

Infrastructural Work in Child Welfare: incommensurable politics in the Dutch Child Index

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Cover Page Footnote

This article flows from a paper the first author presented at the 4th international workshop 'Infrastructures in Healthcare' in Tromsø at June 2013. IL thanks the organisers and programme committee for the opportunity to participate and present her paper. The article draws from a PhD-project of the first author at the department of Health, Ethics & Society at Maastricht University. IL thanks her supervisors and colleagues for their feedback and support. We also would like to thank all stakeholders who kindly agreed to be interviewed and K2 for the hospitality and the opportunity to take a look into daily practice of the Child Index.

Infrastructural Work in Child Welfare

Incommensurable politics in the Dutch Child Index

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Abstract. The Dutch Child Index is a nationwide information system (IS) designed to alert professionals about each other's involvedness with at-risk children, enabling identification of individual at-risk children, improvement of multidisciplinary collaboration and timely interventions. In this paper, we study the infrastructural work and complexities engaged in making the collaborative system of the Child Index function in real life and in care situations. We use the information infrastructure perspective as an analytical lens and describe the infrastructural work that is performed to make the Child Index become part of actual practices. We also identify flexibility, heterogeneity and the connection to existing platforms as difficulties participants have had while performing infrastructural work. The paper makes two main contributions. First, it provides an in-depth empirical analysis of this specific collaborative and preventive infrastructure. Second, based on this empirical analysis, we argue that when developing and understanding infrastructures, it is important to identify limits to the integrative capacity and disciplining power of ISs as result of conflicting infrastructural work due to incommensurable politics.

Keywords: infrastructural work, incommensurable politics, ICT, Child Index, child welfare

1 Introduction

In healthcare, more and more ICT systems are being introduced as they are considered to be “mechanisms for increased control, efficiency, simplicity, quality and collaboration” (Ellingsen

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2004, p. 3). Expectations associated with ICT solutions are high, so growing numbers of ICT tools are mobilised to improve the quality of care and to support the necessary collaboration.

In the context of concerns about the health and well-being of children and adolescents in the Netherlands, new national youth policies have been developed over the last decade to deal with problems like child abuse, overweight, use of alcohol and drugs, mental problems and school dropout (ITJ 2009). Dutch media often catastrophize to suggest a poor quality of work in child welfare, like in the case of the toddler Savanna. After suffering severe abuse from her parents, her lifeless body was found by police in the boot of her mother's car (Inspectorate for Youth Care 2005). To prevent future tragedies and improve the quality of care for youth, new policies have attempted to stimulate prevention, professional collaboration and coordination of care through the introduction of ICT systems (Programmaministerie Jeugd en Gezin 2007; Van Eijck 2006). ICT tools are presented as the magic bullet in youth care.

The Child Index¹ is one such system that was recently introduced in Dutch child welfare. This nationwide information system (IS) is designed to serve as a database that contains professionals' risk reports on individual at-risk children. It is also designed to alert professionals about each other's involvement with an at-risk child and to improve collaboration among a variety of professionals working with youths from birth to 23 years, like child and youth healthcare physicians, school nurses, social workers, mental health care providers, school's care coordinators, general practitioners, youth psychologists and others, whom we will call the 'youth workforce'². The youth workforce's broad range implies that professionals' proximity to and relationship with children and parents is different. Those who see children on a regular basis, like teachers³ or youth workers, view a child differently and have other definitions of risk than professionals who see a child only once a year, like a youth physician. All authorised professionals can use the Child Index to signal their professional involvement with a child or to signal a potential at-risk child.

The Child Index is designed and presented as a simple and user-friendly tool that does not contain privacy sensitive information. It does not contain WHAT-information (e.g., what is the risk?) that describes the characteristics and content of the risks or care eventually provided. Instead, it only shows THAT-information (e.g., is there a risk?) which enables professionals to quickly contact one another and discuss the at-risk child to plan timely interventions. This implies that the Child Index is not a system for collecting health data, but a system through which a broad range of professionals can inform other professionals that they consider a child to be at risk. Each signalled child receives a personal page in the system, showing the child's name, address, birth date, citizen service number and the name(s) and affiliation of the professional(s) who logged their name(s) against this child. If a child receives two or more signals, the Child Index creates a match and the professionals automatically receive an e-mail indicating that collaboration and coordination of care are required. Simultaneously, the system automatically appoints one organisation that has to provide a chain coordinator who becomes responsible for the coordination of care (Zorg voor Jeugd 2010). This way, it is thought that children who are at risk will get better (social, educational, medical) care sooner.

The Child Index was designed and tested in local pilot projects from 2004 and in 2010 the Dutch parliament accepted the law Reference Index for Youth at Risk. As a consequence, all Dutch municipalities became legally obliged to organise a local Child Index and put it into operation. As of February 2013, approximately 1500 organisations were authorised to use the local index we studied, which means that more than 20,000 youth workforce professionals could

use it. At that time, the local system held almost 33,600 signals. With approximately 650,000 children living in this area this comes down to 51,7 signals per 1000 children (K2 2013).

In this paper, we will analyse the dynamics, complexities and infrastructural work involved in the Child Index. We will first explore what previous studies have taught us about the construction of information infrastructures. Subsequently, we will explain our ethnographic methodology and present our empirical analysis of the Child Index. Finally, we will discuss the lessons that can be learned from the Child Index about the construction of information infrastructures across child welfare, healthcare, public health and beyond.

