

Effects of a data use intervention on educators' use of knowledge and skills



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ARTICLE INFO

Article history:

Received 8 June 2015

Received in revised form 18 September 2015

Accepted 21 November 2015

Available online 24 December 2015

Keywords:

Data use

Professional development

School improvement

ABSTRACT

Data use is increasingly considered to be important for school improvement. One promising strategy for implementing data use in schools is the data team intervention. Data teams consist of teachers and members of the school leadership team, who collaboratively analyze and use data to solve an education-related problem at the school. This mixed-methods study aims at measuring the effects of working in a data team on the application of data use in ten secondary schools by using questionnaires and case study interviews. The results show that at the end of the intervention period, educators on the data teams did not apply data use more often for accountability actions, but seemed to be more aware of data use for school development and instruction. Furthermore, it seemed that the teachers made a start at applying data use for instructional actions.

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1. Introduction and conceptual framework

Data use is identified as a common and core characteristic of high-performing schools (Schaffer, Reynolds, & Stringfield, 2012; Snipes, Doolittle, & Herlihy, 2002; Supovitz & Klein, 2003), and is widely believed to promote school improvement (Datnow & Hubbard, 2015). Data use has become a requirement for both school leaders and teachers in many parts of the world (Datnow, Park, & Kennedy-Lewis, 2013; Marsh, Bertrand, & Huguet, 2015; Schildkamp, Karbautzki, & Vanhoof, 2014a). The term 'data' is defined as *information that is systematically collected and organized to represent some aspect of schools* (Lai & Schildkamp, 2013). Assessment data make up the most prominent type of data used in the school context (e.g., Hamilton, Stecher, & Yuan, 2009b; Jimerson, 2014; Jennings, 2012; Supovitz, 2012). However, other qualitative and quantitative data, such as observation data from teacher instruction (process data), questionnaire data and interviews (perception data), student demographics (input data), and dropout data (output data) may also be used by schools (Marsh, 2012).

Recent research has found that data use in schools can lead to school improvement in terms of increased student achievement

(e.g., Carlson, Borman, & Robinson, 2011; Lai, Wilson, McNaughton, & Hsiao, 2014; McNaughton, Lai, & Hsiao, 2012; Wohlstetter, Datnow, & Park, 2008). At the same time, research also shows that schools still struggle with implementing effective data use (Mandinach & Gummer, 2013; Marsh, 2012). Data literacy among educators is a crucial factor for successfully implementing effective data use in schools (Schildkamp & Poortman, 2015). In this study the term data literacy is defined as the knowledge and skills that educators need to effectively use data within the data use intervention. This entails, for example, knowledge and skills with regard to accessing, collecting, and analyzing data, transforming data into information, transforming information into decisions about improvement measures, and evaluating the outcomes of these improvement measures.

However, teacher training colleges only pay little attention to the knowledge and skills related to data use (Mandinach, Friedman, & Gummer, 2015), and researchers frequently mention that in-service teachers lack the skills and knowledge to use data effectively (e.g., Marsh, 2012). Educators need professional development in the use of data (Marsh, 2012). Therefore, we have developed and implemented a data use intervention that aims at professional development for educators regarding data use in secondary schools.

Little research is available on the long term effects of professional development related to data use and data use actions by educators in practice (Jimerson & Wayman, 2015). In a recently published article, Marsh et al. (2015) call for long term research that focuses on the influence of data on educators' practice.

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Accordingly, the current study addresses this need for research by examining the effect of working in a data team on educators' (perceptions of) data use actions in secondary schools.

1.1. Data use theory of action

Data use is a complex, non-linear, and iterative process that requires educators to access data, collect data, analyze data, and turn the data into meaningful and useful information. To become meaningful and useful, this information must further be combined with understanding and expertise (Coburn & Turner, 2011; Marsh, 2012). The data use theory of action framework presented in Fig. 1 describes the iterative process of data becoming valuable information for schools that leads to the desired outcomes or goals. The framework (Fig. 1) shows that data-based decision making is embedded in the organizational context in which data use takes place (e.g., the extent to which a school-wide vision for data use exists, the role of the school leader with regard to facilitating data use, and being a role model for data use), individual and team characteristics that may influence data use (e.g., knowledge and skills for data use, knowledge about the data management system, attitude about data use), and data characteristics (e.g., the availability of data in a data system, reliability and validity of data, and data available on a timely basis). The way in which the several factors within the different layers are fulfilled, highly influences the way in which data use is implemented in schools. For example, several studies show that organizational characteristics, individual and team characteristics, and data characteristics all influence the use of data (e.g., Schildkamp & Kuiper, 2010). Often, the presence of a factor acts as an enabler to data use (e.g., access to data), and the absence of a factor (e.g., lack of knowledge and skills) acts as a barrier (e.g., Datnow et al., 2013). Furthermore, the framework shows that data use involves several feedback loops with every step that is taken.

