

Teacher-initiated change in the primary school: The relationship between supervisor support,
innovative school climate and teacher innovative work behavior

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Abstract

Although a lot of research has looked into employee innovative behavior (IWB) in the private sector, few studies have focused on primary school teachers' IWB and its determinants.

Teacher IWB can help schools keep up to date with educational and societal changes and set the example for students as future employees (Thurlings et al., 2015). By means of a quantitative survey research design, this study investigates whether supervisor support and innovative school climate predicted primary school teacher IWB. Moreover, this study attempted to improve the measurement of teacher IWB by combining knowledge from teacher informal learning, creative behavior and educational change. Principal Component Analysis revealed the IWB questionnaire consisted of three factors, which were interpreted as school-level innovative behavior, individual innovative behavior and innovative personality. Supervisor support was a significant, positive predictor for school-level and individual innovative behavior. The relationship between innovative school climate and IWB was complex. Overall, the results indicated that innovative behavior can occur within and outside one's classroom. Moreover, results suggest that the supervisor is the key actor in enhancing innovative behavior of teachers. Future studies are advised to further investigate the complex nature of IWB and the interaction between contextual and personal factors.

Keywords: innovative behavior, teachers, informal learning, supervisor, school climate

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In the quickly changing 21st century, innovation is considered to be crucial for organizational survival (Amabile, 1988; Scott & Bruce, 1994). Innovation in organizations is dependent on the behavior of people and has been claimed to be closely connected to individual employee creativity (Amabile, 1988; Scott & Bruce, 1994; Thurlings et al., 2015). In research, this individual perspective on innovation is known as employee innovative work behavior (IWB), which refers to the generation and implementation of new ideas, processes and products by the individual employee (Janssen, 2003; Scott & Bruce, 1994).

Whilst the relevance of innovative behavior may be evident in the face of profit and organizational growth, it is not only the private sector that benefits from employee innovativeness. A long history of on research change and reform has shown the importance of bottom-up, teacher-initiated change for the success of innovations (Fullan, 1993; 2007). One of the key actors in driving innovation in education is the human capital of the school, i.e. teachers and principals (OECD, 2019). Teacher innovative behavior can help schools keep up to date with societal or educational changes and adjust to rapidly evolving technologies and set the example for students as future employees (Thurlings et al., 2015). To facilitate teachers in their innovative behavior, it is important to identify innovative behaviors of teachers, and what factors can enhance or inhibit their innovative behavior. However, up to now, research has mostly focused on employee innovative work behavior in the private sector (Haelermans, 2010), whilst only very few studies have explored the innovative work behavior of primary school teachers and its determinants (Thurlings et al., 2015; Klaijnsen, Vermuelen, & Martens, 2018).

Researchers urge to be careful in applying findings on innovative work behavior from other sectors, because the specific characteristics of the work environment have implications

for the perception of IWB and the effect of contextual factors (Hartley, 2005; Bysted & Hansen, 2015). Employees in the public sector commonly perceive innovative behavior as risky, extra-role behavior that can damage relationships with others, whereas private employees also perceive IWB as a way to improve their career (Bysted & Jespersen, 2014; Janssen, 2003). Because of this shift in perception, for public managers it is particularly important to reduce the riskiness of innovative behavior and provide a safe, warm climate in which an employee feels supported and encouraged to take risks and innovate (Bysted & Jespersen, 2014; Bos-Nehles & Veenendaal, 2019). Even within the public sector there are differences between sub-sectors with regard to innovative behavior (Bysted & Hansen, 2015). Research on teacher learning within and outside innovation processes points towards the importance of experimentation and small-scale change in education (Bakkenes, Vermunt, & Wubbels, 2010; Lippke & Wegener, 2014). However, up to now authors have attempted to develop a scale that is valid in every context, that aimed at the development of an idea from idea generation to implementation within the organization.

Both the measurement of teacher innovative behavior (Thurlings et al., 2015; Messman & Mulder, 2012) and the determinants of IWB deserve more attention in research (Thurlings et al., 2015; Klaeijnsen et al., 2018). Thurlings and colleagues (2015) concluded that to investigate relationships between factors, it is important to “develop a sound and precise measurement instrument for innovative behavior to fully grasp its complex and nuanced nature, ...” (Thurlings et al., 2015, p. 464). Moreover, there is little empirical evidence for the importance of supportive supervision and the school climate in enhancing the innovative behavior of primary school teachers. Therefore, this research aims to contribute by constructing and using an IWB-instrument tailored to the work of primary school teachers, and by testing the relationship with supervisor support and innovation school climate.

Theoretical framework

Innovative work behavior

Innovative work behavior has been defined as “the intentional generation, promotion and realization of new ideas within a work role, work group or organization, in order to benefit role performance, the group or the organization” (Janssen, 2003, p. 348). Innovative behavior is closely connected to creativity, which is the production of new and useful ideas (De Jong & Den Hartog, 2010). However, what characterizes IWB is that it goes beyond creativity and entails both the creative and the implementation component of innovation (Dorenbosch, Van Engen, & Verhagen, 2005; Messman & Mulder, 2012).

In the operationalization of the construct, authors originally distinguished three stages of innovative work behavior: idea generation, idea promotion and idea realization (Scott & Bruce, 1994; Janssen, 2003). Idea generation refers to the creation and suggestion of new ideas to improve the current situation, for example through re-thinking or re-organizing existing concepts. Second, idea promotion concerns the process of finding support for the innovation and convincing key actors, for example by expressing enthusiasm about the innovation. Finally, idea realization is behavior related to the implementation of the idea, such as experimenting, building new products or processes and planning the introduction of the idea into the organization (De Jong & Den Hartog, 2010; Messman & Mulder, 2012).

Since the introduction of the concept by Janssen (2003), many authors have developed alternative definitions and instruments (Thurlings et al., 2015), such as a focus on the creative component stages (Noefer et al., 2009; George & Zhou, 2001) or a focus on a specific type of innovation in the sector at hand (Dorenbosch et al., 2005). Recently, Messman and Mulder (2012) argued that innovative work behavior is dynamic and context-bound, as innovation builds on previous experiences and guides future development of the employee and the innovation (dynamic) and the environment influences work activities

(context-bound). Indeed, in order for an idea to be considered innovative, it has to be new, applicable and beneficial in the context in which the idea is developed (Farr & Ford, 1990; Messman & Mulder, 2015). So, what may be innovative for one teacher, may be familiar practice to another (Thurlings et al., 2015). To capture the dynamic and context-bound nature of IWB, Messman and Mulder (2012) developed an instrument that included a new first and last stage: opportunity exploration, referring to staying up to date and spotting opportunities for improvement, and reflection on the innovation. In this study IWB is also considered to be the five-stage process as outlined by Messman and Mulder (2012). However, the validation of their instrument with, amongst others, vocational education teachers highlighted a need for improvement of the instrument. First, the authors recommended to construct new items to better distinguish idea realization from idea generation. Second, some items loaded on a different factor depending on the validation context, on the basis of which they recommended to revise items so that the instrument could adequately represent all dimensions of IWB for each sector (Messman & Mulder, 2012). However, the loading of items in only one context and the lack of distinctiveness of idea realization items may also point towards the possibility that innovative behaviors are unique in each sector.

Teacher behavior in the context of innovation

Findings from studies on teacher learning and educational change provide insight into the characteristics of teacher innovative behavior. Several authors have noticed the connection between teacher (informal) learning and innovation (e.g. Messman & Mulder, 2012; Lippke & Wegener, 2014; Lecat, Beausaert, & Raemdonck, 2018). First, experimenting has been found to be among the most important informal learning behaviors of teachers, not only in everyday work (Kwakman, 2003; Kyndt et al., 2016) but also in innovation processes. Bakkenes, Vermunt and Wubbels (2010) found that within radical, top-down educational reform, teachers learned and changed their teaching behavior through

experimenting with the radical innovation. Rather than the systematic and planned introduction of new ideas in the organization, idea realization for teachers may be experimenting behavior within one's classroom.

Moreover, it seems that next to or instead of school-wide innovation, teacher innovativeness can also be more small-scale and limited to one's classroom. In a review study on teacher informal learning, Tynjälä (2008) presented a model of the process of innovations in vocational education institutes. In this model, individual experimentation of the teacher was considered to be the start of innovations tend to start with the individual teacher. By envisioning new ways of working, generating new ideas and experimenting with their ideas on a small scale, teachers can develop new ways of doing. If the school environment allowed for it, the innovation could possibly spread in the school or district through forums of discussion where ideas can be discussed and promoted (Tynjälä, 2008). When reasoning the other way around, large radical innovations have been found to produce only small changes in the school, because teachers adjusted the innovation to fit their classroom practices (Hargreaves, 2010). Similarly, Imants, Wubbels and Vermunt (2015) found that within a top-down radical school reform, teachers all had their individual perception of the innovation which was shaped by their perception of the school environment, which resulted in different teacher behaviors.

Translating the above findings to the measurement of innovative behavior, the picture emerges that teacher innovativeness can also be limited to small-scale changes within one's work context, in which experimentation can be considered to be the realization of ideas. This may explain why Messman and Mulder (2012) did not find idea realization to be a separate factor in the validation of their scale with vocational education teachers. To further distinguish idea generation from idea realization, idea generation can be considered to be creative behaviour and thinking (Zhou & George, 2001; Noefler et al., 2009) rather than the

expression work-related problems (Messman & Mulder, 2012), as the goal of this stage is to create new ideas (Noefer et al., 2009).

Supervisor support and innovative work behavior

For everyday innovations to occur, a balance between safety to take risks on the one hand and challenging surrounding to change on the other has been said to be important (Howard, 2018). More specifically, Amabile and colleagues (1996) argued that the work environment can encourage creativity at work, for example through support from the supervisor, work group and appreciation of innovations. Several studies in the private sector found that perceived organizational or supervisor support for innovation was positively related to employee innovative work behavior (e.g. Janssen, 2005; Yuan & Woodman, 2010).

One obvious reason that supervisor support enhances innovative behavior is that the supervisor can usually grant permission for the innovation and necessary resources (Janssen, 2005). Second, a non-supportive supervisor indicates a higher chance of failure and in this way inhibits innovative behavior (Janssen, 2005). Zhou and George (2001) found that for employees to engage in creative behavior as a reaction of job dissatisfaction, they needed to feel that their creativity would have an impact and not be useless in order to take the risk to perform creatively. More specifically, the effect of organizational innovation support has been found to be mediated by expected image risk as a result of the innovative behavior (Yuan & Woodman, 2010). If employees feel their ideas can be implemented, this can make them feel as if innovation is appreciated and in this way encourage them to proceed (Bos-Nehles & Veenendaal, 2019). Qualitative research among public fireservice employees in the Netherlands provide support for this rationale. Firefighters perceived their supervisor's support of innovations as crucial in stimulating their innovative behavior and in transferring their ideas to higher levels within the organization (Bos-Nehles, Bondarouk, & Nijenhuis, 2017).

