring the TraPS-file when enrolling their son or daughter. We explicitly ask this so that the parents know that we use this file and we expect them to hand it over' (Homer). The structural interdependence of different groups and organizations in order to provide the care continuity is as such (re)defined and modified. To facilitate and ensure this

continuity of care, teachers, special needs coordinator, students' counsellors, remedial teachers, principals and parents have to engage in interactions and collaborate.

The authority of a data-transfer instrument: Institutional pressure mechanisms

Throughout our analysis, we have shown that the TraPS-file worked as an 'acting' artifact, instead of only a passive tool: its arrival and acceptance in the school did modify existing organizational routines or established new ones, affected both the actions and the beliefs of actors inside and outside the schools. In other words, it made a difference in their practices. However, the arrival of the artifact also implied an intensification of teachers' work: existing practices had to change and their workload increased. Especially the primary schools invested a lot to properly collect and summarize information on care initiatives and to fill out the file. Several participants reported an increased level of stress, workload, as well as feelings of exposure and vulnerability because of working with the file. The additional work was done for the pupils' and secondary schools' sake, without having immediate relevance or benefit for their own practices. There was no clear empirical evidence, however, that the TraPS-file was more effective than the existing practices in the schools. On the contrary, it actually created a form of intensification, partly due to the fact that teachers interpreted this call for innovation as compelling and hard to ignore. Even in educational systems, like the Flemish, with no strict accountability procedures or high stakes testing, teachers did feel they could not neglect the calls for change, even if giving in meant increased stress and workload (see also Ballet and Kelchtermans 2009). From a rational-decision model, we would have expected resistance against this implementation.

Nevertheless, we saw that all four schools actively engaged in implementing the file. We further need to stress that there was no legal or other formal obligation to do so. The constitutional freedom of education would have permitted the schools to simply decline the invitation to implement the file. This raises the question how we can explain that the schools implemented this artifact despite the lack of clear empirical evidence regarding its pedagogical benefits or effectiveness? How can we explain the authority of this artifact in a context where schools have educational freedom[5]? How has the artifact managed to get its authority and exert power to make schools comply with its call for change?

Part of the answer lies in the choice of the cases, all of which were schools with a positive attitude and commitment to educational care. Or in other words, the institutional logic -as a system of normative ideas- represented in the TraPS-file was congruent with the existing local school structures, beliefs, and practices (see also

[5] Freedom of education is a constitutional right in Belgium. The state authorities are not allowed to take preventive measures against the establishment of free schools. Under this constitution, the state is obliged to provide neutral education and governing bodies enjoy considerable autonomy. They are entirely free in choosing teaching methods and are allowed to base their education on a particular philosophy or educational approach. They can also determine their own curriculum and timetables as well as appoint their own staff (Ministry of the Flemish Community, Education Department 2008).

März et al. 2016; Vermeir et al. 2017). The basic idea was that pupils' transition creates an agenda of care continuity that needs to be attended to.

But since the schools already had well-established practices and procedures on educational care, they had a good alibi not to implement the this new artifact. DiMaggio and Powell's (1983) distinction between three types of institutional pressures allows to further our analysis and deepen our understanding: the schools' responses towards each of these institutional pressure mechanisms revealed a fundamental need for legitimacy in the school organizations.

Coercive pressure: Complying to powerful others

As we already indicated, there was no legal obligation for the schools to start implementing the artifact. The Local Exchange Platform (LEP) was an important factor in influencing all schools' decisions to adopt and implement the TraPS-file as one, common standardized tool for data transfer on pupil care. Since the LEP coordinated the design and distribution of this TraPS-file, its moral authority was bestowed on this artifact. Furthermore, the LEP actively stimulated schools and school actors to use the file in order to ensure continuity of pupil care. 'We already had a successful document to facilitate the registration of new students in our school, but we still decided to implement the TraPS-file. David, a representative from the LEP, stressed the importance to work with the TRAPS-file to stimulate care continuity as well as standardization in our region' (Sonja). The LEP promoted the implementation of the TraPS-file through different media -such as a website and information folders- and organized several information sessions for schools and parents. Eddy, for example, referred to the information evenings organized by the LEP for the special needs coordinators, teachers, principals, and parents in which information was given about the use, relevance, and purpose of the file. As such, teachers generally described the LEP as an important mediator in the implementation process: 'David has introduced the TraPS-file in our school. He informed the teachers and parents very well. Moreover, the LEP also supports the schools if there are problems with the system or the use of the file. When I have questions, I can call him' (Petra). Because of the involvement of an educational expert from the organizational field in the design and promotion of the file, schools could not easily ignore the pressure to implement this file.