The starting point for using data effectively is a *purpose* in the form of a problem definition and a related goal. When *data* have

been accessed and collected to investigate hypotheses related to the *purpose*, the data should be checked (validity and reliability), organized, and interpreted to verify or reject the hypotheses. Only then do the data turn into *information* that is valuable for the school. To turn into *knowledge*, the *information* should be combined with the understanding and expertise of data team members. Subsequently – and this is where this study is focused – this new *knowledge* can be applied and turned into *action*, e.g., in the form of an intervention related to classroom instruction. After this *action*, the team should evaluate whether the action has led to the desired *outcomes*. In the framework presented, the interaction between people and data, surrounded by the school context, ultimately results in decisions about interventions that can be implemented.

1.2. Data use actions

The actions (see Fig. 1) that educators can take based on data can be divided into three categories: actions with regard to *accountability*, *instruction*, and *school development* (Breiter & Light, 2006; Coburn & Talbert, 2006; Diamond & Spillane, 2004; Schildkamp, Lai, & Earl, 2013; Wayman & Stringfield, 2006; Wohlstetter et al., 2008; Young, 2006). *Data use for accountability* refers to schools using data (e.g., assessment data and results from internal evaluations) in external reports, for example, to present some aspect of the performance of the school for inspectors (Coburn & Talbert, 2006; Diamond & Spillane, 2004; Wohlstetter et al., 2008; Young, 2006). High policy pressure for data use, as in the 'No Child Left Behind' act, can lead to schools using data extensively for accountability actions (Wayman, Spikes, & Volonnino, 2013). However, using data for accountability actions does not automatically lead to school improvement.

Furthermore, data can be used to modify *instruction*. Effective instruction by educators in classrooms involves actions with a clear goal, that are aimed at explaining concepts and procedures, providing insight at the start of the learning process or sustaining

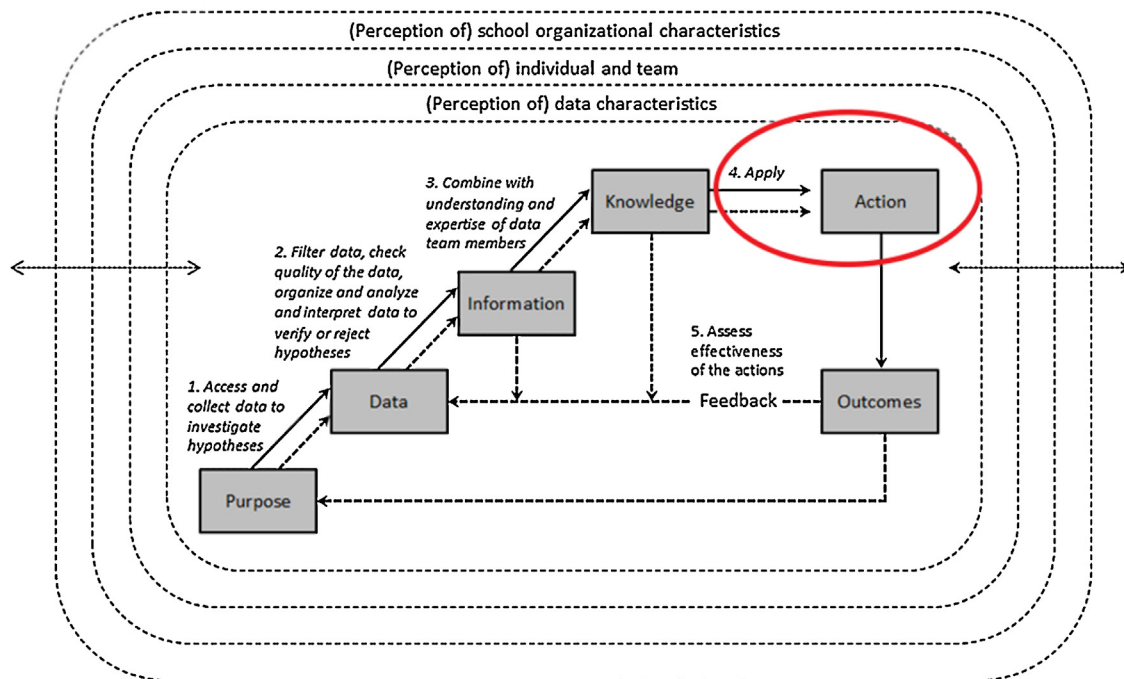


Fig. 1. Data use theory of action, and factors influencing data use (Schildkamp & Poortman, 2015; based on Coburn & Turner, 2011; Ikemoto & Marsh, 2007; Lai & Schildkamp, 2013; Mandinach, Honey, Light, & Brunner, 2008; Marsh, 2012, p. 4; Schildkamp, Handelzalts, & Poortman, 2012; Schildkamp & Kuiper, 2010; Schildkamp & Lai, 2013; Supovitz, 2010).

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