

Understanding teachers as change agents

Citation for published version (APA):

van der Heijden, H. R. M. A., Beijaard, D., Geldens, J. J. M., & Popeijus, H. L. (2018). Understanding teachers as change agents: An investigation of primary school teachers' self-perception. *Journal of Educational Change*, 19(3), 347-373. <https://doi.org/10.1007/s10833-018-9320-9>

Document license:

TAVERNE

DOI:

[10.1007/s10833-018-9320-9](https://doi.org/10.1007/s10833-018-9320-9)

Document status and date:

Published: 01/08/2018

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.tue.nl/taverne

Take down policy

If you believe that this document breaches copyright please contact us at:

openaccess@tue.nl

providing details and we will investigate your claim.

Understanding teachers as change agents: An investigation of primary school teachers’ self-perception

H. R. M. A. van der Heijden¹ · D. Beijaard² · J. J. M. Geldens¹ ·
H. L. Popeijus¹

Published online: 6 March 2018

© Springer Science+Business Media B.V., part of Springer Nature 2018

Abstract This study reports on a large-scale survey on primary school teachers’ perceptions of being change agents and the extent to which these perceptions are related to personality and contextual factors. A principal component analysis and confirmatory factor analysis revealed nine characteristics of teachers as change agents. Personality and contextual factors are related to teachers’ perceptions of being a change agent. Four teacher profiles were distinguished according to the varying degrees of teachers’ perceptions of themselves as change agents. This study adds to the further understanding of teachers as change agents, their characteristics and how these characteristics are related to personality and contextual factors.

Keywords Contextual factors · Personality factors · Primary education · Teacher characteristics · Teachers as change agents

Introduction

Teachers today are expected to cope with high demands, such as teaching in increasingly diverse classrooms, regularly implementing new curricula, and continually developing themselves professionally. Teachers are crucial for the successful implementation of educational changes at school. Therefore, they need to be actively involved in processes of change—from such processes’ initial stages to their final stages (Bakkenes et al. 2010). Like Lukacs and Galluzzo (2014), we believe that schools need teachers who are ‘change agents’ in order to fulfill today’s

✉ H. R. M. A. van der Heijden
m.heijden@kempel.nl

¹ De Kempel University of Applied Sciences, Helmond, The Netherlands

² Eindhoven School of Education, Eindhoven University of Technology, Eindhoven, The Netherlands

complex teaching profession, i.e. skilled teachers who exercise their professional agency for professionally developing themselves continuously and for exerting their positive influences on education in order to change teaching practices inside and outside their own classrooms (van der Heijden et al. 2015). Through their agency, teachers make intentional choices and decisions at work. The manners in which teachers act in schools and develop themselves professionally are related to personality factors and the context in which they work. Personality factors appear to explain differences between teachers in terms of how they further develop themselves and respond to or initiate change (Day 2007; Hoekstra and Korthagen 2011). Supportive school contexts are necessary to encourage teachers to exercise agency, both individually and collectively (Thoonen et al. 2011; Thurlings et al. 2014).

Currently, little is known about how teachers can be identified as change agents. The purpose of this study is to provide insight into (1) the extent to which teachers perceive themselves as change agents, including the ways in which teachers differ from each other in this regard, and (2) how these perceptions are related to personality and contextual factors. The results of this study help to identify teachers as change agents, who are needed in schools today in order to contribute to building schools' capacity for change.

Theoretical background

The concept of *change agent* encompasses not only teacher characteristics but also personality and contextual factors that play an important role as well in how these characteristics are and can be expressed in practice (cf. Lukacs 2012; Thurlings et al. 2014).

Characteristics of teachers as change agents

In 1993, Fullan stated that every teacher should strive to be a change agent. However, limited empirical research has been conducted on what typifies teachers as change agents and on how they can be identified (van der Heijden et al. 2015) Lukacs and Galluzzo 2014). Hattie (2012) argues that being a change agent is a specific mindset that teachers have about their teaching profession. Moreover, Lukacs and Galluzzo (2014) describe change agents as “teachers with areas of expertise that allow them to initiatives in a ‘bottom-up’ design with the school as the unit of change, and not only the classroom” (p. 103). Our previous research (van der Heijden et al. 2015) has shown that teachers as change agents are skilled teachers who have an inner drive to learn and change education, both individually and with their colleagues at school.

Based on our previous research and the literature (including the Teacher Change Agent Scale (TCAS) developed by Lukacs 2009), four general change agent characteristics and eleven sub-characteristics could be distinguished. These change agent characteristics are (1) mastery (giving guidance, being accessible, positive, committed, trustful, and self-assured), (2) collaboration (being collegial), (3) entrepreneurship (being innovative and feeling responsible), and (4) lifelong

learning (being eager to learn and reflective) (van der Heijden et al. 2015). As will become clear in the short descriptions below, a *characteristic* can be described as a specific feature of a person that embodies behavioral and attitudinal entities.

First, teachers as change agents are competent teachers (Lukacs 2009; Fullan 1993a, b; Hattie 2012). Elsewhere (van der Heijden et al. 2015), mastery has been described in terms of teachers' expertise, knowledge, and skills with which they make a difference to students' learning and well-being. Teachers as change agents appear to distinguish themselves by how they practice their profession and by being positive, committed, and accessible teachers who are passionate about education and the teaching profession.

Second, teachers as change agents are receptive to collaborating with colleagues and others and possess the necessary skills for collaboration. They understand the importance of collaboration with others for their own continuous professional development and for improving teaching practices or implementing educational changes at school (Doppenberg et al. 2013; Meirink et al. 2010). These teachers furthermore actively take the initiative to work with others (Lukacs 2009; Lukacs and Galluzzo 2014).

Third, teachers as change agents are innovative entrepreneurs. They are receptive to new insights, and, although they might take a critical stance, they then translate these insights to actual teaching practices at school. They have an entrepreneurial spirit and a will to invest in the quality of education by taking creative initiatives to influence education accompanied by calculated risks (Fullan 1993a, b; le Fevre 2014; Lukacs and Galluzzo 2014). They also take innovative initiatives due to their desire to sustain interest in their work and create challenges.

Fourth, teachers as change agents tend to be lifelong learners who are eager to learn from and through their work as well as from and alongside colleagues (Fullan 1993b). They seek to improve their knowledge and teaching skills in order to enhance student learning (Hattie 2012). They regularly reflect critically on the quality of their own teaching and on the education at their school in general (Eteläpelto et al. 2013).

These four general characteristics (mastery, collaboration, entrepreneurship, and lifelong learning), including the sub-characteristics, were used in this study to develop scales for investigating teachers' perceptions of themselves as change agents.

Personality factors

A relationship exists between personality factors and the ways in which teachers think and act in practice, develop themselves, and respond to educational changes (Day 2007; Fullan 2007; Hattie 2012; Hoekstra and Korthagen 2011; Kelchtermans 2009; Zhang 2007). Personality factors of teachers appear to have a greater effect on continuous professional development and learning than contextual or school factors (Kwakman 2003). The Big Five personality factors appear to be useful for predicting the manner in which teachers behave and (successfully) perform at work (Zhang 2007; Simonton 2003). The Big Five can be considered as relatively stable personality factors that more or less determine how people behave and

respond to their environment (Branje et al. 2007). These five factors are as follows: (1) openness to experience, which assesses open-mindedness, curiosity, creative thinking, and exploration of the unfamiliar (e.g., versatility), (2) emotional stability, which reflects the regulation of positive and unpleasant feelings and emotions (e.g., nervousness), (3) conscientiousness, which reflects the degree of being organized, persistent, and motivated during the fulfillment of goal-directed tasks (e.g., meticulous), (4) extraversion, which assesses the extent to which a person is sociable and assertive (e.g., talkative), and (5) agreeableness, which reflects the interpersonal nature of a person, ranging from compassionate and committed to others versus antagonistic (e.g., friendly).