In the case of education, supervisor support has been associated with several positive outcomes related to innovation, such as positive evaluations of organizational change (Van Emmerik, Bakker, & Euwema, 2009). Moreover, Chang, Chuang, & Benneton (2011) found that an innovative school environment with supportive leadership and collegiality resulted in higher outcomes of creative teaching. However, the relationship between supervisor support and specifically innovative work behavior of primary school teachers needs empirical evidence.

Innovative school climate and innovative work behavior

Organizational or school climate is a broad concept that has been defined in many ways (Sackmann, 1992; Johnson, Stevens, & Zvoch, 2007). Hoy (1990), described a school climate as a broad term that refers to the way the work environment is perceived by the actor. When speaking of organizational climate, it is important to identify the type of climate that is at stake (Schneider, 1975). An innovative school climate has been defined as the shared perceptions of educators and principals regarding practices, procedures and behavior that promote the generation and realization of new ideas (Huang, Van der Vliert, & Van der Vecht, 2005; Moolenaar, Daly, & Slegers, 2011). This includes supporting and encouraging new ideas, an open attitude towards change and collectively challenging the current way of doing (Moolenaar et al., 2011). Teachers have been found actively interpret and shape their work environment (Bakkenes et al., 2010; Imants et al., 2013). So, rather than school climate being an ideal type, it is the employee's perception of the organizational climate that affects behavior (Imants et al., 2015).

In the context of education, Imants et al. (2013) found that secondary education teachers who perceived their work environment as more learning-enriched defined the educational innovation they worked with more on an innovation dimension as opposed to on a efficiency dimension. The innovation dimension referred to questioning existing practices

and developing new ways of doing. Bos-Nehles and Veenendaal (2019) explain the impact of an innovative climate on IWB through the social-exchange theory. In an innovative climate, employees may feel that innovative behavior as appreciated, and a proper way to repay the organization. Moreover, an innovative school climate can encourage innovative behavior by creating “an atmosphere of creativity and risk-taking” (Bos-Nehles & Veenendaal, 2019, p. 2668). Chiao and colleagues (2016) found that an innovative school climate positively correlated with teacher’s innovative teaching with ICT tools. However, empirical research that is aimed specifically of the relationship between innovative school climate and teacher innovative work behavior, which goes beyond innovative teaching, is lacking.

Present study

This research aims to contribute to our understanding of the innovative work behavior of primary school teachers in two ways. First, in response to previous recommendations to further revise IWB-measurement (Thurlings et al., 2015; Messman & Mulder, 2012), this study attempts to improve the measurement of teacher IWB by combining knowledge from teacher informal learning, creative behavior and educational change. Second, the relationship between supervisor support, innovative school climate and teacher IWB will be explored. Insight into the nature of IWB and the role of contextual factors can provide schools with knowledge on how to facilitate teachers in innovative behavior, for example by means of HRM-mechanisms (Bos-Nehles, Renkema, & Janssen, 2017; Runhaar, 2017).

Using a quantitative survey research, this study aims to answer the question: *Can supervisor support and innovative school climate predict the innovative work behavior of primary school teachers?* Reasoning from findings on innovative work behavior in the public sector (Bysted & Jespersen, 2014; Thurlings et al., 2015; Bos-Nehles & Veenendaal, 2019), it is expected that both supervisor support and innovative school climate positively predict teacher IWB.

Methods

Research design

Through a quantitative survey research design, this study tests the relationship between school environmental factors and the primary school teacher IWB. The quantitative survey approach allows to move beyond qualitative case analyses in the field of teacher IWB (Thurlings et al., 2015) and to find empirical evidence for relationships that can be expected based on theoretical grounds.

Participants

An a priori power analysis with G*power showed for a conventional power of .80 (Cohen, 1988) and an alpha of 0.05, a minimum sample size of 43. In total, responses of 78 primary school teachers were collected, 5 of whom were not a primary school teacher at the moment but worked as a teacher a maximum of 1 year ago. Most of the respondents (83.3%) of the respondents were women, which is in correspondence with the population of primary school teachers in The Netherlands (CBS, 2018). Respondents were on average $M=35.89$ years old (Min. 21, Max. = 65, $SD = 13.90$) and had an average of $M = 14.74$ years of teaching experience with years of internship experience included (Min.= 4, Max.= 46, $SD = 11.34$). Respondents worked $M=30.34$ hours per week on average (Min.=8, Max.=41.5, $SD = 9.24$). Also, 6 student-teachers filled in the questionnaire, but due to their different role within the school and alternating workplaces throughout their studies, their responses were not included in further analyses.

Participants were recruited through a combination of a convenience and snowballing sampling method (Neuman, 2014). The professional network of the researcher was used to contact teachers, school principals and others working in the field of education, who were then asked to spread the questionnaire within their network. The convenience sampling method has the risk of resulting in unrepresentative samples (Neuman, 2014), but through the

use of snowballing a larger, more diverse sample can be reached. Apart from receiving the results of the research, participants were not rewarded for participation in this study.

Procedure

The questionnaire (see Appendix 2) was administered online with the data collection programme LimeSurvey. For their convenience, eight respondents filled out the questionnaire on paper (see Appendix 6). The questionnaire was administered in Dutch. To ensure the translation captured the essence of the original (English) items, translations were checked with two graduate students who were fluent in English. Prior to answering the questionnaire, participants were informed about the general aim of the research (see Appendix 4) and agreed to an informed consent (see Appendix 5) which stated that participation is voluntary, data will be processed anonymously and confidentially, and that the participant can choose to withdraw at any time without providing a reason for their withdrawal. In the questionnaire it was mentioned the IWB-items were about innovation, because some items would be rather abstract without this information. Moreover, this priming can help teachers recall relevant instances (Messman & Mulder, 2012). To guarantee safe data storage, the data was stored in YoDa.

Instruments

Demographics. Participants were asked to provide their gender, age, years of experience and the number of hours they work per week according to their contract.

Supervisor support. Supervisor support was measured using the scale by Saunders, Sheppard, Knight and Roth (1992), which was also used by a study on the effect of supervisor support on IWB in the private sector by Janssen (2005). The scale consisted of 7 items measured on a 7-point Likert-scale and were aimed at the way the supervisor handles innovative ideas. An example item was “My supervisor is willing to support me when I have

a valuable idea". The scale had an excellent reliability both in the original study ($\alpha = .96$) and in the current study ($\alpha = .94$).

Innovative school climate. Similar to Daly et al. (2015), innovative climate was measured with the modified version of the Innovative Climate Scale (Bryk, 1999). Their 7-item scale measured the perceived innovative climate on a 6-point Likert-scale. In the study by Daly et al. (2015), the perceived innovative climate was measured separately for principals and the school district because literature indicated differences between them. As teachers and supervisors can also be expected to differ in respect to their attitude towards innovation and change, supervisor - and teacher innovative climate were measured separately. An example item was "All teachers / the supervisor(s) in this school are generally willing to try new ideas" (Bryk, 1999). In addition, teachers were asked about the number of teachers at the school and the number of innovative teachers in the school. The two items were computed into a score for the perceived percentage of innovative teachers at the school.

Innovative work behavior. Due to the lack of a context-specific instrument for the innovative work behavior for primary school teachers (Thurlings et al., 2015) and the unique nature of the profession of primary school teachers, scales from four instruments were combined to measure the five stages of innovative work behavior (Messman & Mulder 2012; 2013). In total, 39 items were administered to measure IWB.

Items were statements about innovative behavior. Respondents were asked to assess to what extent the statements applied to them. Self-assessment has the risk of leading to inflated results, but as some innovative behaviors can be done privately (e.g. exploring opportunities), teachers themselves can be expected to be most knowledgeable about their own innovative behavior (Messman & Mulder, 2012). To create consistency in the questionnaire, each item on innovative work behavior was adjusted to a 5-point Likert scale, with 1 meaning "does not apply to me at all" and 5 meaning "fully applies to me".

Opportunity exploration (OE). Opportunity exploration was measured by two scales in order to comprehend both exploration of opportunities within the school and in the broader field of education. Items 1 to 3 originated from the keeping up to date: reading scale from the TPD@Work instrument (Evers, Kreijns, Van Der Heijden, 2015). An example item was “I visit educational sites on the Internet”. The scale found to have an acceptable reliability in both the original study ($\alpha = .73$) and the present study ($\alpha = .70$). Items 4 to 7 originated from the opportunity exploration scale of Messman and Mulder (2012). Items concerned teachers’ keeping up to date with developments within and outside the school. An example item was “I keep myself informed about the latest developments within at one's school”. The scale had a relatively poor reliability ($\alpha = .57$) compared to the original study ($\alpha = .76$), which was caused by the accidental deletion of an item in the data collection programme.

Idea generation (IG). Similar to Noefer et al. (2009) who limited IWB to the creative component, idea generation was measured using the 13-item creative behavior scale of Zhou and George (2001). Items were aimed at thinking of and suggesting new ideas to others, such as “I come up with creative solutions to problems”. The scale was found to have a good reliability ($\alpha = .89$), although slightly lower than in the original study ($\alpha = .94$).

Idea promotion (IP). Idea promotion was measured with the idea promotion scale by Messman and Mulder (2012). The 7-item scale had a good reliability ($\alpha = .89$), which was higher than in the original study ($\alpha = .83$). An example item was “I promote new ideas to colleagues in order to gain their active support.”. To fit the population, wording of two items was adjusted and added to the scale (see Appendix 2). However, replacement of the old items with the newly worded items slightly did not increase scale reliability ($\alpha = .87$).

Idea realization (IR). Based on previous research on teacher learning in an innovation context (Bakkenes et al., 2010; Tyjälä, 2008), realizing new ideas was considered to be experimenting behavior. Therefore, idea realization was measured by the experimentation

scale from the TPD@Work instrument (Evers et al., 2015) An example item was “I try out new teaching methods in my lesson”. The scale had an acceptable reliability of $\alpha = .76$, compared to a reliability of $\alpha = .80$ in the original study.