At the same time, the authority of the LEP also appeared in the strategies used by school principals to convince their teachers to work with the file and to reduce teachers' and parents' resistance. More specifically, the principals used the LEP as a source in the organizational field in order to increase their own authority (see also Kelchtermans 2007). Each year, the primary school principals invited a representative from the LEP to their schools for a parents' meeting as a strategy to convince parents of the relevance of this file. 'During a parents' meeting, early in the school year, a representative of the LEP gives a short presentation about the TraPS-file and why it is important for parents to hand it over to the secondary schools' (Paul). Backed up by the authority of actors like the LEP, the principals tried to persuade teachers and parents of the relevance of the file.

From a neo-institutional perspective, the artifact thus derived its authority from the fact that it operated as an institutional carrier and was aligned with a broader set of accepted institutional logics (regarding student care, transition from primary to secondary school as a risk phase, etc.). DiMaggio and Powell (1983) label this pressure mechanism as *coercive,* since it confronts schools with an explicit call for compliance with particular policy demands, implying the modification of existing structures. Coercive pressure typically stems from relevant actors in a school's organizational field who are powerful enough to reward or sanction a school's behavior. Complying with the demands from these actors (here: the LEP), enables schools to benefit from rewards and avoid negative sanctions (DiMaggio and Powell 1983) and eventually increase or secure their legitimacy as an organization.

Normative pressure: (Re)positioning in a network of expectations

The data further showed how normative pressure mechanisms -drawing on a shared sense of appropriateness, social obligation, binding expectations- installed and defined legitimate goals or objectives and appropriate ways to pursue them. As we already indicated, the arrival of the artifact (re)positioned several (groups of) actors, installing different normative expectations and strategically imposing a particular normative view.

Both individuals and organizations seek legitimacy for their actions and operations. This concern is even more explicit and urgent in a value-laden, norm-driven field as education. So it comes as no surprise that obtaining the social recognition of living up to what are considered to be just, ethical, fair, appropriate and up-to-date practices constitutes a compelling force for schools and teachers. These expectations are held and communicated by other significant actors in the organizational field, and as such become experienced by the local actor as external pressures (DiMaggio and Powell 1983; Powell and Colyvas 2008). Hence, normative expectations act as prescriptions. They are not only imposed by others, but are at the same time internalized by the actors themselves. Once school members have internalized a norm, behavior that complies with the norm will contribute to the school's organizational legitimacy (Sauder and Espeland 2009).

Mimetic pressure: Implicit pressure through external actors

Finally, this network of expectations also implicitly exerted pressure on schools to mimic each other (Scott 2008). By making these expectations explicit, it also became visible what parents and schools do. This visibility installed mimetic forces to implement the file. This pressure to imitate was, for instance, constantly encouraged and reinforced by parents who vigorously spread the news about the TraPS-file. 'The secondary schools in our region, know which primary schools use this file and which don't. They also ask parents to bring the TraPS-file when registering in the secondary school. This had as a consequence, that most primary schools in our region started to use this file' (Homer). These mimetic forces encompassed the pressure to copy or imitate ideas, activities, systems, processes, practices, or structures of other organizations in order to gain legitimacy, even when

there was no real evidence that this copying would actually improve student learning or overall school performance. Also the LEP stimulated schools to mimic each other. Their promotion tour for the TraPS-file in primary and secondary schools made visible what other schools were doing. At the same time, it stimulated schools to model themselves after other schools which they perceived to be 'good schools' (i.e., conforming to the social values and norms), and thus by imitating them to contribute to their own legitimacy as an organization.

Conclusion and discussion

The last couple of years, educational research shows a growing interest in the material basis of organizing and schooling or 'how matter matters' (see e.g., Fenwick 2011; Tondeur et al. 2015). Within the domain of organizational learning, for example, we can observe an increased attention towards conceptual and material artifacts and their mediating role in processes of knowledge construction and innovation (Ogawa et al. 2008; Paavola et al. 2004). Recent studies in the materiality of learning also underline that artifacts (and more specifically technologies) are not passive presences or mechanistic manipulators in education, but participate in constituting learning spaces, trajectories and relationships between teachers and students in specific ways (Sørensen 2009). Furthermore, among the recent policy studies on standardization, we can see a recognition of this material dimension in understanding the actual organization of education (see Fenwick 2011). Using a socio-technical perspective (e.g., actor network theory), these scholars, for instance, study the role of standards in the enactment of educational practices. With this article, we joined this line of work and illuminated how artifacts operate as co-constitutive components of implementation practices.