Teachers who are open to experience are likely to be open-minded and strongly prefer variety (Branje et al. 2007; Zhang 2007). Teachers as change agents might be assessed as being open to experience because they have an inner drive to change education and (dare to) experiment with new teaching methods in their classroom. They also appear to be inquiry-oriented and open to learning (Fullan 1993b; Lukacs and Galluzzo 2014). In schools, teachers differ in their will and motivation to learn. Van Eekelen et al. (2006) identify three groups of teachers who have different wills to learn: not seeing the need to learn, wondering how to learn, and being eager to learn. Litman (2008) identifies two key motives to learn: (1) to discover completely new ideas (mastery-oriented learning) and (2) to reduce one's own uncertainty by filling a specific lack of information (performance-oriented learning). Teachers who are less open to experience appear to be more conservative and traditional in their teaching (Zhang 2007).

Changing education in schools is accompanied by successes and failures. Teachers may thus experience both positive and negative feelings toward educational reform. They may, for example, experience moments of pessimism, emotional stress, or low self-esteem during change processes at school (van Veen 2003). Change agents may benefit from being emotionally stable and feeling confident in their abilities as they change or influence education individually or with colleagues (Lukacs and Galluzzo 2014).

Conscientious teachers appear to persist in striving for increasingly effective teaching and can be described as being purposeful, responsible, and strong-willed (Zhang 2007). Change agents may benefit from being conscientious as they continue to develop themselves professionally and initiate changes in education. They seek opportunities to learn and improve education in a planned and systematic manner because they are motivated to accomplish their own and collective goals (Fullan 1993b; Lukacs 2012).

Teachers who are extraverted tend to be sociable. Change agents may be extraverted to a certain extent, because they are committed to working collaboratively for their own professional development and for implementing educational changes at school. They seem to easily interact with others and make an effort to involve colleagues in working closely together on school improvements (Lukacs and Galluzzo 2014).

Agreeable teachers tend to be tolerant, trusting, and empathetic (Zhang 2007). Being agreeable may reflect the interpersonal nature of primary school teachers because they teach relatively young students aged 4–12 years. At the school level,

teachers as change agents may need to be agreeable because close collaboration with colleagues and others is required to be able to change and improve teaching practices (Fullan 1993b; Hattie 2012).

The Big Five personality factors described above were used in this study to investigate the relationship between teachers' perceptions of their own personality and of themselves as change agents.

Contextual factors

The way teachers act and learn is either positively or negatively influenced by their school context (Day et al. 2007; Lasky 2005; Vähäsantanen 2013; Thurlings et al. 2014). A supportive school context appears to be important to encourage and motivate teachers to exercise agency both individually and collectively (Day et al. 2005; Fullan 1993b; Hargreaves and Fullan 2012). Job resources can be highly motivational and promote work engagement and performance; they contribute to reaching work goals, decrease job demands, and foster personal and professional development (Bakker and Demerouti 2007). Research has shown that autonomy, social support, and an innovative and social climate are important job resources for teachers to cope with the challenging (external) demands of their work (Hakanen et al. 2006). Contextual factors, such as job resources, may empower teachers to act as change agents.

Three general contextual factors, which derive from the literature on transformational leadership, appear to be important for teachers to act as change agents in their school, since transformational leadership focuses on building both teacher and team capacity for change and on stimulating change through a bottom-up approach. The first factor pertains to school leadership playing a significant role in the quality of education and educational change (Day et al. 2007; Leithwood et al. 2008; Leithwood and Slegers 2006; Thoonen et al. 2011). Three dimensions are essential for school leadership. The first dimension is vision building. By building a school's vision for the future, teachers feel attached to the organization and are motivated to combine organizational goals with their own personal goals (Geijsel et al. 2001; Leithwood et al. 2008). The second dimension is providing individual consideration and support. School leaders need to undertake actions to understand, recognize, and satisfy teachers' concerns so that they feel supported and understood (Bakker and Demerouti 2007; Hakanen et al. 2006; Leithwood et al. 2008). The third dimension is intellectual stimulation provided by the school leader. Thoonen et al. (2011) offer this explanation:

School leaders encourage teachers to question their own beliefs, assumptions, and values and enhance teachers' ability to solve individual, group, and organizational problems. Furthermore, providing intellectual stimulation can also make teachers believe that improving the quality of education is both an individual and collective enterprise. As a consequence, teachers are more willing to invest their energy in continuous professional learning. (pp. 520–521)

The second factor pertains to the importance of enabling and encouraging teachers to participate in organizational decision-making (Bakker and Demerouti 2007;

Hakanen et al. 2006). Teachers as change agents exercise their professional agency to make choices and decisions at work and undertake actions to change education (Eteläpelto et al. 2013; Vähäsantanen 2013). Teachers need to have a degree of autonomy to make such decisions and, simultaneously, to participate in the school's decision-making processes.

The third factor pertains to the necessity of fostering a collaborative learning environment for teachers to enhance student learning and the quality of education (Day et al. 2007; Fullan 2007; Hattie 2012; Lukacs 2009). Collaboration between teachers can be considered a key factor to promote teachers' professional learning in schools (Geijssel et al. 2009). Collaboration contributes to teachers' commitment to work and learn together and support each other to change education at the classroom and school levels (Bakker and Demerouti 2007; Thoonen et al. 2011; Thurlings et al. 2014).

These three contextual factors, including the three dimensions of the first factor, were used here to investigate the relationship between teachers' perceptions of contextual factors of their school and of themselves as change agents.

Method

Participants

With the support of eight teacher education institutes, an online questionnaire was distributed among many primary schools in the Netherlands. School leaders of the primary schools were requested to distribute the questionnaire among teachers. Several reminders were sent to achieve the highest response rate possible. In total, 1222 teachers returned the questionnaire, of which 1028 were appropriate for data analyses.

The distribution of male and female respondents was 11% ($n = 117$) and 89% ($n = 911$), respectively. In the Netherlands, similar to other countries, being a primary school teacher is nowadays a strongly feminized profession [Statistics Labor Market Education Sectors (STAMOS) 2015]. The mean teacher age was 38.6 years ($SD = 11.26$), and their mean amount of experience in primary education was 14 years ($SD = 10.01$). One-third of the teachers were younger than 30 years (31%) and between 30 and 40 (30%) years old. Further, 19% of teachers were aged between 40 and 50 years, and 20% were older than 50 years. This sample is an accurate representation of the Dutch population of primary school teachers [Ministry of Education, Culture and Science (OCW) 2014; STAMOS 2015].

Instrumentation

An online questionnaire was developed to investigate teachers' perceptions of (1) the extent to which they perceive themselves as change agents, (2) their personality factors, and (3) the contextual factors of their schools (Table 1). General items were formulated to obtain background information about the respondents (such as their

Table 1 Focus, scales, number of items, and example items of the questionnaire

Focus	Scales	Number of items	Example items
Change agent characteristics	Mastery		
	Giving guidance	11	I set challenging goals for my students
	Accessible	10	I like to have conversations with my students
	Positive	9	I am motivated to provide my students the best education possible
	Committed	8	I have a passion for my work
	Trustful	7	I offer my students trust and security
	Self-assured	6	I think I am a competent teacher
	Collaboration		
	Collegial	10	I take initiatives to work together with my colleagues
	Entrepreneurship		
	Innovative	11	I dare to experiment in my classroom
	Lifelong learning		
	Eager to learn	7	I take initiatives to further professionally develop myself
Reflective	7	I look critically at my own work	
Personality factors		30	
	Openness to experience	6	I am versatile
	Emotional stability	6	I am nervous
	Conscientiousness	6	I am meticulous
	Extraversion	6	I am talkative
	Agreeableness	6	I am friendly
Contextual factors		37	
	Vision building	9	In our school, one pays attention to my ideas about education
	Providing individual consideration and support	4	Our school leader examines the problems teachers experience during the implementation of reforms
	Providing intellectual stimulation	8	Our school leader engages individual teachers in ongoing discussions about their personal professional goals
	Participative decision-making	8	At our school, changes to classroom teaching are a matter for shared decision-making
	Teacher collaboration	8	My colleagues are supportive of my application of new teaching methods

age, gender, and number of years of experience) and their school context (such as the school's number of pupils and teachers, denomination, and location by postal code).