Reflection (R). Four innovation-related reflection items from the reflection scale by Messman & Mulder (2012) were used to target innovation-reflective behavior. An example item was “I assess the progress when putting ideas into practice”. The scale was found to have a good reliability in both the original study ($\alpha = .86$) as well as in the current study ($\alpha = .78$).

Data analysis

To examine the underlying structure of the 39 innovative work behavior items, an exploratory factor analysis was performed. A principal component analysis (PCA) with oblique rotation was performed, because factors were theoretically assumed to be related (Field, 2013). The extracted factors constituted the dependent variables in further analyses.

To answer the research question regarding the relationship between variables, a multiple regression analysis (MRA) was used. When creating a regression model with new variables, caution is warranted. The decision to include predictors should be theoretically grounded to avoid noise in the model (Field, 2013). Due to a lack of clear theoretical indications for their importance, violation of the assumption of normality and a lack of a clear linear relationship with IWB as shown in scatterplots, demographic variables were not included in the model. Percentage of innovative teachers was excluded due to missing data ($n = 66$). The inclusion of this variable would have seriously limited the sample size for the regression analysis.

Results

Factor analysis

A principal component analysis was used to examine the underlying structure of the 39 innovative work behavior items. An initial, non-rotated principal component analysis led

to the deletion of three opportunity exploration items and one idea realization item, which all had a KMO below the bare minimum of .50 (Kaiser, 1974), had very few correlations $>.3$ with other IWB-items and were not normally distributed. After deletion of the items, the overall Kaiser-Meyer-Olkin measure indicated a 'meritorious' sampling adequacy, $KMO = .824$ (Hutcheson & Sofroniou, 1999).

Eleven factors had an eigenvalue higher than Kaiser's criterion of 1 (Kaiser, 1974), but the scree plot justified the extraction of either one or three factors. In a one-factor solution on the other hand, more than 50% of the nonredundant residuals had a value $>.50$, which indicated the model would not be a good fit (Field, 2013). A three-factor solution with oblimin rotation on the hand, resulted in well-interpretable factors with nonredundant residuals $<.50$. Therefore, three factors were identified as underlying the remaining IWB-items, which together explained 52.61% of the variance. The clustering of items suggested that the three factors reflected school-level innovative work behavior (factor 1), individual innovative work (factor 2) behavior and innovative personality (factor 3). Only items with an absolute factor loading $>.4$ and a communality $>.3$ were retained (Stevens, 2002, Field, 2013), which led to the deletion of two opportunity exploration items and two idea-generation items.

Table 1 shows the loading of the remaining 32 items on the three factors and the explained variance of each factor. The first factor was interpreted as school-level innovative behavior and accounted for the largest part of the explained variance, 35.93%. This factor consisted of 16 items that were aimed idea promotion (IP) and suggesting improvements to others (IG). Factor 2 was interpreted as individual innovative behavior and accounted for 9.533% of the variance. The 10 items that clustered on this factor aimed at the individual opportunity exploration (OE), experimentation (IR) and reflection (R) of the teacher. Each of these behaviors could be done privately in one's classroom without other actors in the school.

Finally, factor 3 was interpreted as innovative personality and accounted for 7.152% of the variance. The 6 items were idea generation (IG) items that were aimed at the teachers' perception of his/her creative ideas. The scales had a good to excellent reliability of respectively $\alpha = .93$ (factor 1), $\alpha = .84$ (factor 2) and $\alpha = .83$ (factor 3), indicating the scales were internally consistent. All 32 items were also computed into a total score for innovative behavior. The total innovative behavior scale had a high reliability of $\alpha = .94$.

Table 1

Factor loadings for principal component analysis with oblimin rotation for innovative work behavior items

Item	Item label	Rotated factor solution		
		1	2	3
IP3	I promote new ideas to the supervisor in order to gain her/his active support	.888		
IP2	I promote new ideas to colleagues in order to gain their active support	.837		
IP1	I address key persons who provide necessary permissions and resource allocation	.793		
IG12	I promote and champion ideas to others	.721		
IP6	I convince others of the importance of a new idea or solution	.718		
IP4	I promote the application of the new solution within my work context	.714		
IP5	I keep colleagues informed about the progress of the realization of ideas	.705		
IG13	I develop adequate plans and schedules for the implementation of new ideas	.683		
IP7	I introduce colleagues to the application of a developed solution	.675		
IP4N	I promote the application of a new idea or a new solution within my work context	.645		-0.339
IG4N	I suggest new ways to increase the quality of education	.606		-0.357
IG1	I suggest new ways to achieve goals or objectives	.598		-0.354

Item	Item label	Rotated factor solution		
		1	2	3
IG4	I suggest new ways to increase quality	.516		-.429
	I come up with new and practical ideas to improve			
IG2	performance	.456		-.376
	I introduce colleagues to the application of a developed			
IP7N	solution or new idea	.449		
	I search out new technologies, processes, techniques, and/or			
IG3	product ideas	.447		
R3	I define criteria of success for the realization of the idea		.749	
R2	I visualize my ideas graphically		.699	
R4	I systematically reflect on recently made experiences		.677	
IR5	I try out new teaching methods in my lesson		.655	
R1	I assess the progress while putting ideas into practice		.644	
IR4	I inquire new teaching methods in class		.638	-.325
IR3	I apply and evaluate other forms of assessment		.616	
IR1	I test alternative teaching materials in class		.576	
OE3	I read educational/subject matter pedagogical literature		.503	.340
	I keep myself informed about new concepts/insights within			
OE7	my professional field		.463	
IG5	I am a good source of creative ideas			-.760
IG8	I often have a fresh approach to problems			-.696
IG7	I come up with creative solutions to problems			-.679
IG9	I suggest new ways of performing work tasks	.445		-.510
IG10	I exhibit creativity on the job when given the opportunity to			-.462
IG6	I often have new and innovative ideas	.341		-.439

Note. Factor loadings <.3 have been suppressed. Factor loadings printed in bold highlight the factor that the item belongs to. For the sake of consistency, items were displayed in English language instead Dutch. For factor loadings of the Dutch items as asked in the questionnaire, see Appendix 7.

Preliminary analyses and assumptions

Prior to calculating correlations and the regression models, assumptions were evaluated. Significant Shapiro-Wilkinson values indicated a non-normal distribution of all

independent variables and the innovative personality scale. However, Field (2013) argued that normality tests should be used with caution because of the influence of sample size, and urges to inspect the shape of the data. An inspection of histograms and P-P Plots showed that all variables were roughly normally distributed, except for the demographic variables age, years of experience and working hours. Moreover, boxplots revealed multiple outliers on supervisor support, innovative teacher and supervisor climate, years of experience and innovative personality. Outliers can bias significance tests and parameter estimates in MRA (Field, 2013). Log and square root transformations were applied to the demographic variables (Field, 2013) to improve distribution and to the predictors to deal with outliers, but the transformation could not improve the distribution of the data. Outliers further than three standard deviations away from the mean of the variable were excluded from further analyses, resulting in the deletion of two cases. Due to mild deviations from a normal distribution for the predictor variables and the presence of mild outliers, bootstrapping was used to compute robust confidence intervals (Field, 2013).

Descriptive statistics and bivariate correlations were calculated before performing the regression analysis (Table 2). Demographic variables age, years of experience and working hours had low, non-significant correlations with all independent variables and innovative work behavior scales ($r < .11$) and were omitted from Table 2 for conciseness. Supervisor support, innovative teacher climate and innovative supervisor climate correlated significantly, with a particularly high correlation between supervisor support and innovative supervisor climate. Supervisor support and innovative supervisor climate correlated positively with all innovative behavior scales except innovative personality. For innovative teacher climate, a medium-sized (Cohen, 1988), positive correlation was found with individual innovative behavior. The correlation between innovative teacher climate and total innovative behavior was flagged as significant, but the 95%CI includes 0, indicating a non-significant correlation

(Field, 2013). Innovative personality correlated significantly with the other IWB-scales, but not with the predictors.

Multiple regression analysis

Standard multiple regression analysis was performed to estimate the proportion of variance in innovative behavior that can be explained by the predictors. Prior to interpreting the results, additional assumptions for MRA were investigated. High correlation between supervisor support and innovative supervisor climate ($r = .798$) indicated there might be collinearity in the data, but the Mahalanobis distances, VIF-values < 10 and tolerance values $> .2$ showed that multicollinearity was not of concern (Bowerman & O'Connell, 1990; Myers, 1990). All Cook's values were below the cut-off score of 1 (Cook & Weisberg, 1982) and DFBetas below the cut-off score of 2 (Stevens, 2002), indicating that no cases exerted undue influence on the model or its parameters. Inspection of plots of standardized residuals against standardized predicted showed the assumption of homoscedasticity could have been violated (Field, 2013). Therefore, bootstrapping was used as a robust method to deal with potential bias in the model due to mild violations of normality, homoscedasticity and to minimize the effect of outliers (Field, 2013).

The parameter estimates of the individual predictors and model statistics are displayed in Table 3. The regression models provided a significant improvement compared to no model in our ability to predict the values on school-level innovative behavior, individual innovative behavior and total innovative behavior, but not for innovative personality. The results of the regression analysis were rather similar for school-level innovative behavior and total innovative behavior. The model accounted for a significant 33.6% of the variance on school-level innovative behavior ($R^2 = .336$, adjusted $R^2 = .308$, $F(3,72) = 12.136$, $p < .001$) and 30.1% of variance on total innovative behavior ($R^2 = .301$, adjusted $R^2 = .272$, $F(3, 72) = 10.337$, $p < .001$). Both supervisor support and innovative school climate were significant

predictors in the model. However, whereas supervisor support predicted a higher outcome on the IWB scales, the negative Beta for innovative school climate was negative. This indicated a decrease of innovative behavior in case of an increase of innovative supervisor climate.

For individual innovative behavior, the predictors together accounted for a significant 21.2% of variance ($R^2 = .212$, adjusted $R^2 = .179$, $F(3, 72) = 6.456$, $p = .001$). Although teacher innovative climate was near-significant for individual innovative behavior ($p = .060$), only supervisor support was a significant, positive predictor in the model ($p = .003$). For innovative personality, the model accounted for a non-significant 5.3% of the variance on the outcome variable, $R^2 = .040$, adjusted $R^2 = .014$, $F(3, 72) = 1.351$, $p = .265$. None of the predictors in the model were significant.

Table 2.