2 Information infrastructure

Bowker and Star's (1998; 1999) inspiring work about the construction of information infrastructures is frequently used to study and understand the dynamics of new ISs. According to Star (1999), studying ISs "implicitly involves the study of infrastructures. Struggles with infrastructures are built into the very fabric of technical work" (Star 1999, p. 378). Star and Ruhleder (1996) developed a relational definition of infrastructure with several dimensions, including its embeddedness in other structures, technologies and social arrangements. As infrastructure is complex, heterogeneous and big, changes take time and never take place from above. As a consequence, "nobody is really in charge of infrastructure" (Star 1999, p. 382). Bowker and Star (1998) showed that building information infrastructures for multiple social worlds is far from simple. As designers change the life of communities, it is important that they remain sensitive to the nature of the work they do. In addition to the communities' information needs, "we need a deep understanding of the structure and nature of the community we are building for, and of the ways it represents itself, others, and the past" (Bowker and Star 1998, p. 246).

Especially, Bowker and Star's understanding of the infrastructural work entailed in building systems of classification and standardisation can add a new perspective on the construction of ICT systems like the Child Index. In their landmark study of the International Classification of Diseases (ICD), a large-scale information infrastructure to monitor morbidity and mortality on an international scale, they show how infrastructures develop through continuing processes of negotiation (Bowker and Star 1998; 1999). Different interests, needs and users cause conflicts and require negotiations and compromises about how to collect and code information to make the ICD useful for national and international comparison. Varying terminologies and different cultures and contexts complicated the use of the ICD, and negotiations and decisions became inscribed in the ICD's form and content (Bowker and Star 1999).

According to Bowker and Star, creating a complex infrastructure involves much infrastructural work and this requires interaction between different actors, technologies and social and cultural elements. They explain that every infrastructure is built on an installed base. An infrastructure "does not grow *de novo*, it wrestles with the inertia of the installed base and inherits strengths and limitations from that base" (Star 1999, p. 382). Not taking into account possible constraints can distort or be fatal to the development process. Once a working infrastructure is in place and embedded in practice, it can eventually become invisible⁴ and perform work itself. The ICD enables nation-states to monitor disease, but it also changes peoples' perspectives on

health and disease, as the classifications define what does and does not count as a disease. To classify is thus not a neutral act, but one that has moral consequences. By consequence, the constitution of classifications and standards entails practical politics (Bowker and Star 1999).

In healthcare, ICT systems have become an important tool for stimulating multidisciplinary collaboration and improving the quality of care. Electronic Patient Records (EPRs), telecare technologies and drugs registration tools are considered to be important for increasing professionals' efficiency and reducing healthcare costs. A diverse area of research emphasises the socio-technical character and complexities of information infrastructures in healthcare settings (Bjorn and Kensing 2013; Ellingsen et al. 2013; Johannessen et al. 2013). Hanseth and Lyytinen (2004) emphasise the influencing role of the installed base in designing an infrastructure. A new infrastructure inherits strengths, limitations and complexities from the installed base of currently existing infrastructures. Therefore, "infrastructure design needs to focus on installed base growth and infrastructure flexibility [...] by enacting design principles of immediate usefulness, simplicity, utilization of existing installed base" (Hanseth and Lyytinen 2004, p. 207). Ellingsen and Røed (2010) argue that establishing integration between different information infrastructures requires technologies with certain flexibility, allowing for different uses and experimentation. Furthermore, they show the tension between stability and change, and stress that organisational redesign should therefore be initiated from within the implicated practice and take stakeholders' autonomy into account. This is in line with Ciborra and Hanseth (1998), who argue that "infrastructures should rather be built by establishing working local solutions supporting local practices which subsequently are linked together rather than by defining universal standards and subsequently implementing them" (Ciborra and Hanseth 1998, p. 315).

As healthcare is a highly collaborative domain, large ISs that support collaborative activities are continuously introduced. According to Grudin (1994), the social dynamics in groups impose different demands on system developers and users. Designers have to understand how systems can appropriately support collaborative activities, and replace mechanisms that have always been part of healthcare, like paper records (Reddy et al. 2011). Moreover, a certain flexibility in collaborative processes is required to make collaborative technologies in complex and heterogeneous practices work (Bjørn and Rødje 2008).

Next to the complexities of infrastructures, many authors also pointed out the political and disciplining aspects of technological designs. Technical systems are not neutral; values, cultural characteristics and political positions are inscribed into their design (Winner 1986). This materialised politics disciplines users, stimulates or constrains certain behaviour and enforces an often implicit political agenda. Winner's (1986) famous—but untrue⁵—example of the politics in design is about the bridges over the Long Island parkways: their height kept busses from passing underneath and, as a consequence, poor peoples' access to the richer areas of Long Island was limited (Joerges 1999). Suchman (1994), in her study on workflow supporting computer systems, adds that inscribing standardised categories (e.g., formal representations of communication and action) into technical designs not only constrains or enables certain work practices, but can also enforce a political agenda to control and discipline its users. Bjørn and Balka's (2007) study on nurses' resistance to an electronic triage system also shows the politics of standardisation: in trying to control hospital costs, the discretionary space nurses had for triage work was limited and the system became "a device for social control forcing particular standardized procedures upon practice" (Bjørn and Balka 2007, p. 373).

While the theoretical apparatus on information infrastructures in healthcare is growing, it has been asked to what extent the insights it provides help to understand other collaborative ISs that intend to span even more professional domains, merge different politics and thus have to deal with more heterogeneity. The introduction of the Child Index enables the study of such a super collaborative IS and the infrastructural work entailed in its construction. Dutch child welfare is paradigmatic in its domain-spanning ambition as it attempts to unite the professional, epistemic and political cultures of healthcare, public health, education, social and individual security, welfare and social work. As valuable as all the literature discussed above is in understanding ISs in healthcare, the scale and scope of infrastructures is rapidly increasing and the reach of many ISs has expanded well beyond a single professional domain or political agenda. We need to invest in an understanding of ISs that increasingly grow beyond health, diagnosis or care into information infrastructures of normal life.

