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Inquiry-based leading and learning

Inquiry-based working by school boards, school leaders and teachers and students' inquiry habit of mind

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General introduction

Introduction

This study addresses inquiry-based working in primary schools, which is a way of working that has become increasingly important in education. It involves having an inquiry habit of mind, being data literate and creating a culture of inquiry in schools (based on Earl & Katz, 2006). Our society has changed in the past decades from an industrial society into a knowledge society because of globalization, internationalization, and information and communication technologies. At the same time schools are held increasingly accountable for their output in terms of student achievement. Schools are more and more expected to provide stakeholders with data that illustrate the quality of their education and to effectively use this data as the basis for the improvement of student performance (Earl & Katz, 2006; Lai & Schildkamp, 2013; OECD, 2013; Vanhoof, Vanlommel, Thijs & Vanderlocht, 2014). Inquiry-based working makes schools more aware of their educational quality, educators are better able to perceive weak spots in instructional processes, and more focused adjustments are made to attain educational improvements (Krüger, 2010a). This way of working implies that school leaders and teachers use data as a basis for collaborative inquiry and that they base educational decisions on the results of this inquiry. Next to using data for school improvement themselves, school leaders also have the new role of giving guidance to a culture of inquiry in which teachers use data to understand the effects of their actions, to act on their learning and to share their findings with others (Earl & Katz, 2006; Krüger, 2014).

When inquiry-based working is typical for the way of working in a school as a whole, it can be said that there is a culture of inquiry in the school; team members are engaged in using data to understand the effects of their actions, to act on their learning and to share what they learn with others (Earl & Katz, 2006). Research in the field of inquiry-based working in schools is relatively new. Existing research in this area predominantly focuses on conducting research and using data, while other aspects of inquiry-based working, such as contributing to a culture of inquiry and working with an inquiry habit of mind are not addressed. Neither is there a lot of research on the way in which educators at different levels in the school organization influence each other in their inquiry-based working (Schildkamp, Ehren & Lai, 2012).

This study examines the role of school boards, school leaders and teachers in creating an inquiry-based culture in their schools. We were interested in what encourages educators to work in an inquiry-based manner and the effect of working this way on the inquiry habit of mind of students. Earlier studies have shown the importance of psychological factors in explaining different aspects of working in an inquiry-based manner (Ikemoto & Marsh, 2007; Krüger & Geijsel, 2011; Schildkamp & Kuiper, 2010; Vanhoof et al., 2014). Therefore, this study firstly examined how several psychological factors (attitude, experienced social pressure, self-efficacy and collective efficacy regarding inquiry-based working) relate to school leaders' and teachers' inquiry-based working. In addition, the role of the teacher in stimulating students' inquiry habit of mind was investigated. Finally, to further investigate how an inquiry-based culture is established in schools, we examined the interplay between school board, school leaders and teachers regarding inquiry-based working.

Theoretical background

Inquiry-based working

As mentioned in the introduction, inquiry-based working involves working with an inquiry habit of mind, being data literate, and creating a culture of inquiry (Earl & Katz, 2006). School boards, school leaders, and teachers who *work with an inquiry habit of mind* value deep understanding, take a range of perspectives, and reserve judgement (Earl & Katz, 2006). According to Van der Rijst, Kijne, Verloop, and Van Driel (2008), it includes being passionate and persistent (an inclination to achieve), being honest and critical to self and others (an inclination to be critical), being curious and excited (an inclination to know), and having overview and wanting to scrutinize (an inclination to understand). *Data literate* school boards, school leaders, and teachers have the skill to transform data into information into knowledge into action (Marsh & Farrell, 2014). This means that school boards, school leaders, and teachers understand and use data effectively to inform decisions. This includes the skills of knowing how to identify, collect, organize, analyse, summarize, and prioritize data. It also includes knowing how to develop hypotheses, identify problems, interpret the data, and determine, plan, implement, and monitor courses of action. To *create a culture of inquiry*, boards and leaders engage others in interpreting data, they stimulate an internal sense of urgency to use data, make time, use critical friends, and communicate a clear vision on working with data in the school (Earl & Katz, 2006; Jimerson, 2014; Krüger & Geijsel, 2011; Wayman & Stringfield, 2006).