Descriptive statistics and bivariate correlations for school environment factors and innovative behavior scales

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7 ^a
1. Supervisor support	5.46	1.10							
2. Innovative teacher climate	4.86	.80	.378** [.114, .600]						
3. Innovative supervisor climate	4.86	.83	.798** [.674, .884]	.371** [.114, .604]					
4. % innovative teachers ^a	61.52	24.63	.066 [-.199, .306]	.619** [.468, .738]	.085 [-.199, .325]				
5. School-level innovative behavior	3.65	.61	.551** [.349, .719]	.129 [-.077, .427]	.340** [.090, .543]	.030 [-.206, .261]			
6. Individual innovative behavior	3.59	.57	.331** [.067, .549]	.370** [.061, .613]	.249* [-.064, .489]	.193 [-.078, .422]	.437** [.171, .667]		
7. Innovative personality	3.77	.54	.220 [-.069, .472]	.145 [-.151, .411]	.206 [-.080, .445]	-.046 [-.302, .212]	.631** [.464, .765]	.457** [.224, .639]	
8. Total innovative behavior	3.65	.49	.514** [.294, .686]	.278* [-.004, .520]	.347** [.087, .545]	.076 [-.171, .314]	.924** [.888, .954]	.719** [.547, .838]	.770** [.636, .859]

Note. 95% Confidence Interval (CI) displayed in parentheses. ^a*n* = 66 instead of *n* = 76. Significant values are printed in bold. **p* < .05. ***p* < .01.

Table 3.

Predictors of school-level innovative behavior, individual innovative behavior, innovative personality and total innovative behavior estimates for school innovation, individual innovation, innovative personality and total innovative behavior.

Variable	School-level innovative behavior			Individual innovative behavior			Innovative personality			Total innovative behavior		
	B [95%CI]	SE β	β	B [95%CI]	SE β	β	B [95%CI]	SE β	β	B [95%CI]	SE β	β
Constant	3,017 [1.615, 4.177]	.580		2,580	.551		3,177	.590		2,911	.498	
SS	.456 [.310, .629]	.082	.749**	,265 [.075, .430]	.088	.462**	.084 [-.086, .296]	.098	,156	,327 [.199, .461]	.067	.663**
ITC	.007 [-.170, .172]	.091	.009	,211 [-.008, .425]	.107	.272	.089 [-.114, .295]	.103	,122	,086 [-.069, .243]	.079	.129
ISC	-.230 [-.419, -.024]	.097	-.284*	-.201 [-.453, .073]	.135	-.263	.001 [-.266, .236]	.131	,002	-.177 [-.343, -.005]	.087	-.270*

Note. $n=75$. 95% Confidence Interval in parentheses. SS = Supervisor Support. ITC = Innovative Teacher Climate. ISC = Innovative Supervisor Climate. Significant values printed in bold. * $p < .05$. ** $p < .01$.

Discussion

A lack of research on the innovative work behavior of teachers and its determinants motivated this study to investigate the relationship between teacher innovative work behavior, supervisor support and perceived innovative climate amongst teachers and the supervisor. The measurement of IWB was tailored to fit the specific characteristics of the teaching profession, as research indicated that innovative behavior can be different for each sector (Bysted & Jespersen, 2014; Bysted & Hansen, 2015). On the basis of teacher informal learning and educational innovation literature, it was argued that innovative behavior of teachers can also be small-scale and limited to the teachers' own classroom. Moreover, instead of the systematic introduction of new ideas in the school, the realization of innovations was considered to be experimenting behavior within in one's classroom (Lippke & Wegener, 2014; Messman et al., 2010; Bakkenes et al., 2010). With regard to the school environment, drawing on findings from the public sector, a school environment in which innovation is appreciated and supported was expected to enhance innovative work behavior of teachers (Bysted & Jespersen, 2014; Bos-Nehles & Veenendaal, 2019).

Regarding the measurement of teacher innovative work behavior, the five-factor structure of the IWB-questionnaire could not be replicated in this study (Messman & Mulder, 2012). Problems in replicating the factor structure is not uncommon; previous studies on IWB in different sectors encountered similar issues and resorted to one-factor models (De Jong & Den Hartog, 2010). Also, Messman and Mulder (2012) in their validation study could not replicate the five-factor structure in the context of vocational educational teachers and called for further development of their questionnaire.

Interestingly, the three-factor solution that was found to be the most appropriate solution in this study, did not reflect the original stages of innovative behavior such as generating or implementing ideas (Janssen, 2003; Bruce & Scott, 1994). Instead, it reflected

the level at which the innovative behavior was performed, specifically innovative behavior on the school level with others and innovative behavior that could be performed individually within one's classroom. The distinction between individual and social innovation activities is in line with previous studies on informal learning and the IWB of vocational education teachers (Clement & Vandenberghe, 2002; Messman, Mulder, & Gruber, 2010). For example, realized innovations have previously been distinguished as within and outside classroom innovations (Messman et al., 2010). An explanation for this distinction can be found in the unique character of the teaching profession. Teaching is known as an isolated profession, because tend to work privately in their own classroom (Fullan, 2007). Because teachers operate both within their classroom and outside, on a school level, their innovative behaviors can also be expected to take place either within or outside their classroom.

The innovative personality scale distinguished itself because it does not measure behavior, but targeted teachers' perception of themselves. The items in the innovative behavior scale resembled the concept of creative self-efficacy, which is the extent to which the employee feels he/she can produce creative ideas effectively (Tiernley & Farmer, 2002). In other sectors, creative self-efficacy has distinguished as a separate concept and has been associated with job performance and creative behavior (Jaiswal & Dhar, 2015; Richter et al., 2012).

Although a factor analysis alone is not sufficient to draw conclusions on the complex nature of IWB, it does provide insight into the way one could classify the innovative behavior of teachers. Items that loaded on the individual innovativeness factor together resembled a full process of innovation including the exploration of opportunities, realization of new ideas through experimenting and reflecting on the innovation. In this process, experimenting with the innovation can be considered the realization of new ideas, such as new ways of teaching or methods for student assessment (Messman et al., 2010). So, the findings seem to support

the idea of public sector innovation partly being small-scale and embedded in everyday practice, specifically within the teachers' classroom (Lippke & Wegener, 2014).

An alternative approach to understanding the distinction between school-level and individual innovative behavior can be found in the area of teacher informal learning. The individual innovative behaviors, experimenting, reflecting and keeping up to date with (educational) literature, are amongst the most reported teacher informal learning behaviors both outside an innovation process (Kwakman, 2003; Hoekstra et al., 2009) and within an innovation process (Bakkenes et al., 2010). Due to this close connection between innovation and learning, the individual innovative behavior scale could also be interpreted as learning behavior of teachers and not necessarily as an innovation process within one's classroom.

With regard to the relationship between IWB and school environment factors, findings were different for the four extracted IWB-scales. First, in line with previous studies (e.g. Janssen, 2005; Bos-Nehles et al., 2017), the results showed that supervisor support is generally positively related to teacher innovative work behavior. Supervisor support was a significant predictor for individual, school-level and total innovative behavior of teachers, but not for innovative personality. Supervisors are considered key actors in granting permission and resources for the innovation and for guiding the introduction of an innovation into the organization (Janssen, 2005; Bos-Nehles et al., 2017). Moreover, a non-supportive supervisor increases the chance of failure and image loss and in this way increases the riskiness of innovative behavior (Janssen, 2005; Yuan & Woodman, 2010). Especially in the public sector in which IWB is commonly perceived as risky, extra-role behavior (Bysted & Jespersen, 2014; 2015), a supportive supervisor could reduce feelings of riskiness and in this way encourage IWB, either within or outside the classroom. Contrastingly, supervisor support was not a significant predictor for innovative personality. Possibly, the perception of

the frequency and quality of their ideas can be expected to be more stable and inherent to the teacher, similar to personality traits.

Concerning innovative school climate, its importance for innovative work behavior is rather ambiguous. The findings suggest that, unlike expectations, teacher innovative climate does not significantly predict teacher innovative behavior. For individual innovativeness and innovative personality, also supervisor innovative climate was a non-significant predictor. Messman and Mulder (2011), showed that major antecedents of innovative behavior were the perception of a problem in the school or class and teachers' personal motivation to improve, such as self-actualization as a teacher. Reasoning from here, reasons for teachers to innovate within their classroom are independent of the extent to which colleagues or the supervisor is perceived as innovative. Second, a lack of clear goal-expectations is one of the key inhibitors of innovative behavior for employees in the public sector. On the individual level, Bakkenes et al. (2010) found teachers tend to experiment because other teachers expected them to do so. However, a climate in which teachers are experienced as innovative, may not necessarily provide these clear expectations regarding innovation, and thus encourage teachers to engage in innovative behavior. This may explain why innovative teacher climate did not significantly predict teacher IWB on the school level.

For school-level innovative behavior and total innovative behavior, the extent to which the supervisor was experienced as innovative *negatively* predicted IWB, whilst the variables positively correlated. It is not yet clear why, in combination with supervisor support and innovative teacher climate, an innovative supervisor climate leads to slightly lower levels of school-level innovative behavior. A possible explanation could be that a supervisor who is continuously learning and open to change and is effectively supportive of innovation, may take away the need for teachers to innovate. Teachers operate within their own classroom as well as on the school level, but often do not perceive themselves as active agents in school-

wide development (Pyhältö et al., 2012). If the supervisor is perceived as innovative and supportive of innovations, teachers might feel their supervisor is responsible for introducing new ideas into the school, taking away the expectation to innovate themselves. However, the data indicates that the results should be interpreted with caution. Although collinearity was not severe enough to take action, the high correlation between SS and ICS may have influenced the parameter estimates of the predictors (Field, 2013).

Overall, the pattern of results regarding innovative school climate, indicate that its relationship with teacher innovative work behavior is a complex one. Likewise, Pyhältö and colleagues (2012) argued that innovative work behavior cannot be explained by a single factor, rather it is the complex interplay of factors that could enhance or inhibit IWB. When taking a broader perspective, it could be that the innovative school climate can help explain the effect of personal or contextual factors on IWB, instead of predicting innovative behavior directly. For example, Imants and colleagues (2015) found that the way a teacher perceived the level of autonomy in the school, had implications for whether this autonomy enhanced or inhibited their uptake of an innovation (Imants et al., 2015). Similarly, Bos-Nehles and Veenendaal (2019) found that organizational innovative climate moderated the relationship between HR-practices such as supervisor support. This may also explain the non-significance of teacher innovative climate for the IWB scales.

Limitations and future directions.