To demonstrate and reflect on the infrastructural work entailed in the construction of information infrastructures and the work classifications and standards do, Bowker and Star operate an infrastructural inversion. This exercise, also called a gestalt switch, helps to foreground the “backstage” (Goffman 1959) elements of work practices and to unfold “the political, ethical, and social choices that have been made throughout its development” (Bowker et al. 2010, p. 99; Star 2002). An inversion is “a struggle against the tendency of infrastructure to disappear”. It means: “recognizing the depths of interdependence of technological networks and standards, on the one hand, and the real work of politics and knowledge production on the other. It foregrounds these normally invisible Lilliputian threads and furthermore gives them causal prominence in many areas usually attributed to heroic actors, social movements, or cultural mores” (Bowker and Star 1999, p.34).

This paper expands upon Bowker and Star’s study on infrastructures by exploiting the contemporary nature of the Child Index system. Most studies of infrastructures (Bowker 1994; Bowker and Star 1999; Star and Bowker 2002; Star 2002) rely on some form of infrastructural inversion to render the threads that comprise the infrastructure visible, thereby constructing their analysis largely or fully post hoc. In contrast, we follow the argument of Greenhalgh and Stones (2010) and document the growth, work and struggle accompanied by the assemblage of infrastructures as it has happened over recent years: infrastructural work-in-action, if you will (cf. Latour 1987). Rather than allowing the infrastructure to resurface through inversion strategies, we document its attempt for immersion⁶ in real time.

From an analytical point of view, this has a number of consequences that we have exploited. First, it enables an analysis of the Child Index while it is in the process of being assembled and embedded, and while it is still unknown whether it will become a success and immerse itself in the youth care practice to the point of invisibility or whether it will slowly fade away to be lost to history. Second, our observations provided access to types of infrastructural work taking place backstage, rather than solely being turned to data gathering through interviews or grey literature, allowing for more detailed documentation. Being there and witnessing attempts to immerse the Child Index can deepen our understanding of infrastructural work, its complexities and its dynamics. In addition to the way infrastructural work is performed in multidisciplinary practices, it also reveals stakeholders’ perspectives and motivations, which allows us to understand the struggles taking place in establishing the Child Index and making it work. To improve

our understanding of the Child Index infrastructure, we will illustrate the infrastructural work that is taking place in practice.

3 Method

In Dutch child welfare, several variants of the Child Index ICT are being used, offered by different software providers. We studied a local Child Index called *Zorg voor Jeugd* (Care for Youth) in a southern province of the Netherlands. Just like all other local infrastructures, it is linked to the national Child Index VIR¹ (Nji 2010).

In Science and Technology Studies, it has become good practice to study technologies in the making or in context (cf. Vikkelsø 2005; cf. Winthereik 2010; cf. Hackett et al. 2007). In line with this tradition, we studied the local Child Index in its natural setting (Denzin and Lincoln 2000). We followed the introduction in practice as it was planned and performed in this province over a period of nearly four years (between 2009 and 2013).

This province consists of 68 municipalities, which for collaborative purposes are subdivided into six regions. Each region introduced the same ICT, but agreements regarding regional collaboration are laid down in a regional Child Index covenant. We focussed especially on four municipalities, which differ in size, location and starting date for introducing the Index. We also performed fieldwork in another Dutch province to allow sensitisation to interprovincial differences and performed interviews and observations throughout the country, as well as in the UK.

3.1 Research approach and data collection

Following other scholars in Science and Technology Studies, we studied the Child Index infrastructure as a socio-technological trajectory. We followed the technology-in-use to learn more about the continuous interplay and recursive relationship between users, technology and its social context (cf. Greenhalgh and Stones 2010). To study information infrastructures and to be able to read their layers of work and complexity, Star argued that researchers should use ethnographic methods, as they “offer the opportunity to go between the layers” (Star 2002, p. 120). Following her argument, we have used three data collection methods.

First, observations provided insight into the day-to-day world of the Child Index. The first author (IL) observed professional meetings, training sessions, follow-up training sessions, congresses, a dinner, preparation activities for an evaluation, chain coordinator meetings and a child case meeting. For three years, IL observed all meetings of the provincial steering group that primarily dealt with strategic processes and the core group that dealt with tactical and operative issues. As there was quite some discontinuity over the years, she, as a researcher, was one of the stable elements. Second, we analysed relevant documents, websites and publications concerning the index, such as intermediary local evaluation reports, reports of preceding studies, relevant notes, agreements and articles. Third, IL performed 58 semi-structured interviews with professionals: policy makers and managers at the municipality level (N=13), professionals from multiple organisations in the chain of youth (N=36) and employees from organisations that support

and facilitate the implementation of the innovation (N=9). Moreover, focus groups were held with parents (1 group) and youngsters (5 groups). Interviewees were recruited via “snowball sampling” (Atkinson and Flint 2001).

The semi-structured interviews dealt with several themes systematically, including experiences with the Child Index in practice, multidisciplinary collaboration, signalling, chain coordination, privacy, the role of parents, implementation work, and the role of policy and politics. They lasted between one and two hours and were open enough to accommodate other ideas and experiences. The interviews were recorded and transcribed verbatim with respondents’ permission.

3.2 Data analysis

A first analysis of the transcripts and field notes was performed by the first author (IL) through coding in the qualitative analysis software NVivo. Themes IL started with corresponded to the themes that were most prominent during the interviews such as signalling, child at risk, collaboration, the ICT system, and the implementation process. While reading and re-reading the transcripts and notes, these codes were refined. The intermediary and final results of this coding process were independently reviewed and refined by all the other authors over several rounds. Following from our research focus on practice, these codes generated insight into the work that was performed when introducing the Child Index in practice.

Analysing the data this way enabled us to identify different types of infrastructural work. Each type of work is connected to operationalising the Child Index’ main goals, signalling risks and stimulating collaboration. In practice, creating and introducing infrastructures is a hybrid process in which all kinds of infrastructural work are intertwined. However, for analytical reasons we will discuss the different types of work with respect to these two goals separately.

