Introduction

From 'professional development for data use' to 'data use for professional development'

Introduction

Data use is on the rise and is receiving more and more attention in education. School leaders, teachers and policy makers are expected (and mostly willing) to make purposeful use of the data that they have at their disposal. Data use in this regard can be defined as the systematic analysis of data sources (internal or external to the school) aimed at informing improvement efforts on teaching and learning and/or at holding actor (and systems) accountable for educational processes and results (Schildkamp, Lai, & Earl, 2013). Effective data use is considered by many stakeholders as a tool that leads to improved educational processes and increased student achievement.

The potential of data use has been promoted by diverse opinion makers and is in that sense not a new idea. For example, already in the 18th century Michel de Montaigne presented 'acting wisely based on the capacity to assess new information and knowledge' as a central public value. In a totally different context, at the beginning of the previous century, Frederick Taylor in his 'Scientific management' also stressed the importance of gathering data to monitor organizations processes (Burke, 2011). However, even though data use has been around for quite a long time, most schools do not seem to be able to use data effectively for improving student learning (yet). In the previous decade many studies have documented that data use in schools was, and in many educational systems still is, rather limited. This special issue aims to take a next step and shifts focus from whether and how educators use data to how educators can be supported to use data. Its focus is 'professional development for data use'.

Although more and more data are available in many educational systems this does not lead directly to intensive use and noteworthy effects. There are ample challenges for educators dealing with data use, and a range of skills can be identified as a relevant focus for professional development. Most apparent are the capacity to collect, interpret and use data in a way that turns numbers into actionable information. These challenges are not only individual challenges, but also relate to a collaborative engagement in finding and implementing solutions for real life school and class problems. Moreover, growing awareness exists that being overly occupied with potential high stake accountability measures might jeopardize the outcomes of data use practices. This special issue aims at broadening and deepening the current knowledge base on how to increase knowledge, skills and attitudes of principals and teachers concerning successful data use. The aim of this special issue is to inform this 'professionalization' debate, both from an academic and policy/practical point of view.

The work in this special issue represents not only a variety of international settings, but also a range methodological approaches. In this issue we brought together a set of papers that represents academic work from around the globe using a variety of methodological approaches that are currently used in studying data use. This special issue is put together by the 'ICSEI data use network' that connects the contributors and that is chaired by the guest editors (ICSEI: International Congress for School Effectiveness and Improvement (www.icsei.net)). At the center of this network are the research activities and findings of scholars. It is however also an explicit aim of the network to include practitioners, policy makers and politicians in order to set the research agenda, in order to discuss implications of studies and in order to disseminate the emerging knowledge base on data use. We hope that this special issue contributes to these network aims and will create opportunities for authors, readers and ideas to get into interaction. Furthermore, we hope that this special issue can advance our understanding of data use in schools, and our capabilities across educational levels to facilitate data use.

A special issue in three parts: overview of the papers

This special issue consist of nine papers. The first four papers address the concepts of data and data use, how this is construed by educators, as well as important aspects of data-related professional learning. The next three papers address the implementation of data use and professional development initiatives in schools. The final two papers present effects of two different data-related professional development initiatives.

Part 1: Conceptualizing 'data use' and the potential of professional development

The first paper '*Thinking about data: Exploring the development of mental models for 'data use' among teachers and school leaders*' by Jimerson (2014) provides insights in how educators conceptualize data and data use. Jimerson's mixed methods study aimed at understanding the development of mental models for data use among educators in a small school district located in Texas (US). Drawing from survey and interview data, the study addresses how educators conceptualize 'data' or 'data use'. From a professional development perspective the finding that mental models are

rooted in ways of thinking about 'data' and 'data use' that were influenced by formal training, modeling by leaders, social interaction with colleagues, and personal experience is highly relevant. In concluding, the author stresses the importance of a broad and common understanding about what 'data use' entails because a hyperfocus on data use as being accountability and test data focused could cause educators to miss opportunities to address fundamental learning and teaching problems. Identifying and shaping mental models therefore is put forward as a required and promising aspect of professional development for data use.

The second paper 'Exploring data use practices around Europe: Identifying enablers and barriers' by Schildkamp, Karbautzki, and Vanhoof (2014) shows that an urgent need for professional development exists in several educational systems. The authors explored what data-based decision making use looks like in schools in five different countries (United Kingdom, Germany, Poland, Lithuania and the Netherlands). Case studies using interviews and policy documents were conducted in each of these countries to identify which data are currently used by schools for which purposes, and to describe the organizational, data and data systems characteristics and user characteristics that influence the use of data. The results show that schools in all the five countries have a wide range of data available, and use these data for policy development, school improvement actions, teacher and instructional development, and accountability purposes. However, in most schools data use for these purposes does not get beyond a superficial monitoring level. Hindering and enabling factors are identified at school, teacher and data system level. Schools in the five countries, with sometimes completely different contexts (e.g. from highly centralized to decentralized) struggled with similar problems: e.g. lack of access to high quality data, lack of professional development in using data, and a lack of collaboration around the use of data. Furthermore the authors challenge the existence of linear relationships between enabling factors and data use and promote a contingent approach toward setting up data use policies in general and professional development in particular.