The methodology and focus of this study provide limitations that should be taken into account when interpreting the results. First, the quantitative approach in this study could have limited our understanding of teacher innovative behavior. For example, this study focused on individual innovativeness by operationalizing idea realization as experimenting within one's classroom. Whilst research showed the importance of experimenting in school-wide reform (e.g. Imants et al., 2015; Henze et al., 2009), it might be that idea realization on the school-

level constitutes of more behaviors than just experimenting. Moreover, the specific work demands of teachers in lower or upper grades, or teachers in regular schools or specific pedagogy schools such as Montessori or Steiner, could have implications for the innovative behaviors that are relevant for them. So, although the alterations of IWB-instrument were firmly grounded in literature on teacher learning and educational innovation, it is impossible that other relevant behaviors were not included in the questionnaire. Second, this study did not look at the underlying mechanisms of *why* the school environment factors predicted teacher innovative work behavior. Therefore, the ability to understand why school environmental factors predict teacher innovative behavior is limited.

The research findings point towards several avenues for further research. First, the distinction between social and individual innovative behaviors gives rise to questions concerning their relatedness and interplay. For example, following the process of Tynjälä (2008), it could be that the individual innovative behavior does not only function as the realization of small-scale innovations in the classroom, but also as the identification of potential innovations to introduce to others in the school. However, it is not yet clear if, and if so, why innovations spread from the classroom wider into the school. Future research should consider taking up a qualitative approach to identify relevant innovative behavior inside and outside the classroom and to understand how the two interact in the complex reality of a school environment. Second, this study points towards the relevance of future research to exploit analyses which address the interaction between variables (Thurlings et al., 2015; Pyhältö et al., 2012). By looking at the interaction, we can gain a better understanding if, but also why contextual or personal factors predict teacher innovative behavior. For example, research could look at the role of personal factors and the moderating role of innovative school climate (Bos-Nehles & Veenendaal, 2019).

All in all, results indicated that the innovative work behavior of primary school teachers can be both inside and outside their classroom. With regard to the school environment, the results suggest that the supervisor is the key actor in enhancing teacher innovative behavior, specifically through providing support for innovation (Janssen, 2005; Klaijnsen et al., 2018). More research is necessary to understand teacher IWB and its facilitating factors, so teacher innovativeness can contribute to schools' ability to keep up to date with the quickly changing 21st century (Thurlings et al., 2015).

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Appendix 1: The original scales measuring components of Innovative Work Behavior

IWB-component	Item label	Source
Opportunity exploration	Read educational/subject matter pedagogical literature	Evers et al. (2015)
	Study subject matter literature	Evers et al. (2015)
	Visit educational sites on the Internet	Evers et al. (2015)
	I keep myself informed about the school's structures and processes	Messman & Mulder (2012)
	I keep myself informed about the latest developments within at one's school	Messman & Mulder (2012)
	I keep myself informed about new concepts/insights within one's professional field	Messman & Mulder (2012)
	I keep myself informed about new developments at other schools or in companies	Messman & Mulder (2012)
Idea generation	Suggests new ways to achieve goals or objectives	Zhou & George (2001)
	Comes up with new and practical ideas to improve performance	Zhou & George (2001)
	Searches out new technologies, processes, techniques, and/or product ideas*	Zhou & George (2001)
	Suggests new ways to increase quality	Zhou & George (2001)
	Is a good source of creative ideas	Zhou & George (2001)
	Often has new and innovative ideas	Zhou & George (2001)
	Comes up with creative solutions to problems	Zhou & George (2001)
	Often has a fresh approach to problems	Zhou & George (2001)
	Suggests new ways of performing work tasks	Zhou & George (2001)
	Exhibits creativity on the job when given the opportunity to	Zhou & George (2001)
	Not afraid to take risks	Zhou & George (2001)
	Promotes and champions ideas to others*	Zhou & George (2001)
Idea promotion	Addressing key persons who provide necessary permissions and resource allocation.	Messman & Mulder (2012)

	Promoting new ideas to colleagues in order to gain their active support.	Messman & Mulder (2012)
	Promoting new ideas to the supervisor in order to gain her/his active support	Messman & Mulder (2012)
	Promoting the application of the new solution within one's work context	Messman & Mulder (2012)
	Making plans how to put an idea into practice	Messman & Mulder (2012)
	Keeping colleagues informed about the progress of the realization of ideas	Messman & Mulder (2012)
	Convincing others of the importance of a new idea or solution	Messman & Mulder (2012)
Idea realization	Testing alternative teaching materials in class	Evers et al. (2015)
	Trying out new applications of ICT in my lesson	Evers et al. (2015)
	Applying and evaluating other forms of assessment	Evers et al. (2015)
	Inquiring new teaching methods in class	Evers et al. (2015)
	Trying out new teaching methods in my lesson	Evers et al. (2015)
Reflection	Assessing the progress while putting ideas into practice	Messman & Mulder (2012)
	Visualising ideas. / Visualising one's ideas graphically	Messman & Mulder (2012)
	Defining criteria of success for the realization of the idea	Messman & Mulder (2012)
	Systematically reflecting on recently made experiences	Messman & Mulder (2012)

Note. * Item is originally from Scott and Bruce (1994) but added to the creativity scale by Zhou & George (2001).

Appendix 2: The questionnaire including item codes, sources and translated item labels

Item	Source	Original label	Translated* item label
Innovative work behavior			
OE1	Evers et al. (2015)	Read educational/subject matter pedagogical literature	Ik lees onderwijskundige, vakdidactische en/of pedagogische literatuur
OE2	Evers et al. (2015)	Study subject matter literature	Ik bestudeer vakinhoudelijke literatuur
OE3	Evers et al. (2015)	Visit educational sites on the Internet	Ik bezoek onderwijs-sites op het internet
OE4	Messman & Mulder (2012)	I keep myself informed about the school's structures and processes	Ik houd mezelf op de hoogte van de structuur van de school en processen binnen de school
OE6	Messman & Mulder (2012)	I keep myself informed about the latest developments within at one's school	Ik houd mezelf op de hoogte van de laatste ontwikkelingen binnen de school
OE7	Messman & Mulder (2012)	I keep myself informed about new concepts/insights within one's professional field	Ik houd mezelf op de hoogte van nieuwe concepten en inzichten in het onderwijs
OE8	Messman & Mulder (2012)	I keep myself informed about new developments at other schools or in companies	Ik houd mezelf op de hoogte van nieuwe ontwikkelingen op andere scholen
IG1	Zhou & George (2001)	Suggest new ways to achieve goals or objectives	Ik stel nieuwe manieren voor om doelen/doelstellingen te behalen
IG2	Zhou & George (2001)	Come up with new and practical ideas to improve performance	Ik bedenken nieuwe en praktische ideeën om de prestaties te verhogen
IG3	Zhou & George (2001)	Search out new technologies, processes, techniques, and/or product ideas	Ik houd me bezig met het uitzoeken van nieuwe technologieën, processen, werkwijzen en/of ideeën voor producten
IG4	Zhou & George (2001)	I suggest new ways to increase quality	Ik stel nieuwe manieren voor om de kwaliteit te verhogen
IG5	Zhou & George (2001)	Is am a good source of creative ideas	Ik ben een goede bron van creatieve ideeën

Item	Source	Original item label	Translated* item label
IG6	Zhou & George (2001)	Often have new and innovative ideas	Ik heb vaak nieuwe en innovatieve ideeën
IG7	Zhou & George (2001)	Come up with creative solutions to problems	Ik bedenk creatieve oplossingen voor problemen
IG8	Zhou & George (2001)	Often have a fresh approach to problems	Ik heb vaak een verfrissende kijk op het aanpakken van problemen
IG9	Zhou & George (2001)	Suggest new ways of performing work tasks	Ik stel nieuwe manieren van werktaken uitvoeren voor
IG10	Zhou & George (2001)	Exhibits creativity on the job when given the opportunity to	Ik laat creativiteit in mijn werk zien wanneer ik daar de kans voor krijg
IG11	Zhou & George (2001)	Not afraid to take risks	Ik ben niet bang om risico's te nemen
IG12	Zhou & George (2001)	Promotes and champions ideas to others	Ik promoot en pleit voor ideeën bij anderen
IG13	Zhou & George (2001)	Develops adequate plans and schedules for the implementation of new ideas	Ik ontwikkel adequate plannen en schema's voor de implementatie van nieuwe ideeën
IG2N	-	-	Ik bedenk nieuwe en praktische ideeën om de prestaties van de school of van mij als leerkracht te verbeteren
IG4N	-	-	Ik stel nieuwe manieren voor om de kwaliteit van het onderwijs te verhogen
IP1	Messman & Mulder (2012)	Addressing key persons who provide necessary permissions and resource allocation.	Ik richt me tot de belangrijkste personen die de nodige toestemming en middelen verstrekken
IP2	Messman & Mulder (2012)	Promoting new ideas to colleagues in order to gain their active support.	Ik promoot nieuwe ideeën bij collega's om hun actieve steun te krijgen
IP3	Messman & Mulder (2012)	Promoting new ideas to the supervisor in order to gain her/his active support	Ik promoot nieuwe ideeën bij mijn leidinggevende om zijn/haar actieve steun te krijgen
IP4	Messman & Mulder (2012)	Promoting the application of the new solution within one's work context	Ik promoot de toepassing van een nieuwe oplossing binnen mijn werkomgeving

Item	Source	Original item label	Translated* item label
IP5	Messman & Mulder (2012)	Keeping colleagues informed about the progress of the realization of ideas	Ik houd collega's geïnformeerd over de voortgang van de verwezenlijking van ideeën
IP6	Messman & Mulder (2012)	Convincing others of the importance of a new idea or solution	Ik overtuig anderen van het belang van een nieuw idee of nieuwe oplossing
IP7	Messman & Mulder (2012)	Introducing colleagues to the application of a developed solution.	Ik laat collega's kennismaken met de toepassing van een ontwikkelde oplossing
IP4N	-	-	Ik promoot de toepassing van een nieuw idee of oplossing binnen mijn werkomgeving
IP7N	-	-	Ik laat collega's kennismaken met de toepassing van een ontwikkelde oplossing of idee
IR1	Evers et al. (2015)	Testing alternative teaching materials in class	Ik test alternatieve lesmaterialen in de klas
IR2	Evers et al. (2015)	Trying out new applications of ICT in my lesson	Ik probeer in mijn les nieuwe ICT-toepassingen uit
IR3	Evers et al. (2015)	Applying and evaluating other forms of assessment	Ik gebruik en evalueer andere manieren van beoordelen/toetsen
IR4	Evers et al. (2015)	Inquiring new teaching methods in class	Ik informeer naar en onderzoek nieuwe manieren van lesgeven in de klas
IR5	Evers et al. (2015)	Trying out new teaching methods in my lesson	Ik test alternatieve lesmaterialen in de klas
R1	Messman & Mulder (2012)	Assessing the progress while putting ideas into practice	Ik beoordeel de voortgang wanneer ik een idee in de praktijk breng
R2	Messman & Mulder (2012)	Visualising ideas. / Visualising one's ideas graphically	Ik visualiseer mijn ideeën op een grafische manier
R3	Messman & Mulder (2012)	Defining criteria of success for the realization of the idea	Ik bepaal succescriteria voor de verwezenlijking van een idee
R4	Messman & Mulder (2012)	Systematically reflecting on recently made experiences	Ik reflecteer op een systematische manier op recent opgedane ervaringen