To provide insight into the Child Index infrastructure, the next section describes its creation chronologically. It puts forward the most salient elements of the process, illustrated by exemplary data from different stakeholders involved. To anonymise the municipalities that hosted our fieldwork, we used the four cardinal directions (North, East, South, West) as pseudonyms. Respondents’ codes represent the interview sequence and their host municipality.

4 A new ICT system in child welfare

The idea to introduce a national Child Index did not come out of thin air, but developed over the last decade. To address many concerns about the quality of care for youth, including some cases of infanticide, the Dutch government began investing a lot of money into the development of ICT systems in 2004. According to the national policy plans from those years, local Child Indexes would be linked to a national Child Index (VIR), a future medical Electronic Child Record and planned Centres for Youth and Family. In line with this, a new law was announced that would make introducing an index obligatory for municipalities. As the 2007 national elections resulted in a small, right-wing Christian party becoming part of the government, a special

Ministry of Youth and Family was established to grant this party's wishes. In this context, child welfare was put high on the political agenda between 2007 and 2010.

To start with the ICT ambitions for child welfare, one municipality was asked to develop the Child Index tool as a pilot (Provincie Noord-Brabant 2005). From April to September 2006, at about 100 professionals from the youth workforce were involved in developing and testing the first version of a local Child Index. Professionals discussed the design of the system and expressed their concerns, which included invading childrens' privacy, damaging trust relationships and breaking existing laws and regulations. Eventually, the pilot was positively evaluated by the professionals involved. As a consequence, in 2008 the province decided to introduce the index in all its municipalities and provided implementation grants to start it up. A project team⁷ led this process. After about 14 months, when the project team considered the local implementation of the Child Index to be finished in all 68 municipalities, a new provincial management structure was set up to control, maintain and further develop it (K2 and WenS 2008).

On the provincial level, the management organisation consisted of a steering group and a core group. The steering group consisted of policy makers and directors of care organisations who focussed on monitoring and further developing the Child Index concept. It checked whether covenant agreements were met, monitored the actual use of the Child Index and was authorised to take decisions about improvements to the Child Index. The core group, comprised of civil servants from each region and a representation of managers from the youth workforce, supported the steering group by initiating and advising about proposals for change, management reports and evaluations. In addition, organisations in the youth workforce had to be convinced that they should use the new system, so informational meetings and training sessions were organised for users, the meaning of a risk was negotiated, and it was discussed by the core group who was responsible for coordination and how the system should be made to operate. The project team's biggest challenge was to motivate all users and to overcome professionals' scepticism and resistance regarding the Child Index.

In the following sections, we will analyse the work that was performed to create the Child Index infrastructure with respect to its two main goals: early signalling of at-risk children and improving multidisciplinary collaboration.

4.1 Risk categorization through the Child Index

The first major goal of the Child Index is the early signalling of at-risk children in order to prevent future problems and secure a child's healthy development. The VIR law states that an authorised professional should register a child when he or she has a "reasonable suspicion" that "the necessary conditions for a youngster's healthy and safe development to maturity are being threatened" (Eerste Kamer 2008-2009, p. 5). From the start, the meaning of signalling at-risk children was a topic of discussion. Professionals wondered how they should decide when a child is at risk, which criteria should be used and when to enter a signal. Therefore, in the Child Index' construction process, several attempts were made to define and standardise an at-risk child.

First, the local Child Index we studied "is equipped with the function to establish degrees of severity in a signal" (Zorg voor Jeugd 2008, p. 8)—low, high or urgent—quickly recognisable by the green, orange and red dots accompanying the registration. This classification of risk signals

inscribed into the ICT tool not only indicated the signal's level of urgency, but also determined the time span during which professionals had to contact each other. To inform professionals about those signalling codes and the accompanying rules, the Child Index covenant contained a table that explained this simple classification system (Table 1. Urgency codes).

<i>Code</i>	<i>Severity</i>	<i>Explanation</i>	<i>Report days</i>
1	Low	Contact about exchanged signals	5 working days
2	High	Consultation between the professionals involved	3 working days
3	Urgent	Chain coordinator analyses the situation and determines, in consultation with parties involved in the chain, what actions have to be performed directly.	Directly

Table 1. Urgency codes (Zorg voor Jeugd 2008)

However, professionals' uncertainty and confusion about using the codes contributed to a variety of expectations in practice. What a teacher assessed as urgent may be dismissed as irrelevant by a youth worker: "We encounter hundreds of situations [...] we are in that nice position of hearing a lot of signals [...] because the contact I have will be damaged [...] [we signal] only if we are seriously concerned. For us it is very hard to constantly make that trade-off." (P3). So matching signals could cause miscommunications and frustrations among the professionals involved.

The management organisation, aiming to make the Child Index work and to stimulate the input of signals, decided to simplify the signalling process and issued the "Proposal for change 14: Decrease amount codes for signalling." The first version of this proposal suggested using two types of urgency codes instead of three, but the steering group decided to completely abolish the urgency codes inscribed into the ICT tool. Since then, professionals have only had to decide whether to enter a signal or not.

A second attempt to standardise the notion of risk came from the government in 2009, in the form of national report criteria. To support professionals in making their considerations and to stimulate usage of the national Child Index infrastructure, the former Dutch Ministry of Youth and Family developed "an aid in qualifying risk" (Meldcriteria.nl 2010), a booklet plus a website, as an outreach that can help professionals decide whether a child is at risk. The tool distinguishes between five life domains and points out possible problems in each of them. For instance, the education domain mentions the problem "youngster is dismissed from school" and the health domain mentions "life events" (Meldcriteria.nl 2010). Professionals have to assess whether a child's development is hampered and a signal should be registered in the Child Index, but different professional paradigms and experiences result in different notions of a child at risk. In practice, professionals find it hard to determine how to deal with those criteria. A youth physician explained: "I'm very happy those criteria exist, but the question still is how you deal with them? [...] For example: take an absent student, but one with satisfactory grades, concerned parents, and the knowledge that the family goes skiing. Do you have to report that or not? [...] You can never come up with rules that apply to everybody." (A1). Additionally, many professionals find the criteria too comprehensive. A youth worker articulated: "based on the report criteria, not much is needed to enter someone. And well, this isn't done frequently."