More specifically, the introduction of the data-transfer instrument (here: TraPS-file) created a particular social reality in which certain solutions or actions are meaningful, achievable or taken-for-granted. It calls human actors (i.e. teachers, parents) to particular actions (rather than others) or demands them to (re-)position themselves towards this artifact and its appeal. Therefore, we conclude that the artifact was a mediating (f)'actor' that influenced the interactions regarding care in the schools. In its describing of the care initiatives and care-related information, the file also co-created a new care reality in schools. New social relationships evolved around the artifact (and care) in and outside the school. In order to fill out the file (and the very specific information it requires), teachers needed to interact with others, that is, care became an issue of concern for teachers. Care also became a collective responsibility of schools and parents. Both were turned into key figures in care continuity, and as such taking care of pupils and their needs turned into something that could be communicated and discussed. Relations and responsibilities were changed in a substantive and not just formal way. As such, our study demonstrated how the role of an artifact within actual implementation processes does more than what it was designed for, that is, the formalization of data use. Following Pentland and Feldman (2008), we could say that even the most carefully designed artifacts may produce effects beyond the intentions of the designers. Some

would call this the side-effects. Yet, instead of framing this in terms of implementation failure, misappropriation of the TraPS-file, or as an unsuccessful reform, our analysis illuminates how this so-called discrepancy has possibly positive effects that are worth addressing and studying in detail. In studying the actual use of this artifact, specific phenomena became visible: the introduction of a broader vision on care, new professional relationships and an increased parental involvement.

Furthermore, our analysis clarified why it could be relevant to study school organizations at the level of the complex interplay between human actors and artifacts, both constituting the school reality through their performance. Artifacts are not passive or neutral objects, but they act as dynamic and constitutive actors in the process of implementation. It is in a network of interactions that we can understand school organizational processes, or more specifically educational change. With the notion of routines, we were able to capture these interactions at a theoretical level. In order to further analyze the broad scope of actors in school organizations and processes of educational change, we advocate a more detailed relational approach that characterizes school organizations as networks of human actors and artifacts (see for instance Orlikowski and Scott 2008). This relational approach does not give priority to the one (humans) or the other (material artifacts), but instead starts from specific practices that consist of (inter)actions between people and artifacts. Its particular value is that they acknowledge the complexities of actual practices and the emergence of new professional and organizational realities, without assuming explicitly or implicitly a prior image of successful implementation and optimal professionalism (fidelity approach—see also Vermeir et al. 2017).

Our results further show how artifacts play a significant role as a carrier of and vehicle for educational innovation (i.e., the beliefs, norms, and rationales about how to properly organize the continuity of care between primary and secondary schools in a specific organizational field). Adopting a neo-institutional approach to study processes of educational innovation allowed us to develop a more nuanced understanding of how policy decisions and their ultimate implementation are distributed across complex social systems composed of actors and artifacts as well as to understand how these artifacts can contribute to educational change and stability.

Instead of only looking at the micro-processes of teacher interpretation in explaining organizational processes as in the sense-making theory, we deepened our understanding by revealing the role of larger institutional contexts (Coburn 2005; Weber and Glynn 2006). The results documented how schools' adoption or implementation of new practices was to an important degree driven by the need to preserve or increase the organization's legitimacy or the "generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman 1995, p. 574). School organizations are concerned about their long-run viability that requires developing a sense of mission and common values as well as maintaining stable relationships with their environment. In particular, schools need others to acknowledge them as legitimate organizations within the educational system or institution. This requires that they comply with social expectations about organizational form and functions (DiMaggio and Powell 1983). Since these

expectations primarily operate at ceremonial and symbolic levels, organizations often adopt structures and practices that are socially valued even if they do not necessarily improve their technical performance or rational efficiency (Scott 2008). From a neo-institutional theory perspective, implementing an artifact can be understood as an answer to institutional forces that are pressurizing organizations to conform to particular ideas of what care continuity should ideally look like. The use of this data-transfer instrument contributed to the schools' organizational legitimacy by serving their symbolic needs and it enabled them to position stakeholders, parents and other schools -the organizational field- as a truly legitimate school.