Item	Source	Original item label	Translated item label
Supervisor support			
SS1	Janssen (2005)	I take ideas to my boss because he or she deals with them effectively	Ik bespreek ideeën met mijn leidinggevende omdat hij/zij daar effectief mee om gaat
SS2	Janssen (2005)	My supervisor is open and fair when I submit an idea	Mijn leidinggevende is open en eerlijk wanneer ik een nieuw idee indien
SS3	Janssen (2005)	My supervisor listens carefully to what I say when I bring in an idea	Mijn leidinggevende luistert nauwkeurig naar wat ik zeg als ik een idee inbreng
SS4	Janssen (2005)	My supervisor is willing to support me when I have a valuable idea	Mijn leidinggevende is bereid mij te ondersteunen als ik een waardevol idee heb
SS5	Janssen (2005)	My supervisor handles my ideas promptly	Mijn leidinggevende pakt mijn ideeën snel op
SS6	Janssen (2005)	My supervisor takes action in pursuance of my ideas we discussed	Mijn leidinggevende onderneemt actie in navolging van mijn ideeën die wij hebben besproken
SS7	Janssen (2005)	My supervisor gives high priority to handling my ideas	Mijn leidinggevende geeft hoge prioriteit aan het oppakken van mijn ideeën
Innovative teacher culture			
ICT1	Daly et al. (2015)	[...]* are continuously learning and seeking new ideas	[...]* leren continu en zoeken voortdurend naar nieuwe ideeën
ICT2	Daly et al. (2015)	[...]* are generally willing to try new things	[...]* zijn over het algemeen bereid om nieuwe dingen te proberen
ICT3	Daly et al. (2015)	[...]* are constantly trying to improve their teaching	[...]* proberen voortdurend hun lesgeven te verbeteren
ICT4	Daly et al. (2015)	[...]* have a positive “can-do” attitude	[...]* hebben een positieve ‘dit kunnen we’ instelling
ICT5	Daly et al. (2015)	[...]* are willing to take risks to make the district better	[...]* zijn bereid om risico’s te nemen om de school beter te maken
ICT6	Daly et al. (2015)	[...]* are encouraged to stretch and grow	[...]* worden aangemoedigd om te groeien en ontwikkelen

Item	Source	Original item label	Translated* item label
ICT7	Daly et al. (2015)	[...]* are continuously developing new approaches to support instruction	[...]* ontwikkelen continu nieuwe manieren om hun onderwijs te verbeteren
AANT	-	-	Hoe veel leerkrachten werken er op deze school?
ICTOp en	-	-	Hoe veel leerkrachten op deze school zijn innovatief?
Innovative supervisor culture			
ICS1	Daly et al. (2015)	[...]** are continuously learning and seeking new ideas	[...]** leert continu en zoekt voortdurend naar nieuwe ideeën
ICS2	Daly et al. (2015)	[...]** are generally willing to try new things	[...]** is over het algemeen bereid om nieuwe dingen te proberen
ICS3	Daly et al. (2015)	[...]** are constantly trying to improve their teaching	[...]** probeert voortdurend zijn/haar leiderschap te verbeteren
ICS4	Daly et al. (2015)	[...]** have a positive “can-do” attitude	[...]** heeft een positieve ‘dit kunnen we’ instelling
ICS5	Daly et al. (2015)	[...]** are willing to take risks to make the district better	[...]** is bereid om risico’s te nemen om de school beter te maken
ICS6	Daly et al. (2015)	[...]** are encouraged to stretch and grow	[...]** wordt aangemoedigd om te groeien en ontwikkelen
ICS7	Daly et al. (2015)	[...]** are continuously developing new approaches to support instruction	[...]** ontwikkelt continu nieuwe manieren om instructie te ondersteunen

Note. *Items were translated and changed into a statement about oneself to create consistency within the questionnaire. [...] * = all teachers in this school / alle leerkrachten op deze school. [...] ** = the supervisor(s) in this school / de leidinggevende(n) op deze school.

Appendix 3: Information letter for school principals

Beste schoolleider,

Voor mijn masterscriptie doe ik onderzoek naar innovatief gedrag van basisschoolleerkrachten. Dit betreft het afstudeeronderzoek van mijn master Educational Sciences (Onderwijswetenschappen) aan de Universiteit Utrecht. Het onderzoek heeft het doel meer te leren over innovatie door basisschoolleerkrachten en de rol van omgevingsfactoren. De resultaten van het onderzoek kunnen bijdragen aan onze kennis van innovatief gedrag en inzicht bieden hoe scholen en schoolleiders innovatie kunnen bevorderen en leerkrachten hierin kunnen ondersteunen.

Voor wie?

Alle leerkrachten die momenteel werkzaam zijn als leerkracht in het basisonderwijs of maximaal 2 jaar geleden werkzaam zijn geweest als basisschoolleerkracht kunnen meedoen aan het onderzoek. Stagiari(e)s met minstens 1 jaar doceerervaring behoren ook tot de doelgroep. Zij hoeven geen ervaring te hebben met innoveren.

Hoe ziet het onderzoek er voor u uit?

Het onderzoek betreft een (online) vragenlijst. Het duurt 10 tot 15 minuten om de vragenlijst in te vullen. In overleg verspreidt de onderzoeker of u als schoolleider de vragenlijst via e-mail naar leerkrachten op de school, afhankelijk van uw voorkeur.

Indien mogelijk komt de onderzoeker één- of tweemaal langs op de school om de vragenlijsten op papier uit te delen, zodat deze direct kunnen worden ingevuld en meegenomen. Dit is om voldoende respons te behalen en leerkrachten de mogelijkheid te geven de vragenlijst op papier in te vullen. Dit is echter niet verplicht; alleen het verspreiden van de vragenlijst via e-mail is voldoende en erg gewenst.

Deelname aan het onderzoek is geheel vrijwillig. Deelnemers kunnen ten alle tijden besluiten om deelname aan het onderzoek te beëindigen, zonder dat zij hier een reden voor hoeven te geven. Indien deelname vroegtijdig wordt beëindigd, worden de tot dan toe verzamelde gegevens wel gebruikt in het onderzoek. Er is geen beloning gekoppeld aan deelname. Indien gewenst, krijgen deelnemers na afronding van het onderzoek de resultaten toegestuurd.

Wanneer?

Het onderzoek dient afgerond en ingeleverd te zijn op 8 juni 2020. Het invullen van de vragenlijst is mogelijk zo lang er nog niet voldoende respons is geweest.

Waarom deelnemen?

In een tijd van continue verandering en technologische ontwikkeling is er veel aandacht voor innovatie in het (basis)onderwijs. Om leerkrachten zo goed mogelijk te ondersteunen in het omgaan met en het ontwikkelen van innovaties, is het van belang om te begrijpen of en hoe zij innoveren en of de schoolomgeving dit al dan niet kan bevorderen. Met uw deelname helpt u mee aan het verzamelen van kennis over innovatie door basisschoolleerkrachten. De resultaten van het onderzoeken kunnen in de toekomst bijdragen aan de kennis over hoe scholen en schoolleiders basisschoolleerkrachten kunnen ondersteunen bij het innoveren.

Privacy en vertrouwelijkheid

Alle gegevens worden vertrouwelijk behandeld en anoniem verwerkt. Alleen de betrokken onderzoekers kunnen bij de gegevens. Persoonsgegevens worden gescheiden van de

onderzoeksgegevens bewaard. De gegevens worden alleen voor onderzoeksdoeleinden gebruikt en niet verstrekt aan derden. De data die in dit onderzoek verzameld wordt, kan voor vervolgonderzoek met een mogelijk ander onderzoeksdoel worden gebruikt.

Persoonsgegevens worden bewaard zolang deze nodig zijn, de ruwe data wordt minimaal 10 jaar bewaard.

De deelnemer wordt bij aanvang van de vragenlijst geïnformeerd over het doel en de manier waarop met de gegevens wordt omgegaan. De deelnemer verleent voor aanvang van de vragenlijst toestemming voor de beschreven voorwaarden van het onderzoek.

Wilt u zich aanmelden voor deelname aan het onderzoek?

Wilt u deelnemen aan dit onderzoek door de vragenlijst te verspreiden onder de leerkrachten op uw school? Hartelijk bedankt! U kunt contact opnemen met de onderzoeker via n.m.mast@uu.nl of +31 6 10230187. Dan wordt er met u een afspraak gemaakt over de verspreiding van de vragenlijst en wordt er indien gewenst een moment gepland voor afname van de vragenlijst op school.

Contactgegevens

Indien u na het lezen van deze informatiebrief nog vragen heeft of liever een afspraak met de onderzoeker maakt, kunt u altijd contact opnemen met de onderzoeker, Nienke Mast, via n.m.mast@uu.nl of +31 6 10230187. Ook kunt u contact opnemen met begeleiders van de masterscriptie via edu.acma.thesis@uu.nl. Indien u klachten heeft, kunt u contact opnemen met klachtenfunctionaris-fetcsocwet@uu.nl.

Met vriendelijke groet,

Nienke Mast

Masterstudent Educational Sciences

Faculteit Sociale Wetenschappen

Universiteit Utrecht

n.m.mast@uu.nl

+31 6 10230187

Appendix 4: Information letter for teachers

Beste basisschoolleerkracht,

Welkom! Hartelijk bedankt voor uw interesse in deelname aan dit onderzoek naar innovatie door basisschoolleerkrachten.

In onderstaande tekst vindt u alle informatie over het onderzoek en de manier waarop met uw gegevens wordt omgegaan. Lees de informatietekst goed door. Als u akkoord bent met het onderzoek en de voorwaarden, tekent u de toestemmingsverklaring. Pas als u akkoord gaat en toestemming verleent, kunt u de vragenlijst invullen en kunnen de resultaten gebruikt worden. Het duurt ongeveer 10 tot 15 minuten om de vragenlijst in te vullen.