Scales were developed to investigate teachers' perceptions of the change agent characteristics mentioned above. Based on our previous study (van der Heijden et al. 2015) and the literature, 90 items were formulated regarding these characteristics. Teachers were requested to indicate the extent to which the item content applied to them on a 4-point scale (1 = does not apply to me at all; 4 = applies to me to a large extent).

Existing scales were used to investigate the above-mentioned personality and contextual factors. Personality factors were operationalized using the existing Big Five scales (Branje et al. 2007). Teachers were requested to indicate the extent to which the item content applied to them on a 7-point scale (1 = does not apply to me at all; 7 = applies to me to a large extent).

Contextual factors were operationalized using existing scales: (1) vision building (Geijsel et al. 2001), (2) providing individual consideration and support (Thoonen 2012), (3) providing intellectual stimulation (Thoonen et al. 2011), (4) participative decision-making (Thoonen et al. 2011), and (5) teacher collaboration (Geijsel et al. 2009). Teachers were requested to indicate the extent to which the item content applied to their school on a 4-point scale (1 = does not apply at all; 4 = applies to a large extent).

The development of the change agent characteristic scales consisted of the following two steps:

- 1) Five teacher educators, five prospective teachers, and five primary school teachers provided feedback on the first 90 change agent items regarding the clarity of their formulation, suggestions for alternative formulations, and their coherence with the respective four general characteristics. Several items were rephrased based on the feedback.
- 2) A pilot study was conducted among teachers ($n = 49$) in six primary schools to test and refine the online questionnaire. The reliability was determined using Cronbach's alpha, which led to two adjustments in the change agent characteristic entrepreneurship: the sub-characteristic 'being responsible' was removed because of a low reliability (Cronbach's $\alpha = .48$), and one item pertaining of this sub-characteristic was moved to the change agent characteristic mastery. These adjustments led to a total of 86 items for change agent characteristics, which together constitute ten change agent scales (Table 1).

Data analysis

Because the section of the questionnaire investigating change agent characteristics had not yet been used in previous research, the 86 items were submitted to a principal component analysis (PCA) using SPSS (group 1, $n = 514$) and a

confirmatory factor analysis (CFA) using AMOS (group 2, $n = 514$). The dataset ($n = 1028$) was randomly divided into two equal groups using SPSS.

Preliminary analysis indicated that the data and variables were appropriate (Field 2013) for PCA (KMO = .96, Bartlett's test of sphericity, $\chi^2(3655) = 23,825.40$, $p = .000$). PCA resulted in 71 items distributed over nine components (value Kaiser's criterion > 1.00), which in combination explained 50.9% of the variance. For these nine components, Cronbach's alpha varied from .73 to .91.

CFA was conducted on the second group to validate the initial model based on PCA. Modification steps were conducted to improve the model by reviewing the factor loading of each item, the standardized residuals, and the modification indices. The goodness of fit indices (Hu and Bentler 1999) indicated a good fit of the improved model to the data (RMSEA = .044, SRMR = .050). The Chi square difference test showed that the improved model was a better fit for the data (Kline 2011) compared to the initial model ($\chi^2_D = 2598.07$, $p = .000$). The final model of change agent characteristics consisted of 57 items, which together constituted nine change agent scales (Table 2). The distribution of scores was approximately normal ($W(1028) > .90$; Field 2013).

Compared to our preliminary change agent scales ($n = 10$, see Table 1) the four general characteristics of change agents remained unaltered (mastery, collaboration, entrepreneurship, and lifelong learning). However, the sub-characteristics were renamed (and reorganized) in line with the data analysis (see Table 2). Namely, being trustful, positive, and accessible were reorganized into one sub-characteristic named 'focus on students'. 'Giving guidance' was renamed 'focus on students' learning,' 'self-assured' was changed to 'confidence in their own abilities,' 'committed' became 'work motivation,' and 'collegial' was renamed 'professional collegiality'. 'Innovative' was reorganized into two sub-characteristics: namely, 'focus on innovation at the classroom level' and 'focus on innovation at the school level'. 'Eager to learn' was renamed 'focus on their own knowledge development,' and 'reflective' was changed to 'focus on their professional skills'.

A reliability test was conducted to determine the internal consistency of the scales, resulting in acceptable Cronbach's alphas. For the nine change agent scales, Cronbach's alpha varied from $\alpha = .75$ to $\alpha = .90$ (see Table 2) for the six personality factor scales from $\alpha = .79$ to $\alpha = .89$ and for the five contextual factor scales from $\alpha = .84$ to $\alpha = .91$.

Descriptive statistics were used; t-tests and analyses of variance (ANOVAs) were conducted to obtain insight into the extent to which teachers perceived themselves as change agents. Descriptive statistics, correlations, and regression analyses were used to investigate the relationship between personality and contextual factors and the perceived change agent characteristics. Additionally, ANOVAs and t-tests were used to investigate the background information of the school contexts to explore relationships between the perceived change agent characteristics and this information. A two-step cluster analysis was conducted to identify profiles of teachers' perceptions of the change agent characteristics. ANOVA was used to investigate differences among the change agent characteristics across the profiles. Multiple regression analyses were performed to further explore the relationships among the

Table 2 Characteristics of teachers as change agents, including number of items, Cronbach's alpha, and descriptions

General characteristics	Sub-characteristics	Number of items	Cronbach's alpha	Descriptions
Mastery	Focus on students	12	.90	Teachers as change agents demonstrate empathy toward students and build a strong social relationship with them. They create an open and safe learning climate for students in the classroom. They offer students trust and security and ensure that students feel competent
	Focus on students' learning	7	.84	Teachers as change agents are skilled professionals who set challenging goals for students, support their students' development, and guide their learning (process). They make the students aware of their own learning process
	Confidence in their own abilities	4	.80	Teachers as change agents believe (and are confident) that they (can) have a positive impact on the learning and behavior of students (at the classroom and/or school level)
	Work motivation	4	.79	Teachers as change agents are enthusiastic teachers committed to their work. They have a passion for the job and enjoy their work at school
Collaboration	Professional collegiality	9	.85	Teachers as change agents find that collaboration is needed to realize successful changes in education at school. They take on-going initiatives to work together with colleagues in a professional learning environment. They see working with colleagues as a method to learn and achieve both individual and collective goals. They are team players with an open attitude and are willing to support their colleagues
Entrepreneurship	Focus on innovation at the classroom level	5	.80	Teachers as change agents dare to experiment in their classroom. They have the courage to transform new ideas into actions. They dare to step out of their comfort zone and view complex changes as challenges
	Focus on innovation at the school level	4	.75	Teachers as change agents feel ownership regarding the quality of education at the school level. They see opportunities for school development and are able to translate changes into concrete applications in educational practice and support their colleagues when necessary

Table 2 continued

General characteristics	Sub-characteristics	Number of items	Cronbach's alpha	Descriptions
Lifelong learning	Focus on their own knowledge development	6	.84	Teachers as change agents are curious about new insights and new educational developments. They take initiatives to create (new) knowledge using inquiry-oriented methods and develop support for their own arguments. They apply this new knowledge in their teaching practices
	Focus on their professional skills	6	.82	Teachers as change agents are focused on improving their own professional teaching skills using inquiry-oriented methods. They think deeply and carefully about the quality of their teaching and how it can be improved. They set high work standards for themselves and look critically at their own work

characteristics of teachers as change agents within the teacher profiles to be able to determine the similarities and differences across the profiles.

Results

Characteristics of teachers as change agents

Data analysis resulted in nine distinct change agent characteristics. Table 2 provides an overview of these characteristics, including the number of items, Cronbach's alphas, and clear descriptions for each characteristic based on the items included. Taken together, these descriptions provide a detailed account of how teachers see themselves as change agents in their daily primary school practices.

Table 3 Means and standard deviations of the characteristics of teachers as change agents (n = 1028)^a

Change agent characteristics	Mean	SD
Focus on students	3.69	.35
Focus on students' learning	3.33	.41
Confidence in their own abilities	3.47	.46
Work motivation	3.57	.45
Professional collegiality	3.61	.37
Focus on innovation at the classroom level	3.24	.50
Focus on innovation at the school level	3.24	.51
Focus on their own knowledge development	3.23	.50
Focus on their professional skills	3.51	.40

^aFor comparison reasons (between the scale scores), the scores per scale have been converted to mean scale scores on a 4-point scale

Table 3 shows that the teachers perceived the characteristic ‘focus on students’ as the most applicable to their own educational practice, followed by ‘professional collegiality’. The characteristics ‘focus on their own knowledge development’ and ‘focus on innovation at the classroom and school levels’ were perceived as least applicable.