Furthermore, the neo-institutional lens helped us to understand the impact of various institutional factors that are difficult to 'measure', such as institutional logics, carriers, and pressures as it illuminated the external motives or drivers in the adoption and implementation process beyond pedagogical and personal ones (Bardon and Josserand 2009; März et al. 2016). An educational innovation not only derives its authority from so-called personal (i.e., capacities, skills; interest, beliefs) or pedagogical motivations (i.e., the effectiveness of the new curriculum, instructional technology, intrinsic pedagogical quality of innovations, perceived benefits for learning and teaching; Bardon and Josserand 2009). Our analysis of the TraPS-file exemplified the institutional pressures at play in schools' adoption or implementation behaviors and the interplay of the coercive, normative, and mimetic forces present in the organizational field. It is these forces that provide the artifact's authority, stimulate (or even impose) its implementation, contribute to an environment that induces organizational conformity and homogeneity. The need for organizational legitimacy was the ultimate drive that allowed these pressures to operate effectively.

Finally, applying both organizational routines theory and neo-institutional theory enabled us to conceptualize the dynamic interplay between human actors and material artifacts in implementation practices. As such, artifacts provide a powerful venue to deepen our understanding of innovation processes, and in particular to understanding the actual changes or the lack of change (stability) in schools.

References

Anderson, L. W., Jacobs, J., Schramm, S., & Splittgerber, F. (2000). School transitions: Beginning of the end or a new beginning? *International Journal of Educational Research, 33*(4), 325–339.

Ballet, K., & Kelchtermans, G. (2009). Struggling with workload. Primary teachers' experience of intensification. *Teaching and Teacher Education, 25*, 1150–1157.

Bardon, T., & Josserand, E. (2009). Why do we play the games? Exploring institutional and political motivations. *Education + Training, 51,* 460–475.

Benner, A. (2011). The transition to high school: Current knowledge, future directions. *Educational Psychology Review, 23,* 299–328.

Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford: Oxford University Press.

Burch, P. (2007). Educational policy and practice from the perspective of institutional theory: Crafting a wider lens. *Educational Researcher, 36,* 84–95.

Chedzoy, S., & Burden, R. (2005). Making the move: Assessing student attitudes to primary–secondary school transfer. *Research in Education, 74*(1), 22–35.

Coburn, C. E. (2005). The role of non-system actors in the relationship between policy and practice: The case of reading instruction in California. *Educational Evaluation and Policy Analysis, 27*(1), 23–52.
D'Adderio, L. (2011). Artifacts at the centre of routines: Performing the material turn in routines theory. *Journal of Institutional Economics, 7,* 197–230.
DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48,* 147–160.
Evangelou, M., Taggart, B., Sylva, K., Melhuish, E. C., Sammons, P., & Siraj-Blatchford, I. (2008). *What makes a successful transition from primary to secondary school? Project report*. London: The Department for Children, Schools and Families.
Feeney, C., & Best, G. F. (1991). Transition of integrated students and students with special needs from primary to secondary school. *Australasian Journal of Special Journal, 21,* 36–44.
Feldman, M. S. (2000). Organizational routines as a source of continuous change. *Organization Science, 11,* 611–629.
Feldman, M. S., & Pentland, B. T. (2003). Reconceptualizing organizational routines as a source of flexibility and change. *Administrative Science Quarterly, 48,* 94–118.
Fenwick, T. (2011). Reading educational reform with actor network theory: Fluid spaces, otherings, and ambivalences. *Educational Philosophy and Theory, 43,* 114–134.
Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry, 12,* 219–245.
Kelchtermans, G. (2007). Macropolitics caught up in micropolitics. The case of the policy on quality control in Flanders. *Journal of Education Policy, 22*, 471–491.
Kelchtermans, G., & Ballet, K. (2002). The micropolitics of teacher induction. A narrative-biographical study on teacher socialisation. *Teaching and Teacher Education, 18*, 105–120.
Kvale, S. (1996). *Interviews. An introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage.
März, V., Kelchtermans, G., & Dumay, X. (2016). Stability and change of mentoring practices in a capricious policy environment: Opening the "black box of institutionalization". *American Journal of Education, 122*, 303–336.
März, V., Kelchtermans, G., Vanhoof, S., & Onghena, P. (2013). Sense-making and structure in teachers' reception of educational reform. A case study on statistics in the mathematics curriculum. *Teaching and Teacher Education, 29*, 13–24.
McLellan, R., & Galton, M. (2015). *The impact of primary–secondary transition on students' well-being.* [Final report to Nuffield Foundation]. Cambridge: University of Cambridge- Nuffield Foundation.
Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis. An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: Sage.
Ministry of the Flemish Community, Education Department. (2008). *Education in Flanders. A Broad View of the Flemish Educational Landscape,* http://www.flanders.be/en/publications/detail/education-in-flanders-a-broad-view-of-the-flemish-educational-landscape.
Noddings, N. (1984). *Caring: A feminine approach to ethics and moral education*. Berkeley: University of California Press.
Ogawa, R., Crain, R., Loomis, M., & Ball, T. (2008). CHAT/IT: Toward conceptualizing learning in the context of formal organizations. *Educational Researcher, 37,* 83–95.
Orlikowski, W. J., & Scott, S. V. (2008). Sociomateriality: Challenging the separation of technology, work and organization. *Annals of the Academy of Management, 2,* 433–474.
Oser, F. K. (1994). Moral perspectives on teaching. *Review of Research in Education, 20,* 57–127.
Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of innovative knowledge communities and three metaphors of learning. *Review of Educational Research, 74,* 557–576.
Pentland, B. T., & Feldman, M. S. (2008). Designing routines: On the folly of designing artifacts, while hoping for patterns of action. *Information and Organization, 18,* 235–250.
Pentland, B. T., Feldman, M. S., Becker, M. C., & Liu, P. (2012). Dynamics of organizational routines: A generative model. *Journal of Management Studies, 49,* 1484–1508.
Powell, W. W., & Colyvas, J. (2008). Microfoundations of institutional theory. In R. Greenwood, C. Oliver, K. Sahlin, & R. Suddaby (Eds.), *The SAGE handbook of organizational institutionalism* (pp. 276–298). London: SAGE.
Qualter, P., Whiteley, H. E., Hutchinson, J. M., & Pope, D. J. (2007). Supporting the development of emotional intelligence competencies to ease the transition from primary to high school. *Educational Psychology in Practice: Theory, Research and Practice in Educational Psychology, 23,* 79–95.