(P3) A region manager explained: “Sometimes I also refer to [reportcriteria.nl] but when you read those, you can almost report every child.” (L1).

In the meantime, in the policy discourse about the Child Index, the term “signalling” gradually gave way to “reporting”, which is an emotionally charged term in the Netherlands because of its association with reporting child abuse. This changing discourse made it more difficult for professionals to use the Child Index and to communicate about it with parents. As one interviewee explained: “What I still frequently see is that the word ‘reporting’ is used. Then I think, don’t use that word, because parents flare up immediately.” (K2).

The aim to standardise the use of the Child Index is not only challenged by different professional paradigms, but also by place-related differences. The life of a child in a small rural municipality is different than that of a child who lives in a big city, where different public problems with youth are constructed. Both East and West have relatively few children, but drug and alcohol addiction are considered to be a serious problem in both areas, and local youth policy makers welcomed the Child Index as a solution for fighting this problem. However, before actually entering a signal in the system, a professional is obliged to inform the parents and share his or her concerns. The severe social control in small communities can prevent them from signalling. A policy adviser in one of East’s neighbouring municipalities explained: “Some problems have more impact in a small area. It is often underestimated, the problems in a village opposed to a city.”(D4o) In practice, organisations attempted to institutionalise the Child Index tool by developing their own definitions, protocols and guidelines to define an at-risk child. (Lecluijze et al. forthcoming).

A third attempt to standardise use of the Child Index was enabled by the ICT itself, which counted all signals and matches to monitor professionals’ signalling behaviour. The management organisation produced quantitative reports, not only to get insight into at-risk children but also into professional compliance. The Child Index website explained: “With the signalling system, the following goals are realised: [...] – accountability for the way coordination of care around a youngster is performed. – generating management information (among others input for policy development).” (Zorg voor Jeugd 2013).

From the launch of the index, everything was monitored: that included the number of signals and registrations, the number of authorised professionals and the number of organisations. Depending on the needs of policy makers and managers, data could be presented per domain, organisation or region. Periodic management reports, including figures, tables and graphs, were made for local policy makers to control the “registration quality” of the local organisations involved (WenS 2009). This way the Child Index also became a management tool that could be used as a performance indicator for the professionals in the field. In fact, the system was not only used by local policy makers to see whether organisations signal enough: in cases of a new dramatic incident like a murdered toddler (STJ 2013), the Dutch inspection on youth care consulted the Child Index system to see which organisation had or had not used the index before things went wrong.

The periodic management reports showed that some regions “lag behind” compared to others, some organisations or domains “do not signal enough” or that the numbers “do not correspond to expectations”. Therefore, stimulating use of the Child Index was a priority for local policy makers and managers. Municipalities organised improvement projects to bring the Child Index to users’ attention (for the first time or again) and offered extra trainings about

early signalling to teach professionals how to communicate with parents about the Child Index. Furthermore, municipalities wrote instructions for new employees, organised refresh meetings at organisations and invited all users to attend big regional user afternoons to renew attention for the Child Index.

Despite all attempts to standardise the concept of risk and stimulate use of the Child Index in practice, professionals continued to struggle with the consequences of the Child Index' classification work: "If a flag is raised, a signal is being sent, then it's just like the child is tainted [...] is marked. That's how it is often perceived." (M1) Although the Child Index is presented as simple—enter a signal or not—professionals expressed that they viewed signalling as a moral act: they were afraid it would stigmatise or discriminate against children instead of helping them. One welfare worker wondered: "Is there actually something happening, because it feels like a relatively heavy measure, so it has to bring something. Otherwise you are risking relationships without a good reason. That is totally useless [...] which interest do you serve in that case?" (P1).

A lot of work has been performed to standardise the notion of an at-risk child and to make professionals put signals into the system. In the next section, we will take a look at the work that has been performed to achieve the Child Index' other goal: collaboration and coordination of care.

4.2 Multidisciplinary collaboration through the Child Index

Improving multidisciplinary collaboration by connecting youth care professionals is the second goal of the Child Index. The Child Index website reads: "[youth care] requires optimal collaboration, coordination, information-exchange and tuning, but that does not always work naturally. Sometimes it does not go well and then a youngster tends to fall between two stools. Sometimes it even goes terribly wrong. We have to prevent this as much as possible." (Zorg voor Jeugd 2010). It was thought that when all professionals involved with a child share their concerns via the Child Index, collaboration can start earlier, which prevents "risks turning into problems". Furthermore, the Child Index was thought to streamline coordination of care.

The project team realised early on that collaboration was not new to child welfare and that the Child Index infrastructure should adequately fit all the collaborative structures that predated it. In addition to organisations' internal collaboration structures (like care teams at schools), the youth workforce also collaborated through a variety of other structures (like neighbourhood networks). Furthermore, youth workforce professionals consider mapping the professional network around a child and collaborating with other involved professionals to be part of their tasks and responsibility (cf. Lecluijze et al. forthcoming). Despite those existing collaborative structures, several dramatic incidents were related to a lack of multidisciplinary collaboration in Dutch child welfare, and national ICT infrastructures should solve the problem (Lecluijze et al. 2013).