Further analyses revealed that female teachers scored significantly higher than male teachers on the characteristics ‘focus on students’ learning’ [$t(1026) = -2.945, p = .003$], ‘professional collegiality’ [$t(1026) = -2.959, p = .003$], and ‘focus on their professional skills’ [$t(1026) = -4.584, p = .000$]. Male primary school teachers scored significantly higher than female teachers on ‘confidence in their own abilities’ [$t(152.518) = -3068, p = .003$].

The teachers differed in age [< 30 ($n = 314$), $30-40$ ($n = 309$), $40-50$ ($n = 195$), $50 +$ ($n = 210$)] and years of experience in primary education [< 10 ($n = 368$), $10-20$ ($n = 327$), $20-30$ ($n = 131$), $30 +$ ($n = 102$)]. The group of teachers under 30 years old scored significantly lower than the other age groups on ‘confidence in their own abilities’ [$F(3,1024) = 12.888, p = .000$]. These teachers (< 30 years old) also scored significantly lower on ‘focus on their own knowledge development’ [$F(3,1024) = 14.416, p = .000$] and ‘focus on their professional skills’ [$F(3,1024) = 6.219, p = .000$] compared to teachers aged $40-50$ years and $50 +$ years. In line with the under-30 years age group, the group of teachers with less than 10 years of experience also scored significantly lower on the characteristic ‘confidence in their own abilities’ compared to the other three experience groups [$F(3,1024) = 15.800, p = .000$] and on the characteristic ‘focus on their own knowledge development’ [$F(3,1024) = 6.514, p = .000$]. However, a small percentage of the variance in the scores pertaining to the characteristics of teachers as change agents was explained by age and years of experience (respectively .1–4.1% and .2–4.4%).

Personality factors

Table 4 shows that the teachers perceived the personality factor ‘agreeableness’ as the most applicable to themselves and the personality factor ‘emotional stability’ as the least applicable.

Significant correlations were observed between the characteristics of teachers as change agents and the Big Five personality factors, except for the correlation between the characteristic ‘focus on their professional skills’ and the personal factor ‘emotional stability’. Further exploratory analyses revealed significant relations of

Table 4 Means and standard deviations of the Big Five personality factors ($n = 1028$)

Personality factors	Mean	SD
Openness to experience	30.77	5.35
Emotional stability	30.28	6.05
Conscientiousness	32.86	6.27
Extraversion	32.03	6.46
Agreeableness	35.69	4.19

the Big Five personality factors and the extent to which primary school teachers perceived themselves as change agents. In particular, 24.7% of the variance in the characteristic ‘focus on innovation at the classroom level’ was explained by personality factors, especially by openness to experience ($\beta = .427, p = .000$), emotional stability ($\beta = .119, p = .000$), and extraversion ($\beta = .122, p = .000$). Further, 19.7% of the variance in the characteristic ‘confidence in their own abilities’ was explained by the personality factors; significant relations were observed for openness to experience ($\beta = .158, p = .000$), emotional stability ($\beta = .297, p = .000$), conscientiousness ($\beta = .115, p = .000$) and extraversion ($\beta = .079, p = .014$).

Contextual factors

Table 5 shows that teachers perceived the contextual factors ‘participative decision-making’ and ‘vision building’ as the most applicable to their school. In particular, the factor ‘teacher collaboration’ was perceived as least applicable.

Significant correlations were observed between nearly all characteristics of teachers as change agents and the contextual factors. No significant correlation was observed between the characteristic ‘focus on their own knowledge development’ and the contextual factors ‘vision building’ and ‘teacher collaboration’. Additional analyses revealed significant relations between the contextual factors and the extent to which teachers perceive themselves as change agents. In particular, 12.7% of the variance in work motivation was explained by the contextual factors, especially by vision building ($\beta = .103, p = .018$), participative decision-making ($\beta = .143, p = .001$), and teacher collaboration ($\beta = .108, p = .003$). Additionally, 12.5% of the variance in professional collegiality was explained by the contextual factors, particularly by participative decision-making ($\beta = .164, p = .000$) and teacher collaboration ($\beta = .130, p = .000$). Further, contextual factors explained 15.5% of the variance in focus on innovation at the school level; significant relations were found for vision building ($\beta = .112, p = .009$), participative decision-making ($\beta = .204, p = .000$), and teacher collaboration ($\beta = .124, p = .000$).

Further exploratory analyses regarding the background information of the schools showed no significant differences between the extent to which the teachers

Table 5 Means and standard deviations of contextual factors (n = 1028)^a

Contextual factors	Mean	SD
Vision building	3.20	.52
Providing individual consideration and support	3.08	.65
Providing intellectual stimulation	3.16	.60
Participative decision-making	3.23	.53
Teacher collaboration	2.95	.51

^aFor comparison reasons (between the scale scores), the scores per scale have been converted to mean scale scores on a 4-point scale

perceived themselves as change agents and school size (number of students and teachers), school denomination, a (possible) decline in student numbers, and urban versus rural schools.

Profiling teachers as change agents

A two-step cluster analysis resulted in four distinct teacher profiles divided according to the varying degrees of teachers’ perceptions of themselves as change agents (Fig. 1). These four profiles, based on the nine change agent characteristics (Table 2), provided the best fit for the data. The characteristics ‘focus on students’ learning’ and ‘focus on innovation at the classroom level’ appeared to be the most important predictor variables for clustering.

An ANOVA indicated significant differences in the mean scores of the nine change agent characteristics across the four teacher profiles ($p < .01$), ranging from focus on students’ learning [$F(3, 1024) = 447.090, p < .01$] to work motivation [$F(3, 1024) = 204.062, p < .01$]. A Games-Howell post hoc comparison indicated that all nine change agent characteristics differed significantly across the four profiles ($p < .05$).

Teachers belonging to profile 1, based on their own perceptions, were placed far below the mean as change agents ($n = 135$). The standardized mean scores indicated that profile 1 teachers perceived the characteristic ‘focus on own knowledge development’ as the most applicable to their daily behavior at school and the characteristic ‘focus on students and professional collegiality’ as the least applicable. Based on their own perceptions, profile 2 teachers were placed below the

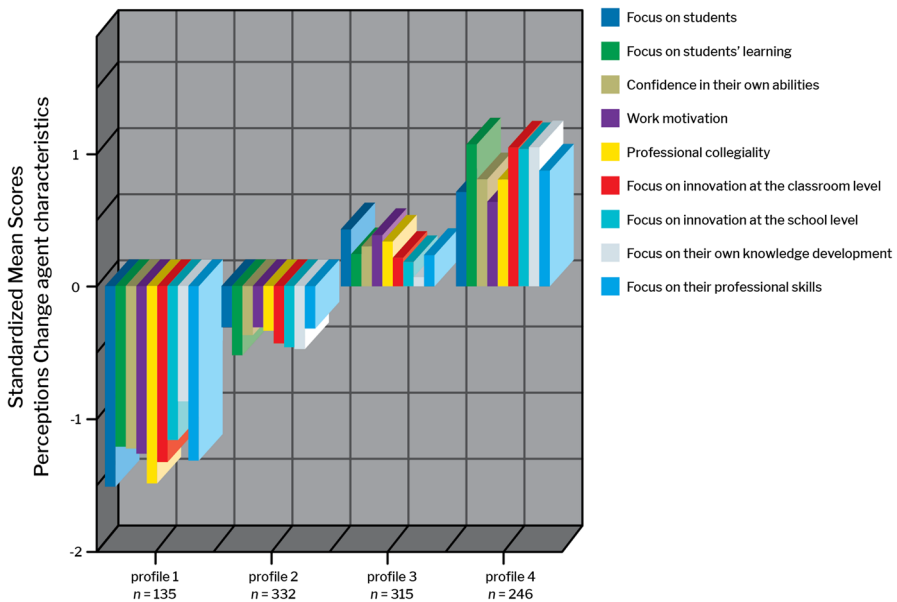


Fig. 1 Teacher profiles based on teachers’ own perceptions of being change agents

mean as change agents ($n = 332$). These teachers primarily perceived themselves as being professional colleagues, motivated to work, focused on students, and focused on their professional skills. They perceived the characteristic ‘focus on students’ learning’ as the least applicable. Teachers belonging to profile 3, based on their own perceptions, were placed above the mean as change agents ($n = 315$). These teachers perceived focus on students, work motivation, and professional collegiality as most applicable to their daily behavior. They perceived themselves as being the least focused on their own knowledge development. Based on their own perceptions, profile 4 teachers were placed far above the mean as change agents ($n = 246$, which was 23.9% of all the teachers included). In their daily practice, these teachers perceived themselves as being most focused on students’ learning, innovation at the classroom and the school level, and their own knowledge development. They perceived work motivation as the least applicable to themselves.