The study conducted by Wayman and Jimerson (2014) provides more information on what professional learning in the use of data can look like. Their study 'Teacher needs for data-related professional learning' sheds light on the competencies teachers need in the use of data. The results of their qualitative study show, for example, that teachers need to be able to pose thoughtful and relevant questions of the data. Moreover, they need to be able to use data on a day-to-day basis so they can adjust their teaching and lesson plans to the needs of the students in a timely manner. The results of their study also shows what the needs are with regard to data related professional development, such as: contextual learning specific to their content and grade level; coherent professional development that fits well with prior learning and builds upon prior skills; timely professional learning so that it can be put to immediate use. Based on these findings, Wayman and Jimerson suggest four directions that districts may explore to better support data-related professional learning: (1) expand the circle of inquiry to include data related professional learning. (2) Align data-related professional learning with individual and district goals. (3) Make collaboration an essential element of data-related professional learning. (4) Treat data-related professional learning as a component of all learning activities. Data-related professional learning should not be an event but part of the culture of schools.

Katz and Dack (2014) shed light on why data use has the potential to yield professional learning. Their paper complements other papers in this special issue as it does not primarily looks at how professional development can lead to successful data use, but rather at how data use can lead to professional development. Their contribution is entitled 'Towards a culture of inquiry for data use in schools: Breaking down professional learning barriers through intentional interruption'. Real professional learning is, they argue, about making permanent changes to thinking and practice. Data-use has the potential to yield real professional learning when it interrupts the status-quo. The authors point to the cognitive architecture of human beings (i.c. teachers and principals) that leads to a natural predisposition to preserve and conserve existing beliefs. As such, professional development is challenged by the natural propensity of people to avoid new learning by transforming the world to fit what is already in their minds, rather than changing their mental structures to fit new information. The paper makes challenging claims about the potential of data-use to interrupt educators' cognitive biases, given that educators are informed by knowledge of how these biases work. This paper describes how data-use within a culture of inquiry can intentionally interrupt the biases to lead to authentic professional learning.

Part 2: Implementation of data use and professional development initiatives in schools

Three papers in this special issue studied the implementation of a data use initiative in schools. The first paper by Hubbard, Datnow, and Pruyn (2014) reports findings from a year-long case study of a US elementary school that placed data use at the core of its platform for school reform. The paper 'Multiple Initiatives, Multiple Challenges: The Promise and Pitfalls of Implementing Data' aims at showing how historical, institutional and cultural factors influence data use. The authors hypothesize that data use initiatives are layered on top of already established routines and relationships, and some run counter to data-informed practice. Therefore the goal of their study was to determine how teachers implement data use in concert with other reform initiatives and to investigate actions taken and the challenges faced by educators in moving data into useable knowledge to inform instruction. The paper reports that although groups of teachers collected various forms of data and showed a willingness to apply assessment results to classroom practice, they indicate to lack training in how to use the data in their own context. Also, the requirements to implement multiple initiatives created tensions that decreased teachers' ability and motivation to use data: 'the incompatibility of multiple initiatives'. The authors conclude that how and when teachers used data was the result of a broader set of policies and structures at the federal, district, and school levels, as well as the capacity of the teachers and principal at the school. Understanding the usefulness of using data across content areas was not only found to be unfamiliar but also uncomfortable terrain. To tackle such issues the authors relate their findings to larger questions about organizational learning and change management.

The paper by Farley-Ripple and Buttram (2014) focusses on the implementation of a data use initiative: 'Developing Collaborative Data Use through Professional Learning Communities: Early Lessons from Delaware'. The department of Delaware mandates that all grade or subject area teachers have 90 min weekly to engage in professional learning communities (PLCs) in which collaborative data use is the central activity. The authors studied the implementation of this mandate in four schools and two districts. Their results show that all schools implemented this mandate, but the extent and quality of implementation varied. Both schools from district A implemented the 90 min meeting time. District B delegated the decision to the schools, but the schools did not always meet the 90 min weekly demand. The schools from district A also seemed to be more effective in actually using data for improvement actions in the classrooms. One school in specific engaged in a broad range of data use practices, shared data among and across grades, and used different forms of data. The authors extract four important lessons from the results of their study: (1)