However, the introduction of the Child Index was not the only national policy measure the government took to improve multidisciplinary collaboration in the field. In the same period of government (2007-2010), each municipality had to organise a Centre for Youth and Family to stimulate collaboration and plan for the introduction of a national Electronic Child Record. Existing collaborative structures had to make room for the new ones. As a consequence, professionals started to lose track in the child welfare landscape, as this social worker explained: "In

all those years, I noticed that youth care is the accumulation of youth mental health care, youth assistance and youth health care. A lot of people can't make heads or tails of it." (B3) A local policy maker recognised this situation: "In fact, it comes down to the idea that they can't see the wood for the trees [...] actually a lot of confusion has been raised." (B2).

Many professionals expressed resistance against using a new ICT system they have to incorporate on top of struggling with the definition and operationalisation of risk. While professionals underline the importance of multidisciplinary collaboration in child welfare, a novel ICT system was not what most professionals wished for. Most professionals thought: "Something new again. Another thing I have to do [...] on top of everything that is already out there" (K2) In addition to the pressure of being required to use another system, professionals also experienced the Child Index as a top-down introduced political answer. As one interviewee remarked: "I clearly had the impression that it was developed behind a desk by politicians and had to be spread in the field [...] Politics determines what the best way of providing care is." (A1)

In light of the Child Index' ambitions to create a fully connected network of optimally collaborating professionals, the project team put much effort into countering professionals' scepticism, resistance and doubts. A detailed communication framework, environmental analyses to map the Child Index' context and many information and training sessions were mobilised to stimulate its adoption and use. Regional work groups were established in each region to coordinate its introduction at a local level and to gear all collaboration activities toward one another. These work groups consisted of local policy makers and representatives of local organisations.

In each region, introducing the Child Index began with an environmental analysis to map the local context. Through these local analyses, the project team gathered information about environmental factors and requirements for establishment, such as costs and human resources (Projectteam ZvJ 2007). The final regional reports also paid attention to existing (digital and physical) collaborative structures and described them explicitly. Professionals clearly articulated the importance of a "connection to existing structures (e.g., neighbourhood networks too)", which was also mentioned in the final reports under the heading of "critical success factors" (K2 and WenS 2007a, p.12). One regional report explained: "In the safety house of [North] and in the neighbourhood network in [North], systems have been deployed that have a direct relationship with the [Child Index] signalling system. At a possible introduction of the signalling system, those systems need to be aligned to each other." (K2 and WenS 2007b, p.14). Although the regional report mentioned the relevance of aligning the ICT to regional collaboration, most professionals working in this area articulated that one of the biggest problems they encountered in practice was the missing connection between the Child Index and the established structures. A social worker from North explained: "It is presented as something new that would make other things redundant. If you present it like that, then you are not talking about embedding in what is already there or connecting to what is there [...] Then people start thinking [...] when the Child Index comes, then [the youth networks] probably disappear. [...] There have been training days for signallers [...] but one way or another they didn't make clear how that relates to the existing youth networks. That was not considered in here." (B3)

While respecting the local context was an explicit aim in introducing this ICT infrastructure, many professionals expressed that there was a lack of attention for and connection with the local context. Local priorities were ignored and every region was subjected to the same uniform implementation scheme and training sessions. Sticking to the plan and its time schedule was the

policy makers' main focus, thereby making it impossible to handle variation. Meanwhile, professionals grew confused about the Child Index' contribution to multidisciplinary collaboration. Two recurring questions were frequently discussed: When should the Child Index be used? And how does the Child Index relate to existing collaboration structures?

To deal with professionals' questions and struggles regarding collaboration, municipal policy makers came up with all kinds of initiatives to clarify and standardise the local collaboration structure. Municipalities started to develop tools to help professionals oversee the complexity of child welfare and introduced "digital roadmaps" or "railroad timetables." North, for example, developed road maps for each organisation, including the step "signal in Child Index." The majority of professionals, however, questioned its added value and started to work around it or ignore it in a variety of creative ways (Lecluijze et al. forthcoming).

The ability to discipline professionals toward collaboration and coordination received much attention throughout the introduction of the Child Index. Initially, the management organisation was keen to expand the Child Index' network, recruiting increasing numbers of connecting organisations. Later on, the decision rules governing the allocation of responsibility for coordinating care following a match—inscribed into the index' code—were continuously re-negotiated. This standardisation of collaboration and coordination led to many discussions among professionals.

First, the decision rules regarding the coordination of care were discussed, evaluated and reconsidered regularly. To determine which discipline would be appointed chain coordinator, the decision rules were developed in a hierarchical way. Most regions applied the following classifications when assigning this task: 1) youth care professional, 2) youth physician, or 3) social worker. In case of a match, the highest discipline involved would become the coordinator.

In practice, professionals experienced problems with this classification system. Being second in line, youth physicians rarely become coordinators. A youth physician argued: "I do think that should be possible. Coordinating care is part of our job. [...] So it would have made sense if it was arranged that way." (A1) Moreover, organisations that were not included in the decision rules (e.g., specialised youth care organisations or schools) felt ignored and wanted to coordinate their own cases. A municipal policy adviser explained: "Special education [...] says, we can do this much better than the chain coordinators, so we want to be coordinators ourselves." (A3a)

An organisation specialised in providing care to mentally challenged children managed to convince the Child Index management organisation to give it the fourth position in the hierarchy, but schools still cannot fulfil the role of chain coordinator. Sometimes the coordination task has to be passed on to another discipline. This happens when a match expands because a higher organisation becomes involved with the child and enters a signal as well. However, professionals do not always feel comfortable doing this. A school social worker from West shared how she experienced the intervention of a chain coordinator: "Then someone else enters, who will coordinate it, and to whom you have to report. [...] And I thought, everything goes well. [...] Although you continue with what you are doing, I had the feeling that I gave the whole process away. Especially because I had control at the moment and knew exactly what others were doing. When somebody takes over, you are dependent on that." (N2). This unpleasant feeling is strengthened by the fact that many professionals already doubted the added value of using the Child Index in the first place, because coordinating care is something they consider to be one of their regular job responsibilities. One interviewee remarked: "School social work just has a very

broad perspective [...] so it already is a broad network. Therefore, it is sometimes difficult to see the added value. Why do I also have to enter a signal into the system, and what will happen after that? Actually, you are coordinating already.” (M2).