Further analyses (ANOVAs) showed significant differences in the mean years of experience in primary education [$F(3,1024) = 10.308$, $p = .000$] and age [$F(3,1024) = 10.207$, $p = .000$] across the four teacher profiles. A Games-Howell post hoc comparison indicated that profile 3 and 4 teachers had more years of experience (3–4 years on average) than profile 1 and 2 teachers ($p < .05$). Profile 4 teachers were older (4–5 years on average) than profile 1 and 2 teachers. In turn, profile 3 teachers were, on average, 4 years older than profile 2 teachers ($p < .05$).

Additional exploratory analyses revealed significant (predominantly reciprocal) relations among the change agent characteristics per teacher profile (see Table 6). In contrast to the other teachers, within the profile 4 teachers, no negative relations were found regarding the characteristics ‘focus on students,’ ‘focus on students’ learning,’ ‘work motivation,’ ‘professional collegiality,’ and ‘focus on innovation’ at both levels. Profile 2 and 3 teachers’ focus on students’ learning, however, negatively relates to work motivation. The characteristics ‘focus on innovation at the classroom level’ and ‘focus on their own knowledge development’ negatively relate to ‘focus on students’ within the profiles 2 and 3 teachers, and ‘focus on innovation at the school level’ negatively relates to ‘focus on students’ in regard to the profile 1 teachers.

In contrast to the profile 1 and 2 teachers, the profile 4 teachers’ focus on students’ learning (instead of ‘focus on students’) is related to ‘confidence in their own abilities.’ Only within the profile 4 teachers does ‘focus on innovation at the school level’ relate to ‘confidence in their own abilities.’

Table 7 provides an overview of the high and low standardized mean scores of change agent characteristics (see also Fig. 1), the personality factors, and the contextual factors per teacher profile. The standardized mean scores show that the teachers who perceived the change agent characteristics as increasingly being applicable to themselves also perceived both personality and contextual factors as increasingly applicable to themselves and their school. The personality factor ‘openness to experience’ and the contextual factor ‘participative decision-making’ were the most applicable to the teachers and their school in profile 4 compared to the other profiles. Profile 1 and 2 teachers did not perceive the contextual factors ‘vision building’ and ‘participative decision-making’ as applicable to their school compared to profile 3 and 4 teachers. Profile 3 and 4 teachers perceived the contextual factor ‘teacher collaboration’ as the least applicable to their school.

Table 6 Overview of the significant relations among the characteristics of teachers as change agents per teacher profile based on the multiple regression analyses^a

Teacher as change agent characteristics	Relations ^b	1	2	3	4	5	6	7	8	9
1. Focus on students	Positive	–								
	Negative	–								
2. Focus on students’ learning	Positive	P1 P2 P3 P4	–							
	Negative		–							
3. Confidence in their own abilities	Positive	P1 P2	P4	–						
	Negative			–						
4. Work motivation	Positive				–					
	Negative		P2 P3		–					
5. Professional collegiality	Positive	P1 P4				–				
	Negative		P1 P2 P3	P2	P2	–				
6. Focus on innovation at the classroom level	Positive						–			
	Negative	P2 P3	P3				–			
7. Focus on innovation at the school level	Positive			P4	P1	P1	P1 P2	–		
	Negative	P1	P3					–		
8. Focus on their own knowledge development	Positive					P1	P1 P2	P1 P2 P4	–	
	Negative	P2 P3	P3	P2 P3 P4	P3				–	
9. Focus on their professional skills	Positive	P1 P4				P1			P1 P2 P3 P4	–
	Negative			P3	P2 P3			P2		–

^aP1 = profile 1 teachers, P2 = profile 2 teachers, P3 = profile 3 teachers, and P4 = profile 4 teachers

^bBoth positive and negative relations among the change agent characteristics are presented to emphasize the direction of these relations within the teacher profiles

Discussion

Change agent characteristics

The participating primary school teachers primarily perceive themselves as teachers focused on students. The teachers are aware that an emotionally safe school environment and close teacher–student relationships are important for students’ well-being (cf. Baker 2006). These teachers also view themselves as motivated and

Table 7 High and low standardized means of change agent characteristics, personality factors, and contextual factors according to teacher profiles ($n = 1028$)

Teacher profiles	Change agent characteristics	Standardized mean scores	Personality factors	Standardized mean scores	Contextual factors	Standardized mean scores
Profile 1 ($n = 135$)						
High	Focus on own knowledge development	-.88	Emotional stability	-.43	Providing individual consideration and support	-.38
Low	Focus on students	-1.52	Openness to experience Agreeableness	-.56	Vision building	-.54
	Professional collegiality	-1.50		-.56	Participative decision-making	-.51
Profile 2 ($n = 332$)						
High	Professional collegiality	-.30	Conscientiousness	-.05	Teacher collaboration	-.14
	Work motivation	-.31				
	Focus on students	-.31				
	Focus on their professional skills	-.33				
Low	Focus on students' learning	-.53	Openness to experience Emotional stability	-.24 -.20	Vision building Participative decision-making Providing individual consideration and support	-.22 -.21 -.21
Profile 3 ($n = 315$)						
High	Focus on students	.43	Agreeableness	.13	Vision building	.20
	Work motivation	.38	Extraversion	.12		
	Professional collegiality	.33				

Table 7 continued

Teacher profiles	Change agent characteristics	Standardized mean scores	Personality factors	Standardized mean scores	Contextual factors	Standardized mean scores
Low	Focus on their own knowledge development	.06	Openness to experience	.07	Teacher collaboration	.10
Profile 4 (<i>n</i> = 246)					Providing intellectual stimulation	.10
High	Focus on students' learning	1.07	Openness to experience	.53	Participative decision-making	.40
	Focus on innovation at the classroom level	1.05			Providing intellectual stimulation	.34
	Focus on their own knowledge development	1.04			Vision building	.34
	Focus on innovation at the school level	1.03				
Low	Work motivation	.63	Conscientiousness	.22	Providing individual consideration and support	.30
					Teacher collaboration	.30

as professional colleagues who work and learn alongside members of their school team, which may be because primary school teachers have to work together to provide education for young students (aged 4–12 years) for a period of 8 years.

Teachers now are expected to continuously develop themselves professionally and to change or improve their teaching methods (Harteis and Goller 2014). Against this background, it is both striking and a cause for concern that the teachers perceive the two characteristics pertaining to entrepreneurship (focus on innovation at the classroom and school levels) and one characteristic pertaining to lifelong learning (focus on their own knowledge development) as applicable to themselves to only a limited extent. A possible explanation might be that many teachers are afraid to move away from or change their current teaching practices (le Fevre 2014). Previous research has shown substantial differences between individuals and their desire and motivation to learn (Litman 2008; van Eekelen et al. 2006). The results of this study also indicate that teachers perceive themselves as being focused on students' learning and as having confidence in their own abilities to a limited extent, potentially because being a teacher is a complex profession that requires a high level of work-related knowledge and teaching skills, including an increased pressure to meet external demands (cf. Hargreaves and Fullan 2012). Age and years of experience in primary education explain only a small percentage of the variance in the scores on the characteristics of teachers as change agents.