Wat is dit onderzoek?

Voor mijn masterscriptie doe ik onderzoek naar innovatief gedrag van basisschoolleerkrachten. Dit betreft het afstudeeronderzoek voor mijn master Educational Sciences (Onderwijswetenschappen) aan de Universiteit Utrecht. Het onderzoek heeft het doel meer te leren over innovatief gedrag van basisschoolleerkrachten en wat de rol van omgevingsfactoren hierin is. De resultaten van het onderzoek kunnen bijdragen aan onze kennis van innovatie door basisschoolleerkrachten, en zo mogelijk inzicht bieden in hoe scholen en schoolleiders leerkrachten hierbij kunnen ondersteunen.

Voor wie?

Alle leerkrachten die momenteel werkzaam zijn als basisschoolleerkracht OF kortgeleden werkzaam zijn geweest als basisschoolleerkracht (max. 1 jaar geleden) kunnen meedoen aan het onderzoek. Stagiair(e)s met minstens 1 jaar doceerervaring behoren ook tot de doelgroep. Het is niet nodig om ervaring te hebben met innoveren.

Wat houdt het onderzoek voor u in?

Het onderzoek betreft een (online) vragenlijst. Het duurt ongeveer 10 tot 15 minuten om de vragenlijst in te vullen.

Vrijwillige deelname

Deelname aan dit onderzoek is vrijwillig. U kunt op elk gewenst moment, zonder opgave van reden en zonder voor u nadelige gevolgen, stoppen met het onderzoek door de vragenlijst af te sluiten. De tot dan toe verzamelde gegevens worden wel gebruikt voor het onderzoek, tenzij u expliciet aangeeft dit niet te willen. Er is geen beloning gekoppeld aan uw deelname. Indien gewenst, krijgt u na afronding van het onderzoek de resultaten toegestuurd. Om de resultaten te ontvangen kunt u aan het einde van de vragenlijst uw e-mailadres invullen. U kunt de vragenlijst invullen zolang er nog niet voldoende deelnemers zijn geweest. Dit afstudeeronderzoek dient afgerond en ingeleverd te zijn op 8 juni 2020.

Privacy en vertrouwelijkheid

Alle gegevens worden vertrouwelijk behandeld en anoniem verwerkt. De gegevens worden alleen voor onderzoekdoeleinden gebruikt en niet verstrekt aan derden. Alleen de betrokken onderzoekers kunnen bij de verzamelde gegevens. De gegevens die in dit onderzoek worden verzameld, kunnen worden gebruikt voor vervolgonderzoek met een mogelijk ander onderzoeksdoel. De persoonsgegevens die in de vragenlijst worden verzameld zijn nodig om de onderzoeksvraag goed te kunnen beantwoorden. De persoonsgegevens worden gescheiden van de onderzoeksgegevens bewaard. Uw persoonsgegevens worden bewaard zolang dat nodig is, de onderzoeksgegevens worden voor minimaal 10 jaar bewaard. Dit is volgens de daartoe bestemde richtlijnen van de VSNU.

Waarom deelnemen?

In een tijd van continue verandering en technologische ontwikkeling is er veel aandacht voor innovatie in het (basis)onderwijs. Daarom is het belangrijk om te begrijpen of en hoe basisschoolleerkrachten innoveren en wat de rol van omgevingsfactoren hierin is. Deze inzichten kunnen mogelijk bijdragen aan onze kennis over hoe scholen en schoolleiders leerkrachten hierin kunnen ondersteunen. Met uw deelname aan dit onderzoek draagt u bij aan deze kennis.

Contactgegevens

Indien u na het lezen van deze informatiebrief nog vragen heeft, kunt u altijd contact opnemen met de onderzoeker, Nienke Mast, via n.m.mast@uu.nl of +31 6 10230187. Ook kunt u contact opnemen met de begeleiders van de masterscriptie via edu.acma.thesis@uu.nl. Als u een klacht heeft, kunt u contact opnemen met klachtenfunctionaris-fetcsocwet@uu.nl.

Appendix 5: Informed consent

Toestemmingsverklaring

- *Paper questionnaire*: Om de vragenlijst te kunnen starten, dient u toestemming te verlenen voor deelname aan het onderzoek. Indien u akkoord gaat met deelname, vult u hieronder uw naam, handtekening en de huidige datum in
- *Electronic questionnaire*: Om de vragenlijst te kunnen starten, dient u door middel van een vinkje onderaan deze pagina toestemming te verlenen voor deelname aan het onderzoek.

Hierbij verklaart u dat:

- U de informatietekst met betrekking tot het onderzoek ‘Innovatie door basisschoolleerkrachten’ hebt gelezen en u volledig geïnformeerd bent over het doel van het onderzoek en de manier waarop met uw gegevens wordt omgegaan;
- U weet dat deelname geheel vrijwillig is en u op elk moment uw deelname kunt beëindigen zonder opgave van reden;
- U de onderzoeker toestemming geeft om uw antwoorden op de vragenlijst te gebruiken voor het onderzoek.

Naam:

Handtekening:

Datum:

Appendix 6: Paper version of the questionnaire**1. Wat is uw geslacht?**

- Man
- Vrouw
- Anders

2. Wat is uw leeftijd in jaren?**3. Wat is uw huidige situatie?**

- Ik werk als leerkracht in het basisonderwijs
- Ik ben stagiair(e)-leerkracht in het basisonderwijs
- Ik werk nu niet als basisschoolleerkracht, maar ik heb kortgeleden (max. 1 jaar geleden) als leerkracht in het basisonderwijs gewerkt

4. Hoeveel jaar doceerervaring heeft u, inclusief stage-ervaring?**5. Hoeveel uur per week werkt u als basisschoolleerkracht? Vul het aantal uren in dat u volgens uw arbeidsovereenkomst werkt.**

Als u momenteel niet als basisschoolleerkracht werkt, vul dan het aantal uren in dat u volgens uw laatste arbeidsovereenkomst per week als basisschoolleerkracht werkte. Als u stagiair(e)-leerkracht bent, vul dan het aantal uren in dat u per week stage loopt.

Deze stellingen gaan over innoveren op uw werk. Het is mogelijk dat de stellingen op elkaar lijken. Dit heeft te maken met het doel van het onderzoek.

In hoeverre zijn onderstaande stellingen op u van toepassing?

6. In hoeverre zijn onderstaande stellingen op u van toepassing?

	<i>Helemaal niet van toepassing</i>	<i>Grotendeels niet van toepassing</i>	<i>Evenveel niet van toepassing als wel van toepassing</i>	<i>Grotendeels van toepassing</i>	<i>Helemaal van toepassing</i>
<i>Ik bestudeer vakinhoudelijke literatuur</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik bezoek onderwijs-sites op het internet</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik lees onderwijskundige, vakdidactische en/of pedagogische literatuur</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik stel nieuwe manieren voor om de kwaliteit van het onderwijs te verhogen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik houd mezelf op de hoogte van de structuur van de school en processen binnen de school</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik houd mezelf op de hoogte van de laatste ontwikkelingen binnen de school</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik houd mezelf op de hoogte van nieuwe concepten en inzichten in het onderwijs</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik houd mezelf op de hoogte van nieuwe ontwikkelingen op andere scholen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik promoot de toepassing van een nieuw idee of een nieuwe oplossing binnen mijn werkomgeving</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik stel nieuwe manieren voor om doelen/doelstellingen te behalen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<i>Helemaal niet van toepassing</i>	<i>Grotendeels niet van toepassing</i>	<i>Evenveel niet van toepassing als wel van toepassing</i>	<i>Grotendeels van toepassing</i>	<i>Helemaal van toepassing</i>
<i>Ik bedenk nieuwe en praktische ideeën om de prestaties te verhogen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik houd me bezig met het uitzoeken van nieuwe technologieën, processen, werkwijzen en/of ideeën voor producten</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>Ik stel nieuwe manieren voor om de kwaliteit te verhogen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik ben een goede bron van creatieve ideeën</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik heb vaak nieuwe en innovatieve ideeën</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik bedenk creatieve oplossingen voor problemen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik heb vaak een verfrissende kijk op het aanpakken van problemen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik stel nieuwe manieren van werktaken uitvoeren voor</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik laat creativiteit in mijn werk zien wanneer ik daar de kans voor krijg</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik ben niet bang om risico's te nemen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik promoot en pleit voor mijn ideeën bij anderen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik ontwikkel adequate plannen en schema's voor de implementatie van nieuwe ideeën</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik richt me tot de belangrijkste personen die de nodige toestemming en middelen kunnen verstrekken</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik promoot nieuwe ideeën bij collega's om hun actieve steun te krijgen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<i>Helemaal niet van toepassing</i>	<i>Grotendeels niet van toepassing</i>	<i>Evenveel niet van toepassing als wel van toepassing</i>	<i>Grotendeels van toepassing</i>	<i>Helemaal van toepassing</i>
<i>Ik promoot nieuwe ideeën bij mijn leidinggevende om zijn/haar actieve steun te krijgen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik promoot de toepassing van een nieuwe oplossing binnen mijn werkomgeving</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik houd collega's geïnformeerd over de voortgang van de verwezenlijking van mijn ideeën</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik overtuig anderen van het belang van een nieuw idee of nieuwe oplossing</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>Ik laat collega's kennismaken met de toepassing van een ontwikkelde oplossing</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik bedenk nieuwe en praktische ideeën om de prestaties van de school of van mij als leerkracht te verbeteren</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik probeer in mijn les nieuwe manieren van lesgeven uit</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik probeer in mijn les nieuwe ICT-toepassingen uit</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik test alternatieve lesmaterialen in de klas</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik gebruik en evalueer andere manieren van beoordelen/toetsen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik informeer naar en onderzoek nieuwe manieren van lesgeven in de klas</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik laat collega's kennismaken met de toepassing van een ontwikkelde oplossing of idee</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik beoordeel de voortgang wanneer ik een idee in de praktijk breng</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<i>Helemaal niet van toepassing</i>	<i>Grotendeels niet van toepassing</i>	<i>Evenveel niet van toepassing als wel van toepassing</i>	<i>Grotendeels van toepassing</i>	<i>Helemaal van toepassing</i>
<i>Ik visualiseer mijn ideeën op een grafische manier</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik bepaal succescriteria voor de verwezenlijking van een idee</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>Ik reflecteer op een systematische manier op recent opgedane ervaringen</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

heeft een positieve “dit kunnen we” instelling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
is bereid om risico's te nemen om de school beter te maken	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
wordt aangemoedigd om te groeien en ontwikkelen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ontwikkelt continu nieuwe manieren om instructie te ondersteunen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Indien u meer dan één leidinggevende heeft, kunt u in de stellingen 'mijn leidinggevende' beschouwen als 'mijn leidinggevend', en de werkwoorden als meervoudsvorm lezen. *Bijvoorbeeld, stelling 1 wordt: "de leidinggevenden op deze school... leren continu en zijn voortdurend op zoek naar nieuwe ideeën".*

12. Als u de resultaten van het onderzoek wilt ontvangen, vul dan hieronder uw e-mailadres in.

Zodra het onderzoek is afgerond en met een voldoende is beoordeeld, ontvangt u de resultaten per e-mail.