For teachers, this third aspect means contributing to a culture of inquiry by collaborating with other teachers in conducting research in the school and using data to improve their own teaching. In addition, teachers can create a culture of inquiry in their classroom in order to stimulate students' inquiry habit of mind. This involves creating an environment where pupils are curiosity-driven, ask questions, make discoveries, and test these discoveries in a search for new understanding (Chin, 2002; Al-Sabbagh, 2009).

Attitude, experienced social pressure, self-efficacy and collective efficacy regarding inquiry-based working

According to the Theory of Planned Behavior of Ajzen (1991, 2002b) human behavior and human intentions to perform a specific behavior can be predicted by three psychological factors: attitude towards the behavior, experienced social pressure with respect to a given behavior, and self-efficacy in relation to the behavior. The more favourable the attitude and experienced social pressure, and the greater the self-efficacy, the stronger should be the person's intention to perform the behavior in question. People are expected to carry out their intentions when the opportunity arises (Ajzen, 2002b).

Attitude towards inquiry-based working can be defined as the tendency to respond with some degree of (un)favour towards inquiry-based working – an evaluative dimension that ranges from negative to positive (based on Fishbein & Ajzen, 2010). Research on school leaders has shown a relationship between such an attitude and data use (Ikemoto & Marsh, 2007; Schildkamp & Kuiper, 2010; Vanhoof et al., 2014). School leaders' positive attitude towards data use appears to have a positive relationship with their actual use of data (Vanhoof et al., 2014). *Social pressure* has two aspects: social approval and normative pressure (Fishbein & Ajzen, 2010). Social approval refers to the belief that others do or do not want us to perform a given behavior (for example, believing that parents want school leaders to lead the school in an inquiry-based way). Normative pressure refers to the perception of how others engage in a particular behavior (for example, believing that other school leaders are also leading their schools in an inquiry-based way). This study focuses on both of these aspects of experienced social pressure. *Self-efficacy* is receiving continued attention in educational research (Kleinsasser, 2014). It is defined as believing for oneself that a specific behavior can be performed successfully and the conviction and self-belief that it is possible to organize and execute the actions required in order to produce given levels of attainment (Bandura, 1997).

Vanhoof et al. (2014) found that self-efficacy has an effect on data use by school leaders. In addition, self-efficacy appears to have a strong positive influence on the inquiry habit of mind and data literacy of secondary school teachers (Krüger & Geijsel, 2011). Since inquiry-based working requires teachers to work together in teams (Coburn & Turner, 2011; Earl & Katz, 2006; Katz & Dack, 2014), teachers' beliefs about the ability of his or her team to work in an inquiry-based manner are also relevant. Such beliefs represent perceived *collective efficacy* (Bandura, 1997; Goddard, Hoy, & Woolfolk Hoy, 2004; Skaalvik & Skaalvik, 2007). This study investigates what the relationship is between attitude, experienced social pressure, self-efficacy and collective efficacy regarding inquiry-based working and different aspects of inquiry-based working by teachers and school leaders.

Students' inquiry habit of mind

The concept "inquiry habit of mind" is strongly related to concepts such as "researcherly disposition" (Tack & Vanderlinde, 2014), "inquiry as stance" (Cochran-Smith, 2003), and "scientific research dispositions" (Van der Rijst, 2009). There does not appear to be a consistent definition of students' inquiry habit of mind. All studies agree, however, that an inquiry habit of mind involves being both curious and critical. Both of these aspects are important components of a student's inquiry habit of mind. *Curiosity* can be defined as a desire to know, see, or experience that motivates exploratory behavior directed towards the acquisition of new information (Litman, 2005). *Critical thinking* is not only a set of processing skills but also a habit of using those skills to guide behavior. It refers to an intellectually disciplined process of conceptualizing, applying, analyzing, synthesizing, and/or evaluating information to guide beliefs and actions. (Scriven & Paul, 2008). This study did not focus on critical thinking as a skill. Rather, it emphasizes its role as a habit of mind, which we call critical thinking habits. This means that we do not interpret being critical as the practice of processing several scientific skills. Instead, we understand it as the attitude necessary for performing these skills.

The interplay between school boards, school leaders and teachers regarding inquiry-based working

School boards are expected to monitor and enhance the educational quality of their schools (Hooge & Honingh, 2014; Lee et al., 2012). Members of school boards in the Netherlands

hardly spend any time directly working with teachers. Instead their influence works via school leaders. A supporting school leader appears to be an important factor in enabling teachers to effectively use data (Schildkamp & Kuiper, 2010). However, according to Daly (2012), many studies suggest that leaders may not have the skill sets to enact the leadership necessary to support data use and create a culture of inquiry in schools.