Second, the ways organisations interpreted the chain coordinator function fed many struggles and miscommunications. A few employees from each coordinating organisation were trained as chain coordinators by following three training sessions. Participants learned how to coordinate the collaboration process and how to lead the multidisciplinary meetings according to a predefined and structured conversation model. In practice, organisations appeared to interpret and fulfil the role of chain coordinator in different ways: “There is ambiguity about the role of the chain coordinator, because how that task is performed depends on which organisation is appointed.” (A3b)

The Child Index system does not contain any health data or information on the content or quality of collaboration. To evaluate the Child Index’ contribution to multidisciplinary collaboration, all quantitative data related to collaboration are watched closely. Besides the number of matches created, management reports show precisely how many times chain coordinators are appointed and to which organisation. Based on this quantitative information, the questions of who should be responsible for performing the coordination task after a match and who was going to pay for this extra work were also recurring topics on the agenda. Although organisations want to be part of the Child Index infrastructure, the resources available determine if they are actually willing to adopt the coordination task. A manager explained: “We don’t receive any subsidy from the municipality, so we don’t get paid either [...] The role we fulfil regarding the [Child Index] and its coordination task, doesn’t pay [...] Therefore, we are of course a bit hesitant with respect to the coordination tasks we pick up.” (H1)

Since 2010, the management organisation has been thinking about and discussing the possibility of introducing a ‘family module’ as part of the Child Index infrastructure in order to enable the organisation of a collaboration structure for a family as a whole. By matching family members in the system, professionals can gain insight into the family situation and will be informed by the system when a child’s sibling is at risk. The Ministry responded to this request from the practice and started to work on a national family module as well. Although a new government took office in 2010 and abolished the special Ministry for Youth and Family, the Dutch child welfare domain was still subject to new policy plans. Currently, the government is preparing a new national youth law that includes the Child Index and the family module. In anticipation of these developments, most municipalities have put the Child Index project on hold, but some are also making plans to expand the Child Index infrastructure and turn it into a Citizen Index.

5 Discussion

Despite good intentions and a legal framing, in practice the new IS struggles to function as a collaborative tool that spans different professional domains to prevent problems through reporting risks. The ICT system is officially in place and a lot of work has been done to get professionals to use it. However, most professionals characterise the new IS as unsuccessful and “not alive” (O2).

With the help of Bowker and Star's theoretical apparatus on information infrastructures, we analysed the Child Index in terms of infrastructural work. We observed how different forms of infrastructural work shaped the construction of the Child Index in practice. First, work was performed to design, materialise and operationalise the ICT system. Through rhetorical work, policy makers, designers, the project team and management organisations attempted to convince the youth workforce of the Child Index' added value and the need to use the system in everyday professional work. In addition, standardisation and classification work was performed to further stimulate use. By inscribing various standards and classifications into the Child Index (like signalling codes and decision rules), designers attempted to discipline professionals towards risk signalling, multidisciplinary collaboration and coordination of care. We showed that the Child Index standards and classifications also perform moral work as children and professionals are made at-risk. By entering a child's name in the system, a child becomes at-risk and the norms inscribed in the index define how professionals interfere with the child or the family. By monitoring the number of signals and matches, the Child Index is appropriated as a management tool for supervising professional work.

However, professionals performed resistance work, opposing much of the work listed above. Many professionals felt uncomfortable with the imposed classifications and experienced the managerial use of the Child Index as a lack of trust in their expertise, as well as limiting their discretionary space. They find it difficult to classify a child this way and are afraid to stigmatise children or threaten the relationship with a family. Considering the legal framing of this IS, resistance was not done openly and was mostly shaped in the form of muttering. By working around the Child Index, developing their own informal risk criteria and holding on to old collaborative structures, professionals kept the Child Index from playing a major role in their work practices.

Many researchers have stressed the importance of building in a sufficient level of flexibility for an infrastructure to become successful (Bowker and Star 1999; Hanseth and Lyytinen 2004; Ellingsen and Røed 2010; Johannessen et al. 2013). Flexibility enables people to take heterogeneity into account and to provide room for local solutions (Ellingsen and Røed 2010; Ellingsen et al. 2013). The Child Index can be considered a rigid and inert infrastructure. Pressured by media attention, policy makers presented the Child Index as a simple but promising tool to prevent future tragedies for children. To make the youth workforce use the Child Index and to overcome heterogeneity in professional practices, a national law was developed to oblige all municipalities to install, introduce and use the same ICT tool. The top-down and imperative character provided no space for the aforementioned required flexibility, variety, reflection and change. Professionals' worries about the classification of risks, collaboration standards or privacy issues were solved in a legal, uniform and rather technocratic way (e.g., by performing a legal test or developing national reporting criteria). Mobilising the power of the law insufficiently addressed professionals' concerns and smothered the flexibility required for successfully building the Child Index infrastructure.

Previous studies also emphasised the importance of taking the installed base into account when building a new infrastructure. In designing the Child Index, there was a lack of attention paid to both the collaborative and preventive infrastructures already in place. Professionals describe Dutch child welfare as a complex and fluid landscape of digital and physical collaborative structures. The aim of the Child Index was to create a new all-embracing IS that integrates all

youth-related professional domains and risk-paradigms and connects the variety of existing collaborative structures in a simple and standardised way.