Ramduny-Ellis, D., Dix, A., Rayson, P., Onditi, V., Sommerville, I., & Ransom, J. (2005). Artefacts as designed, artefacts as used: Resources for uncovering activity dynamics. *Cognition, Technology & Work, 7,* 76–87.

Sauder, M., & Espeland, W. (2009). The discipline of ranking: Tight coupling and organizational change. *American Sociological Review, 74,* 63–82.

Scott, W. R. (2008). *Institutions and organizations. Ideas and interests* (3rd ed.). Thousand Oaks, CA: Sage.

Sirsch, U. (2003). The impeding transition from primary to secondary school: Challenge or threat? *International Journal of Behavioral Development, 5,* 385–395.

Sørensen, E. (2009). *The materiality of learning: Technology and knowledge in educational practice*. New York, NY: Cambridge University Press.

Spillane, J. P. (2012). Data in practice: Conceptualizing the data-based decision-making phenomena. *American Journal of Education, 118,* 113–141.

Spillane, J. P., Halverson, R., & Diamond, J. B. (2004). Towards a theory of leadership practice: A distributed perspective. *Journal of Curriculum Studies, 36,* 3–34.

Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage.

Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review, 20,* 571–610.

Symonds, J. (2015). *Understanding school transition: What happens to children and how to help them.* London-New York: Routledge.

Thornton, P. H., & Ocasio, W. (1999). Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry 1958–1990. *American Journal of Sociology, 105,* 801–843.

Thornton, P. H., & Ocasio, W. (2008). Institutional logics. In R. Greenwood, C. Oliver, R. Suddaby, & K. Sahlin (Eds.), *The Sage handbook of organizational institutionalism* (pp. 1–46). Los Angeles: Sage Publications.

Tondeur, J., De Bruyne, E., Van Den Driessche, M., McKenney, S., & Zandvliet, D. (2015). The physical placement of classroom technology and its influences on educational practices. *Cambridge Journal of Education, 45,* 537–556.

Vermeir, K., Kelchtermans, G. & März, V. (2017). Implementing artifacts. An interactive frame analysis of innovative educational practices. *Teaching and Teacher Education, 63*, 116–125.

Volkoff, O., Strong, D. M., & Elmes, M. B. (2007). Technological embeddedness and organizational change. *Organization Science, 18,* 832–848.

Weber, K., & Glynn, M. A. (2006). Making sense with institutions: Context, thought and action in Karl Weick's theory. *Organization Studies, 27,* 1639–1660.

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Thousand Oaks, CA: Sage.