Research on the interplay between boards, leaders and teachers regarding inquiry-based working appears to be rare. So far, little attention in literature has been paid to the fact that when boards (leaders) and leaders (teachers) work together there is not only a top-down influence from board (leaders) on leaders (teachers), but there is also a bottom-up influence from teachers (leaders) on leaders (boards). To investigate this mutual influence, this study focused on the interplay between these 3 types of educators.

This dissertation

Our main goal was to provide insight in the way school boards, school leaders and teachers collaborate in an inquiry-based culture, what encourages them to do so, and what this means for the inquiry habit of mind of students. We investigated how psychological factors (attitude, experienced social pressure, self-efficacy and collective efficacy regarding inquiry-based leadership) are related to inquiry-based working by school leaders and teachers of primary schools in the Netherlands. In addition, we examined how teachers' inquiry-based working is related to students' inquiry habit of mind. Finally, we studied the interplay between school boards, school leaders, and teachers regarding inquiry-based working. The main question of this research is fourfold:

1. How are attitude, experienced social pressure, and self-efficacy regarding inquiry-based working related to primary school leaders' inquiry-based leadership?
2. How are attitude, experienced social pressure, self-efficacy, and collective efficacy regarding inquiry-based working related to primary school teachers' inquiry-based working?
3. What is the relationship between teachers' inquiry-based working and students' inquiry habit of mind?
4. How can the interplay between school boards, school leaders, and teachers regarding inquiry-based working be characterized?

The conceptual model showing the key elements of these questions is shown in Figure 1.1. The blue arrows represents research question 1, the red arrows represents research question 2, the green arrow represents question 3, and the two yellow arrows represent question 4.

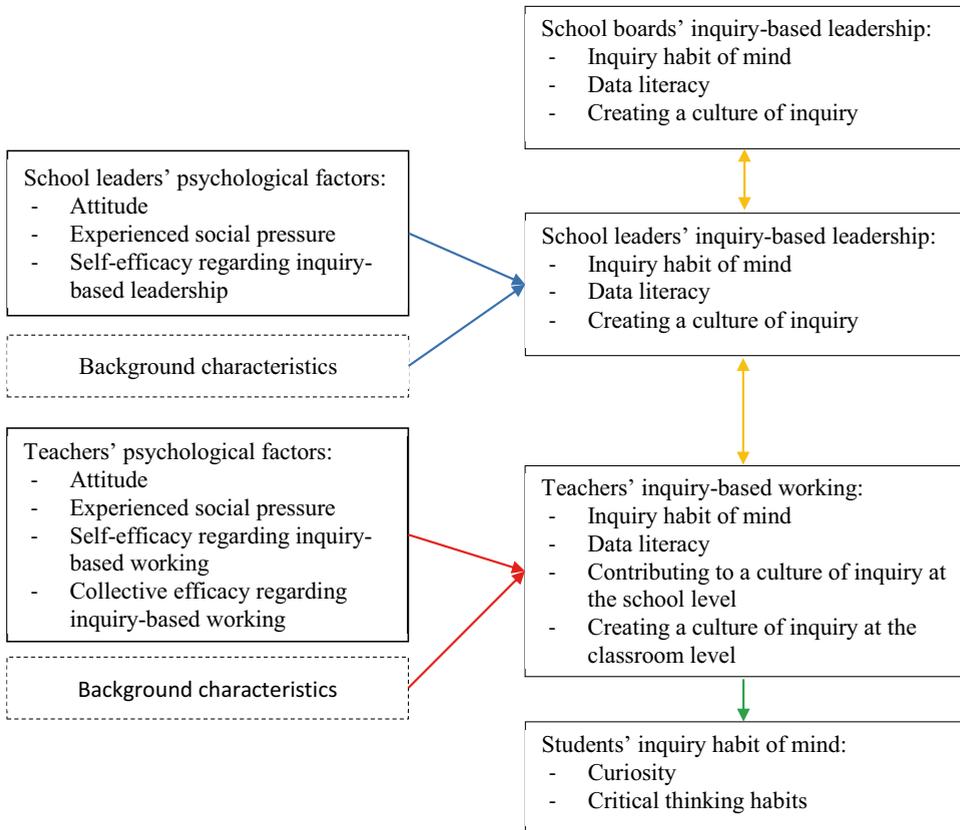


Figure 1.1.