Appendix 7: Factor solution in Dutch*Table 1*

Rotated factor solution and factor loadings for each item.

Item	Item label	Rotated factor solution		
		1	2	3
IP3	Ik promoot nieuwe ideeën bij mijn leidinggevende om zijn/haar actieve steun te krijgen	,888		
IP2	Ik promoot nieuwe ideeën bij collega's om hun actieve steun te krijgen	,837		
IP1	Ik richt me tot de belangrijkste personen die de nodige toestemming en middelen kunnen verstrekken	,793		
IG12	Ik promoot en pleit voor mijn ideeën bij anderen	,721		
IP6	Ik overtuig anderen van het belang van een nieuw idee of nieuwe oplossing	,718		
IP4	Ik promoot de toepassing van een nieuwe oplossing binnen mijn werkomgeving	,714		
IP5	Ik houd 58rober58's geïnformeerd over de voortgang van de verwezenlijking van mijn ideeën	,705		
IG13	Ik ontwikkel adequate plannen en schema's voor de implementatie van nieuwe ideeën	,683		
IP7	Ik laat collega's kennismaken met de toepassing van een ontwikkelde oplossing	,675		
IP4N	Ik promoot de toepassing van een nieuw idee of een nieuwe oplossing binnen mijn werkomgeving	,645		-,339
IG4N	Ik stel nieuwe manieren voor om de kwaliteit van het onderwijs te verhogen	,606		-,357
IG1	Ik stel nieuwe manieren voor om doelen/doelstellingen te behalen	,598		-,354
IG4	Ik stel nieuwe manieren voor om de kwaliteit te verhogen	,516		-,429
IG2	Ik bedenk nieuwe en praktische ideeën om de prestaties te verhogen	,456		-,376
IP7N	Ik laat collega's kennismaken met de toepassing van een ontwikkelde oplossing of idee	,449		
IG3	Ik houd me bezig met het uitzoeken van nieuwe technologieën, processen, werkwijzen en/of ideeën voor producten	,447		
R3	Ik bepaal succescriteria voor de verwezenlijking van een idee		,749	
R2	Ik visualiseer mijn ideeën op een grafische manier		,699	
R4	Ik reflecteer op een systematische manier op recent opgedane ervaringen		,677	
IR5	Ik informeer naar en onderzoek nieuwe manieren van lesgeven in de klas		,655	
R1	Ik beoordeel de voortgang wanneer ik een idee in de praktijk breng		,644	
IR4	Ik gebruik en evalueer andere manieren van beoordelen/toetsen		,638	-,325
IR3	Ik test alternatieve lesmaterialen in de klas		,616	
IR1	Ik probeer in mijn les nieuwe manieren van lesgeven uit		,576	
OE3	Ik lees onderwijskundige, vakdidactische en/of pedagogische literatuur		,503	,340
OE7	Ik houd mezelf op de hoogte van nieuwe concepten en inzichten in het onderwijs		,463	
IG5	Ik ben een goede bron van creatieve ideeën			-,760
IG8	Ik heb vaak een verfrissende kijk op het aanpakken van problemen			-,696
IG7	Ik bedenk creatieve oplossingen voor problemen			-,679
IG9	Ik stel nieuwe manieren van werktaken uitvoeren voor	,445		-,510

IG10	Ik laat creativiteit in mijn werk zien wanneer ik daar de kans voor krijg		-,462
IG6	Ik heb vaak nieuwe en innovatieve ideeën	,341	-,439

Note. Factor loadings <.3 have been suppressed.

Appendix 8: FETC form**Appendix C: FETC form****Section 1: Basic Study Information**

1. Name student:

Nienke Mast

2. Name(s) of the supervisor(s):

Jos Jaspers
Liesbeth Kester

3. Title of the thesis (plan):

Primary school teacher innovative work behavior and its relationship with supervisor support and innovative culture

4. Does the study concern a multi-center project, e.g. a collaboration with other organizations, universities, a GGZ mental health care institution, or a university medical center?

No.

5. Where will the study (data collection) be conducted? If this is abroad, please note that you have to be sure of the local ethical codes of conducts and permissions.

In The Netherlands.

Section 2: Study Details I

6. Will you collect data?

Yes
Yes → Continue to question 11
No → Continue to question 7

7. Where is the data stored?

8. Is the data publicly available?

Yes / No
If yes: Where?

9. Can participants be identified by the student? (e.g., does the data contain (indirectly retrievable) personal information, video, or audio data?)

Yes / No
If yes: Explain.

10. If the data is pseudonymized, who has the key to permit re-identification?

The names of participants will not be collected, so data will not be pseudonymized.

Section 3: Participants

11. What age group is included in your study?

Primary school teachers who have finished their study, which means that the participants are between the age of 20 and 67.

12. Will be participants that are recruited be > 16 years? No
13. Will participants be mentally competent (wilsbekwam in Dutch)? Yes
14. Does the participant population contain vulnerable persons?
(e.g., incapacitated, children, mentally challenged, traumatized, pregnant) No
15. If you answered 'Yes' to any of the three questions above: Please provide reasons to justify why this particular groups of participant is included in your study.

16. What possible risk could participating hold for your participants?

Questions in the research may trigger unpleasant feelings. Second, participants may feel the risk that their supervisor finds out what they answered in the questionnaire.

17. What measures are implemented to minimize risks (or burden) for the participants?

Participants will sign an informed consent in which it is explicated that participation is voluntary. Moreover, participants will be given limited information about the topic of the study, so they can assess whether participation in the study might not be pleasant for them. Third, not sensitive or harming questions will be asked. Finally, data will be collected anonymously and processed, which takes away the risk of being exposed.

18. What time investment and effort will be requested from participants?

10 to 15 minutes.

19. Will be participants be reimbursed for their efforts? If yes, how? (financial reimbursement, travelling expenses, otherwise). What is the amount? Will this compensation depend on certain conditions, such as the completion of the study?

No, participants will only receive the results on the study once it is finished and graded with a sufficient.

20. How does the burden on the participants compare to the study's potential scientific or practical contribution?

The burden on the participants is low as participations takes a relatively short amount of time. The questionnaire can be filled in online, which makes the burden increasingly low. Moreover, participation is voluntary, so participants can assess whether their contribution compares to the result.

21. What is the number of participants? Provide a power analysis and/or motivation for the number of participants. The current convention is a power of 0.80. If the study deviates from this convention, the FERB would like you to justify why this is necessary. (Note, you want to include enough participants to be able to answer your research questions adequately, but you do not want to include too many participants and unnecessarily burden participants.)

A total number of 45 participants is the aim of this research. An a priori power analysis shows that for a research design with one group, 2 predictors, an alpha of 0.05 and the conventional power of 0.80, a total number of 43 participants is needed. A number of 45 participants will be enough to answer the research question, solve the potential problem of missing data in case of early drop-out or mistakes, but does not burden participants due to an unnecessarily large number of participants.

22. How will the participants be recruited? Explain and attach the information letter to this document.

Participants will be recruited via the network of the researcher. Additionally, a snowballing method will be used to reach a larger number of participants. The information letter (in Dutch) is attached.

23. How much time will prospective participants have to decide as to whether they will indeed participate in the study?

Participants will receive approximately 4 weeks to fill in the questionnaire, which means they have 4 weeks to decide whether they want to participate. Participants will never receive less than 7 days to decide whether they want to participate. In case the necessary number of participants has not been reached before the intended day of closing the questionnaire, the closing will be delayed so all participants have had at least 7 days to decide.

24. Please explain the consent procedures. Note, active consent of participants (or their parents) is in principle mandatory. Enclose the consent letters as attachments. You can use the consent forms on Blackboard.

Active consent will be used. See attachment for the consent letters.

25. Are the participants fully free to participate and terminate their participation whenever they want and without stating their grounds for doing so? Explain.

Yes, they are. They can quit the questionnaire any time and their results will not be saved if they do not finish the questionnaire. If the questionnaire is filled in on paper, the results will be destroyed and not be used. This is explicitly stated in the informed consent.

26. Will the participants be in a dependent relationship with the researcher?

No.

27. Is there an independent contact person or a general email address of a complaint officer whom the participant can contact?

Yes, the participant can contact the faculty of educational sciences at Utrecht University.

28. Is there an independent contact person or a general email address of a complaint officer whom the participant can contact in case of complaints?

Yes, the participant can contact the faculty of educational sciences at Utrecht University.

Section 4: Data management

29. Who has access to the data and who will be responsible for managing (access to) the data?

The researcher will have access to the data and will be responsible for managing (access to) the data. Besides the researcher, only the supervisor will have access to the data.

30. What type of data will you collect or create? Please provide a description of the instruments.

Quantitative data using a questionnaire. Participants will answer questions on their innovative behavior, school culture and supervisor support on a likert-scale. The instrument to measure innovative behavior is a self-compiled scale, based on existing and validated scales. Scales for the measurement of school culture and supervisor support have been validated before.

31. Will you be exchanging (personal) data with organizations/research partners outside the UU?

No.

32. If so, will a data processing agreement be made up?

No, but the information letter inform the participant about how the data will be handled. See the appendix for the information letter.

33. Where will the data be stored and for how long?

The data will be stored in YoDa. Personal information will be stored as long is necessary, raw data will be stored for a minimum of 10 years.

34. Will the data potentially be used for other purposes than the master's thesis? (e.g., publication, reporting back to participants, etc.)

The data will be used to report participants about the findings of the study in the form of the results and discussion section, not the raw data. Moreover, the data might be used for publication in case the master's thesis can be published.

35. Will the data potentially be used for other purposes than the master's thesis? (e.g., publication, reporting back to participants, etc.)

The data will be used to report participants about the findings of the study in the form of the results and discussion section, not the raw data. Moreover, the data might be used for publication in case the master's thesis can be published.