Although the Child Index project team attempted to take existing collaborative platforms in Dutch child welfare into account and to handle collaboration across disciplines by installing decision rules that ascribe coordination responsibilities, professionals did not comply with the index. According to them, this new tool with its standards and classifications does not fit existing collaborative structures and neglects different professional cultures. Grudin (1994) and Bjørn and Rødje (2008) already stressed that designers of collaborative technologies have to understand the dynamics, complexity and heterogeneous nature of the work practices they design for. In the case of the Child Index, which needed to connect a broad variety of disciplines that make up the youth workforce, designers addressed those differences by inscribing a vague risk categorisation system. Professionals experienced this categorisation as too unspecified to use the index in their daily collaborative work practices. Moreover, turning disciplinary, analogue, situated risk assessments into a digital but vague risk signal does not fit professionals' notions of quality work and their ideas about how to relate to parents and children.

Successful infrastructures discipline users towards a desired behaviour (Winner 1986; Suchman 1994; Bjørn and Balka 2007). Our analysis of the Child Index shows how several types of infrastructural work tried to make the Child Index work, but also demonstrate professionals' resistance work against the new system. Some of this resistance work was effective as it induced renegotiations and change (e.g., the abolishment of signalling codes). However, the lack of flexibility in the IS implied that much feedback and professional resistance was not effective in changing the system. Accordingly, the Child Index system does not discipline its users as expected.

The Child Index should contribute toward achieving two goals simultaneously: early signalling of at-risk children and stimulating multidisciplinary collaboration. Connecting different domains by making all professionals use the index should improve the quality of care. As the Child Index' goals require colleagues with different professional backgrounds, and parents, children and colleagues who have very different perspectives on dealing with risk and providing good care to relate to one another, the infrastructure has to integrate a lot of heterogeneity. The required flexibility for managing such heterogeneity was mostly absent.

However, flexibility is not omnidirectional. Professionals created flexibility to deal with risk in practice by renegotiating the risk classification in the IS. In the process, they discarded much of the content and severity of the risk, allowing for flexibility in their relationship with parents and children and a situation in which trust, privacy and anonymity could (in some way) be maintained. In parallel, professionals attempted to create discretionary space to collaborate. They used the system differently, post hoc or not at all to create the collaborative effort the child needed (Lecluijze et al. forthcoming). This infrastructural work performed by professionals, which was meant to operationalise both politics in the IS, does not always strengthen them both; it can even keep the infrastructure from taking off. Operationalising the risk politics in the IS means surrendering the collaborative politics. In perfect symmetry, operationalising the collaborative politics in the Child Index means surrendering risk politics. Through their operationalisation in the IS, both politics are made incommensurable.

While large scale systems can be used to serve different political agendas, support collaboration, achieve several different goals and overcome disciplinary boundaries that cannot be over-

come in any other way, this is not something that can be taken for granted. We have demonstrated that, in practice, certain politics can be incommensurable; they can give rise to infrastructural work that actively excludes other politics. How many paradigmatic differences and how many different professional worlds and logics can become connected in an ICT infrastructure? ICT is not a magic bullet that solves every child welfare problem, it is not a magic bullet that can overcome every disciplinary boundary and it is not a magic bullet that can merge all political positions. Despite their impressive track record, there are limits to the integrative capacity of ISs.

6 Conclusion

Building the Child Index IS is characterised by all types of infrastructural work Bowker and Star consider of key importance, like negotiation, classification and standardisation. However, the technocratic, legal and top-down introduction strategy, the lack of respect for the installed base and the lack of sensitivity to the heterogeneity the Child Index has to deal with created an inflexible new infrastructure that fed resistance work, with the implicit and sometimes even explicit goal of undermining the infrastructure's two political agendas of classifying risk and increasing multidisciplinary collaboration. Besides the growing number of ICT infrastructures that intend to stimulate multidisciplinary collaboration in healthcare, the scale and scope of infrastructures is rapidly increasing and the reach of many ISs has expanded well beyond a single professional domain.

The Child Index is an example of such an infrastructure, presented as a simple solution to improve the quality of care collaboratively provided by multiple domains of a complex field. Because the Child Index was designed to meet two political agendas and to discipline users from multiple different domains, effort was invested in uniformity and speed rather than in flexibility, heterogeneity and respecting the installed base. The resulting infrastructural work made both politics incommensurable, which explains why the Child Index never really found solid ground. The consequences of conflicting infrastructural work and the limits of the integrative capacity of ISs are worth signalling.

Notes

1. In this paper, we use the term Child Index to refer to the local ICT tool we studied, called *Zorg voor Jeugd* (Care for Youth), or to the national Child Index, named VIR (Verwijs-index voor Risicojongeren; translated: Reference Index for Youth at Risk). In practice, different local systems are being used, but each local system is linked to the national Child Index.
2. All professionals in the youth workforce can be potential Child Index users. Therefore, it is difficult to give an indication of the number of potential users, as new organisations can be engaged and connected to the system anytime. As soon as policy makers decide that new organisations can become authorised (e.g., local private care providers or sport clubs), the number of potential users will grow. Only professionals who received a username and

- password can use the system to log their name against a child's. Authorised professionals cannot consult a child's information without sharing their own involvement or concerns.
3. Teachers are not authorised to use the index themselves, but signal risks indirectly via the school's care coordinator.
 4. Oudshoorn (2008) uses the notion of invisibility to study all the work it takes to make a technology work; this is also called "invisible work". She illustrates how new healthcare technologies help to do work, but also introduce, redistribute and displace work. Neglecting this work has consequences for technologies' viability and actual use; it induces selective use and non-use.
 5. Joerges (1999) illustrates that there were many other routes to gain access to Long Island's rich areas and that busses were not allowed at parkways anyway.
 6. We use immersion to indicate a property of infrastructures Star and Ruhleder (1996) refer to as embeddedness: "infrastructure is 'sunk' into, inside of, other structures, social arrangements and technologies" (Star and Ruhleder 1996, p. 113).
 7. The Child Index project team guides and supports municipalities and organisations with the introduction of the Child Index. The team resulted from the collaboration between the organisation that developed the index and provided the first project leader for the pilot (a consultancy bureau specialised in youth issues) and a communication bureau.

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