Personality and contextual factors

The Big Five personality factors relate to the extent to which primary school teachers say they act as change agents in their educational practice, particularly regarding being focused on innovation at the classroom level and having confidence in their own abilities. These results corroborate the literature that focuses on how teachers' personality factors affect the ways they behave and act in schools (e.g., Kwakman 2003; Simonton 2003; Zhang 2007), which may indicate that the relatively stable personality factors of teachers play an important role in whether or not teachers become change agents.

Contextual factors also relate to teachers' perceptions of being a change agent, particularly being focused on innovation at the school level, work motivation, and professional collegiality. Only vision building and teacher collaboration come across as unrelated to teachers' focus on their own knowledge development, potentially because this characteristic primarily stems from an inner drive to learn and change, which is supported by the significant relationships we found between personality factors and this characteristic (cf. Fullan 1993b; Hattie 2012). In line with the literature, our findings indicate that supportive school contexts are important for enabling teachers to act as change agents. Leadership behavior is a key factor in positively influencing school organizational conditions, teacher motivation, and teacher learning (Leithwood et al. 2008; Thoonen et al. 2011; Thurlings et al. 2014).

Teacher profiles of perceptions of being change agents

Four teacher profiles were distinguished according to the varying degrees of teachers' perceptions of themselves as change agents. A substantial difference was observed between profile 1 teachers (placed far below the mean as change agents based on their own perceptions) and profile 4 teachers (placed far above the mean as change agents based on their own perceptions). Profile 1 teachers can be characterized as the least focused on students and as being a professional colleague. It is unclear whether and how profile 1 teachers can be fostered to demonstrate more change agent characteristics. Another issue concerns how to prevent profile 2 teachers from shifting toward profile 1. In general, profile 1 may not be a desirable teacher profile because of these teachers' low scores on agreeableness and openness to experience. Profile 1 teachers' perceptions of being emotionally stable might be due to the perceived support of their school leader (high individual consideration and support). Additionally, profile 1 and 2 teachers are both younger and less experienced than profile 3 and 4 teachers, which might indicate that more time and experience is necessary to become a change agent. Nevertheless, we must be careful with this indication, because years of experience and age only explain a small percentage of the variance in teachers' perceptions of change agent characteristics.

Profile 2 teachers can be characterized as being motivated professional colleagues and as focused on students. They are the least focused on students' learning, potentially because these teachers are striving to improve their teaching practices (high conscientiousness and focus on their professional skills) and experience unpleasant feelings, such as insecurity or incompetence (low emotional stability). They also scored low on perceived individual consideration and support by the school leader. For these teachers, receiving the needed guidance and support (for example, from profile 3 or 4 teachers) appears important to gain positive experiences and develop themselves professionally into (more) competent and skilled teachers who can make a difference in student learning.

Profile 3 teachers can be characterized as motivated professional colleagues who are focused on students and their professional skills. Strikingly, these teachers perceive themselves as the least focused on their own knowledge development and openness to experience. This latter personality factor is important for all change agent characteristics, particularly for being innovative. This result may be due to these teachers feeling more comfortable reflecting on their teaching practices to enhance their performance rather than adding completely new ideas to their repertoire (cf. Litman 2008). These teachers might be satisfied with how they practice their profession. Whether or how these teachers can or need to be stimulated to be more open to new experiences is a lingering question. The school context, particularly the school leader, can play an important role by supporting these teachers' participation in professional learning communities, given their low scores on perceived teacher collaboration and intellectual stimulation.

Profile 4 teachers can be characterized as real change agents. These teachers distinguish themselves through their own perceptions and through comparisons with other teachers; they aim to present themselves as skilled teachers who make a difference in student learning and well-being and as innovative and open to learning

and experience (van der Heijden et al. 2015; Hattie 2012). These teachers have an inner drive to learn and to professionally develop themselves, which might require an open and creative mind (Fullan 1993b). These teachers appear to be intrinsically motivated to learn a broad range of new ideas. An explanation might be that expertise and comprehensive teaching knowledge are prerequisites for becoming change agents at school. Expertise in teaching and comprehensive teaching knowledge appear to be crucial for improving the quality of education at school in a bottom-up manner and gaining the support of colleagues as they initiate changes at the school level (Lukacs and Galluzzo 2014). Among the profile 4 teachers, and in contrast to the other teachers, the characteristics focus on students' learning (instead of 'focus on students') and focus on innovation at the school level are both related to confidence in their own abilities. The relationship between focus on students' learning and confidence in their abilities may be explained by the fact that profile 4 teachers derive their confidence from work, in contrast to the other teachers, in particular from having an impact on students' learning and students' progress. The relationship between focus on innovation at the school level and confidence in their own abilities may indicate that teachers as change agents, in contrast to the other teachers, have a more leading role in the change processes at school, which requires having faith in their own abilities and work-related knowledge. This aligns with the work of Lukacs (2012), who argues that teachers as change agents are initiators of change beyond their own classrooms.

The profile 4 teachers, however, perceive themselves as being the least motivated for their work. Nevertheless, the scores on this characteristic are relatively high compared with those of the other teacher profiles. This result might be due to high work standards they set for themselves so that job strain develops. They also had relatively low scores on perceived individual consideration and support by the school leader and teacher collaboration. These low scores might indicate that teachers do not feel sufficiently supported, appreciated, or rewarded by both their school leader and their colleagues for all the hard work they (themselves perceive to) do. High effort combined with low reward at work negatively affects work motivation (Bakker and Demerouti 2007). It is possible that only some teachers in a school team act as change agents. These teachers may feel isolated or have difficulty finding likeminded colleagues in their school who have a similar inner drive and will to achieve similar goals (Carse 2015). It is important to keep these teachers as change agents motivated for their work and the profession. Work motivation develops when job resources are high; the school context, including supportive school leadership, plays an important role in contributing to teachers' well-being and thus motivation (Bakker and Demerouti 2007).

We believe that every teacher should put forth the effort to develop the characteristics in which the profile 4 teachers distinguish themselves the most strongly from the other teachers: focus on students' learning, being innovative at the classroom and school levels, and developing one's own knowledge. In our view, these characteristics are essential for the teaching profession, now and in the future. The characteristic focus on students' learning is of particular importance for all teachers. Today, teaching focuses on the learning of 21st century skills, such as problem solving and communication skills as well as higher-order learning

activities, such as regulating one's own learning (Ertmer and Ottenbreit-Leftwich 2010; Saavedra and Opfer 2012). Add to this that focusing on students' learning can be seen as a key characteristic for becoming and being a successful teacher (Lidstone and Ammon 2002). Our findings, however, showed that only a limited number of teachers explicitly concentrate on students' learning. This might be a serious reason for concern.

Our findings also showed that in particular the Big Five personality factor openness to experience is related to the change agent characteristics, especially focus on innovation at the classroom level. However, only a limited number of teachers appear to be open to new experiences. The profile 1, 2, and 3 teachers perceived this personality factor as the least applicable to themselves. This may indicate that relatively few teachers are intrinsically willing to change and innovate their work at school; in turn, this may suggest a low change capacity of schools (e.g., Fullan and Quinn 2016; Lai 2014). A question arises concerning how these teachers can be stimulated to be more open to new experiences or how, from Dweck's (2012) perspective, they can evolve their current mindset into a more growth mindset. Dweck argues that those who hold a growth mindset, in contrast to those who hold a fixed mindset, tend to seek challenging opportunities for learning and change. Nevertheless, we believe that teachers' personality factors and their mindset can develop over time, such as by maturing or by adapting to their working environment (e.g., Branje et al. 2007; Srivastava et al. 2003).

Given our findings that relatively few teachers possess all the change agent characteristics to a high degree, two important questions are raised: How can teachers as change agents be retained to act (and to sustain to act) as such in schools? How can we develop teachers into change agents? A possible answer to these questions might lie within the school context in which teachers work, as school contexts seem to be important for empowering teachers to act as change agents (Priestley et al. 2012). Watson (2014), for example, argues that a professional learning community at school can function as a means for teachers to engage in professional development and change processes. In particular, the school leader plays an important role in managing such a community, such as by providing conditions for vision building, participative decision-making, and professional teacher collaboration. Moreover, the various degrees in which teachers were categorized as change agents within schools might provide direction for school leaders to strengthen teachers' specific development of the change agent characteristics. For example, leaders can create supportive work conditions to meet teachers' specific needs (Leithwood et al. 2008).