Conceptual research model. For the ease of presentation, the different psychological factors, the variables of inquiry-based working, and the variables of students' inquiry habit of mind are presented as one rectangle each, as well as and the background characteristics.

Method

We started this study with a nationwide quantitative survey. Responses were received of 36 members of school boards, 79 school leaders, 249 teachers and 1,104 students from 71 different

primary schools. We used a different questionnaire for each group of participants. The instruments used to measure the aspects of school boards', school leaders', and teachers' inquiry-based working (i.e. inquiry habit of mind, data literacy and creating a culture of inquiry) were based on existing instruments of Krüger (2010b) and Krüger & Geijsel (2011). To measure the psychological factors (i.e. attitude, experienced social pressure, self-efficacy, and collective efficacy) we based our scales on the work of Krüger (2010b), Krüger and Geijsel (2011), Visser-Wijnveen, Stes, and Van Petegem (2012), and Fishbein and Ajzen (2010). Since there were no existing scales available to measure students' inquiry habit of mind (i.e. curiosity and critical thinking habits), we designed an instrument with propositions and vignettes specifically for this study.

Subsequently, we used an embedded multiple-case study design (Yin, 2012) to investigate three schools that scored average to high on inquiry-based working in the survey. Within each school we studied: (1) members of the school board, (2) school leaders, (3) teachers teaching in grade 5 to 8, and (4) students from grade 5 to 8. We used semi-structured interviews, observations, and an analysis of documents.

The results of the survey were used to answer our first and second research question. To answer our third research question on the relationship between teachers' inquiry-based working and students' inquiry habit of mind, we combined results of the survey with results of the case study. The data of the case study were used to help explain the survey responses, explore and understand teachers' perceptions, and provide a more complete picture of students' inquiry habit of mind. Finally, the case study data were used to answer our fourth question on the interplay between school boards, school leaders, and teachers. We used the qualitative data to identify multiple ways in which educators can encourage each other to work in an inquiry-based manner.

Outline of the dissertation

The general aim of this study was to provide insight in the way school boards, school leaders and teachers work in an inquiry-based manner, how an inquiry-based culture is established in schools and what this means for the inquiry habit of mind of students.

Chapter 2 reports on how the psychological factors attitude, experienced social pressure, and self-efficacy relate to aspects of inquiry-based school leadership (research question 1, represented by the blue arrow in Figure 1.1). This chapter addresses two gaps in the existing

literature, by focusing on inquiry-based leadership instead of data use and on psychological factors instead of knowledge and skills that are related to inquiry-based leadership.

In addition, *Chapter 3* provides insight in the relationship between psychological factors and inquiry-based working by teachers (research question 2, represented by the red arrow in Figure 1.1). For teachers, we not only investigated attitude, experienced social pressure and self-efficacy regarding inquiry-based working, but also collective efficacy. Because inquiry-based working requires teachers to work together in teams, teachers' beliefs about the ability of his or her team to work in an inquiry-based manner are also relevant. Such beliefs represent perceived collective efficacy.

In *Chapter 4*, to answer research question 3 (represented by the green arrow in Figure 1.1), our mixed-method study is described which examined the relationship between teachers' inquiry-based work and students' inquiry habit of mind. We investigated how teachers create a culture of inquiry in their classroom with students and students' curiosity and critical thinking skills.

Chapter 5 presents the key findings from the qualitative case study in three primary schools, focused on the interplay between school boards, school leaders, and teachers regarding inquiry-based working (research question 4, represented by the yellow arrows in Figure 1.1). We were interested in good practices regarding inquiry-based working. Therefore, we selected schools at which leaders and teachers gave themselves average to high scores on inquiry-based working in the survey.

Chapter 6 contains a summary of this dissertation and a discussion of the main findings. Additionally, methodological considerations are discussed as well as the limitations of the study and directions for further research. Chapters 2, 3, 4, and 5 were written as independent articles, which have been published in, or submitted into different journals. As a consequence, the chapters differ in reference style and some sections partly overlap.

Additional information on the used scales described in Chapter 2 and 3 can be found at: <https://www.marnixonderwijscentrum.nl/onderzoek-uiterwijk>.