Limitations and further research

This study reported on the perceptions of teachers. In general, teachers tend to perceive themselves differently from how more objective others do (e.g., den Brok et al. 2006). In addition to these self-perceptions, it would be relevant to also investigate the perceptions of significant others, such as students, parents, colleagues, and school leaders, to truly validate our findings. In a follow-up study on teachers as change agents, it would be particularly important to involve students.

Our research made clear that having a focus on students and especially a focus on students' learning turn out to be important change agent characteristics. It thus makes sense to ask students whether and to what extent this is the case for the respective teachers under investigation. Colleagues and school leaders, for example, can be asked if the teachers under investigation really are focused on innovation at the classroom and school levels.

Furthermore, on the basis of only one questionnaire, we profiled a large number of teachers in terms of the extent to which they can be characterized as change agents. It seems obvious that in real practice teacher profiling may turn out to be more complex and nuanced than our current research findings show. Teachers may not only demonstrate individual differences within one teacher profile but also across other teacher profiles. Qualitative case studies of a narrative nature combined with thorough observations of individual teachers are necessary to investigate whether the profiles as distinguished in our study are valid from a more practical point of view. It would be relevant to investigate how teachers with these different profiles work together in varied school contexts and which 'composition of profiles' contributes to optimally functioning school teams. It would be particularly useful to identify how teachers with different profiles challenge each other as well as the constraints and tensions such differences cause.

Practical implications

Our findings may contribute to ways to reconsider the teaching profession. In schools, the change agent characteristics may foster teachers' debate and discussion on their vision of the teaching profession. Therefore, the nine change agent characteristics can be used as a source for dialogue and discussion in schools. The four distinguishing change agent characteristics as mentioned above (focus on students' learning, on innovation at both classroom and school level, and on their own knowledge development) are particularly important for schools to address. Focus on students' learning can be regarded as a key factor for being a successful teacher and for demonstrating innovative work behavior and continuous professional development. Both professional development policies as well as innovations at school therefore need to be aimed at fostering teachers' skills to enhance students' learning processes and progress in class, which can be seen as a collective purpose.

The change agent characteristics can furthermore be used in current schools to obtain a differentiated picture of (teams of) teachers in terms of the extent to which they perceive themselves as change agents and act accordingly. Our finding that contextual factors in schools are related to teachers' perceptions of themselves as change agents may foster the debate among and provide direction for school leaders and school boards to empower teachers to act as change agents in their schools. School leaders in particular play an important role in encouraging teachers to engage in change processes and in continuous professional development (e.g., Fullan and Quinn 2016). School leaders therefore need to be equipped to successfully fulfill such a role in schools. Thus, our research may have implications for both schools' professional development policies and policies regarding the

recruitment or personnel in order to build schools' capacity for change. However, attaching negative consequences to personnel policies with regard to the teacher profiles, such as because of the fact that profile 1 may not be a desirable teacher profile, requires careful consideration. As mentioned earlier, statistically profiling teachers has its limitations and may not do enough justice to the complexity of teachers' professional work and lives. Instead, the challenge must be to empower all practicing teachers to enact change agent characteristics in a professional collaborative learning environment while fostering the collective purpose of enhancing students' learning.

Teacher education lays the basis for the teaching profession and sufficiently needs to equip prospective teachers to meet the challenges of their future profession. As such, it is important to focus on educating prospective teachers and preparing them to become teachers as change agents. The characteristics of teachers as change agents as found in this study as well as the role of personal(ity) factors (especially openness to experience) may serve prospective teachers to better understand relevant aspects of their future profession. They may furthermore be useful as a source for reflection upon their own professional development. The characteristics can, for example, inspire and provide direction for prospective teachers in the process of developing their personal vision of the teacher they want to become. By undertaking assignments such as observing and interviewing practicing teachers and mentors, the change agent characteristics may come to life in terms of examples to be used as sources for dialogues and discussion among peers and with teacher educators. Holding a growth mindset (which includes the personality factor openness to experience) is important for (prospective) teachers to be or become open for change and deeper learning and, through that, develop themselves into directors of students' learning (Dweck 2012; Hattie 2012). In teacher education, pedagogies need to be developed and experimented with in order to develop learning trajectories through which prospective teachers can become such directors of students' learning. For example, Swinkels et al. (2013) developed a learning environment for prospective teachers with an explicit focus on 'teaching for learning' from the start of their teacher education. More effort is needed to build such environments in the whole teacher education program in close cooperation with practice schools. This results in the support of growth mindsets not only among prospective teachers but also among teacher educators and mentors in schools.

Conclusion

This study adds to the further understanding of teachers as change agents, their characteristics and how these characteristics are related to personality (The Big Five) and contextual factors. In particular, openness to experience appears to be an important personality factor for all change agent characteristics, especially for being innovative at the classroom level and being focused on their own knowledge development. Participative decision-making, vision building and teacher collaboration appear to be the most important contextual factors for fostering change agent characteristics. Our study reveals that relatively few teachers perceive themselves as

distinct change agents (profile 4 teachers). Profile 4 teachers appear to function at both classroom and school level. They are focused on having a high impact on students' learning in class. At the school level, they seem to fulfill a more leading role in change processes than the other teachers, which requires having faith in their own abilities and work-related knowledge. The low numbers of teachers as change agents as perceived by themselves can be considered as disappointing, given the need for teachers to keep pace with today's rapidly changing society, the implications this has for their work as teachers, and the high demands all this places on continuous learning. The factors mentioned above can be considered from the point of view of retaining teachers as change agents in schools and enhancing teachers' professional growth in becoming or being change agents. In general, this study helps to address what it means for teachers to be or become change agents.

Acknowledgements This work was supported by the Netherlands Organisation for Scientific Research (NWO) under project number: 023.002.035 (Doctoral Grant for Teachers). We would like to thank our cooperating partners for their support and for distributing the questionnaire to the primary schools in their relationship networks.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

References

- Baker, J. A. (2006). Contributions of teacher-child relationships to positive school adjustment during elementary school. *Journal of School Psychology, 44*, 211–229.
- Bakkenes, I., Vermunt, J. D., & Wubbels, T. (2010). Teacher learning in the context of educational innovation: Learning activities and learning outcomes of experienced teachers. *Learning and Instruction, 20*(6), 533–548.
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*, 309–328.
- Branje, S. J. T., van Lieshout, C. F. M., & Gerris, J. R. M. (2007). Big Five personality development in adolescence and adulthood. *European Journal of Personality, 21*, 45–62.
- Carse, N. (2015). Primary teachers as physical education curriculum change agents. *European Physical Education Review, 21*(3), 309–324.
- Day, C. (2007). School reform and transitions in teacher professionalism and identity. In T. Townsend & R. Bates (Eds.), *Handbook of teacher education* (pp. 597–612). Dordrecht: Springer.
- Day, C., Elliot, B., & Kington, A. (2005). Reform, standards and teacher identity: Challenges of sustaining commitment. *Teaching and Teacher Education, 21*, 563–577.
- Day, C., Sammons, P., Stobart, G., Kington, A., & Gu, Q. (2007). *Teachers matter: Connecting lives, work and effectiveness*. Berkshire, UK: Open University Press.
- den Brok, P. J., Bergen, T. C. M., & Brekelmans, J. M. G. (2006). Convergence and divergence between students' and teachers' perceptions of instructional behaviour in Dutch secondary education. In D. L. Fisher & M. S. Khine (Eds.), *Contemporary approaches to research on learning environments: World views* (pp. 125–160). Singapore: World Scientific.
- Doppenberg, J. J., den Brok, P. J., & Bakx, A. W. E. A. (2013). Relationships between primary school teachers' perceived learning outcomes of collaboration, foci and learning activities. *Learning and Individual Differences, 28*, 1–8.
- Dweck, C. S. (2012). Mindsets and human nature: Promoting change in the Middle East, the schoolyard, the racial divide, and willpower. *American Psychologist, 67*(8), 614–622.

- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284.
- Eteläpelto, A., Vähäsantanen, K., Hökkä, P., & Paloniemi, S. (2013). What is agency? Conceptualizing professional agency at work. *Educational Research Review*, 10, 45–65.
- Field, A. P. (2013). *Discovering statistics using IBM SPSS* (4th ed.). London: Sage.
- Fullan, M. (1993a). *Change forces. Probing the depth of educational reform*. New York, NY: Falmer Press.
- Fullan, M. (1993b). Why teachers must become change agents. *Educational Leadership*, 50(6), 12–17. Retrieved from <http://eric.ed.gov/>.
- Fullan, M. (2007). *The new meaning of educational change* (4th ed.). New York, NY: Teachers College Press.
- Fullan, M., & Quinn, J. (2016). *Coherence. The right drivers in action for schools, districts, and systems*. Thousand Oaks, CA: Corwin.
- Geijsel, F. P., Slegers, P. J. C., Stoel, R. D., & Krüger, M. L. (2009). The effect of teacher psychological and school organizational and leadership factors on teachers' professional learning in Dutch schools. *The Elementary School Journal*, 109(4), 406–427.
- Geijsel, F., Slegers, P., van den Berg, R., & Kelchtermans, G. (2001). Conditions fostering the implementation of large-scale innovation programs in schools: Teachers' perspectives. *Educational Administration Quarterly*, 37(1), 130–166.
- Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology*, 43, 495–513.
- Hargreaves, A., & Fullan, M. (2012). *Professional capital: Transforming teaching in every school*. New York, NY: Teachers College Press.
- Harteis, C., & Goller, M. (2014). New skills for new jobs: Work agency as a necessary condition for successful lifelong learning. In S. Billett, T. Halttunen, & M. Koivisto (Eds.), *Promoting, assessing, recognizing and certifying lifelong learning: International perspectives and practices* (pp. 37–56). Dordrecht: Springer.
- Hattie, J. (2012). *Visible learning for teachers. Maximizing impact on learning*. New York, NY: Routledge.
- Hoekstra, A., & Korthagen, F. (2011). Teacher Learning in a context of educational change: Informal learning versus systematically supported learning. *Journal of Teacher Education*, 62(1), 76–92.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Kelchtermans, G. (2009). Who I am in how I teach is the message: Self-understanding, vulnerability and reflection. *Teachers and Teaching: Theory and Practice*, 15(2), 257–272.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York, London: The Guilford Press.
- Kwakman, K. (2003). Factors affecting teachers' participation in professional learning activities. *Teaching and Teacher Education*, 19, 149–170.
- Lai, E. (2014). Principal leadership practices in exploiting situated possibilities to build teacher capacity for change. *Asia Pacific Education Review*, 15, 165–175.
- Lasky, S. (2005). A sociocultural approach to understanding teacher identity, agency and professional vulnerability in a context of secondary school reform. *Teaching and Teacher Education*, 21, 899–916.
- Le Fevre, D. M. (2014). Barriers to implementing pedagogical change: The role of teachers' perceptions of risk. *Teaching and Teacher Education*, 38, 56–64.
- Leithwood, K., Harris, A., & Hopkins, D. (2008). Seven strong claims about successful school leadership. *School Leadership and Management*, 28(1), 27–42.
- Leithwood, K., & Slegers, P. (2006). Transformational school leadership: Introduction. *School Effectiveness and School Improvement*, 17, 143–144.
- Lidstone, M. L., & Ammon, P. (2002). A key to successful teaching is understanding and focusing on student learning: Implications for teacher development. *ERS Spectrum*, 20(4), 27–37. Retrieved from <http://eric.ed.gov/>.
- Litman, J. A. (2008). Interest and deprivation dimensions of epistemic curiosity. *Personality and Individual Differences*, 44, 1585–1595.

- Lukacs, K. S. (2009). Quantifying ‘the ripple in the pond’: The development and initial validation of the Teacher Change Agent Scale. *The International Journal of Educational and Psychological Assessment*, 3, 25–37.
- Lukacs, K. S. (2012). Exploring ‘the ripple in the pond’—A correlational study of the relationships between demographic variables and the Teacher Change Agent Scale. *Current Issues in Education*, 15(2), 1–12. Retrieved from <http://cie.asu.edu/ojs/index.php/cieatasu/article/view/956>.
- Lukacs, K. S., & Galluzzo, G. R. (2014). Beyond empty vessels and bridges: Toward defining teachers as the agents of school change. *Teacher Development: An International Journal of Teachers' Professional Development*, 18(1), 100–106.
- Meirink, J. A., Imants, J., Meijer, P. C., & Verloop, N. (2010). Teacher learning and collaboration in innovative teams. *Cambridge Journal of Education*, 40(2), 161–181.
- Ministry of Education, Culture and Science (OCW). (2014). *Kerncijfers 2009–2013*. Den Haag: OCW. Retrieved from https://www.google.nl/webhp?sourceid=chromeinstant&rlz=1C1SAVU_enNL546NL548&ion=1&espv=2&ie=UTF8#q=kerncijfers+2014+ocw.
- Priestley, M., Edwards, R., Priestley, A., & Miller, K. (2012). Teacher agency in curriculum making: Agents of change and spaces for manoeuvre. *Curriculum Inquiry*, 42, 191–214.
- Saavedra, A., & Opfer, D. (2012). Learning 21st-century skills requires 21st-century skills teaching. *Phi Delta Kappan*, 94(2), 8–13.
- Simonton, D. K. (2003). *Teaching and the big five: Or what I've learned from a dozen years on teaching award committees*. In: Presentation to the society of personality and social psychology teaching workshop. Los Angeles, California: Society of Personality and Social Psychology.
- Srivastava, S., John, O. P., Gosling, S. D., & Potter, J. (2003). Development of personality in early and middle adulthood: Set like plaster or persistent change? *Journal of Personality and Social Psychology*, 84, 1041–1053.
- Statistics Labor Market Education Sectors (STAMOS). (2015). *Factsheet Werkgelegenheid naar geslacht*. Den Haag: STAMOS. Retrieved from <http://stamos.nl/index.rfx?verb=showitem&item=3.2.11&view=graph>.
- Swinkels, M. F. J., Koopman, M., & Beijaard, D. (2013). Student teachers' development of learning-focused conceptions. *Teaching and Teacher Education*, 34, 26–37.
- Thoonen, E. E. J. (2012). *Improving classroom practices: The impact of leadership, school organizational conditions and teacher factors*. Amsterdam: Ipskamp Drukkers B.V.
- Thoonen, E. E. J., Slegers, P. J. C., Oort, F. J., Peetsma, T. T. D., & Geijsel, F. P. (2011). How to improve teaching practices: The role of teacher motivation, organizational factors, and leadership practices. *Educational Administration Quarterly*, 47(3), 496–536.
- Thurlings, M., Evers, A. T., & Vermeulen, M. (2014). Toward a model of explaining teachers' innovative behavior: A literature review. *Review of Educational Research*, 85(3), 430–471.
- Vähäsantanen, K. (2013). *Vocational teachers' professional agency in the stream of change*. Jyväskylä: University of Jyväskylä, Faculty of Education.
- van Eekelen, I. M., Vermunt, J. D., & Boshuizen, H. P. A. (2006). Exploring teachers' will to learn. *Teaching and Teacher Education*, 22, 408–423.
- van der Heijden, H. R. M. A., Geldens, J. J. M., Beijaard, D., & Popeijus, H. L. (2015). Characteristics of teachers as change agents. *Teachers and Teaching: Theory and Practice*, 21(6), 681–699.
- van Veen, K. (2003). *Teachers' emotions in a context of reforms*. Nijmegen: Katholieke Universiteit Nijmegen.
- Watson, C. (2014). Effective professional learning communities? The possibilities for teachers as agents of change in schools. *British Educational Research Journal*, 40(1), 18–29.
- Zhang, L. (2007). Do personality traits make a difference in teaching styles among Chinese high school teachers? *Personality and Individual Differences*, 43, 669–679.