

MASTER

How ability, motivation and opportunity drive innovative work behavior a model of perceived work environment, work engagement and self-efficacy

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How ability, motivation and opportunity drive innovative work behavior:

A model of perceived work environment, work engagement and self-efficacy



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OPERATIONS MANAGEMENT AND LOGISTICS**

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Abstract

Purpose and focus

Using the Ability Motivation Opportunity (AMO) framework, relationships between job demands, job resources, work engagement, self-efficacy, high commitment human resource management (HC-HRM), and innovative work behavior were examined. This study aimed to explain innovative work behavior from both individual and environmental characteristics. The author believes that job demands and job resources (opportunity) affect innovative work behavior through changed levels of work engagement (motivation) and self-efficacy (ability). Moreover, the moderating role of HC-HRM on the relation between job demands, job resources and work engagement and self-efficacy was analysed such that HC-HRM mitigates the proposed negative effect of job demands and fosters the proposed positive effect of job resources.

Methodology

Data was collected via an online questionnaire that was sent to secondary school teachers in The Netherlands. In total, 80 respondents filled in the entire questionnaire. Hypotheses were tested with several statistical techniques, namely multiple linear regression, simple moderation analysis, simple mediation analysis and a moderated mediation analysis.

Results

Results showed that both work engagement and self-efficacy were positively related to innovative work behavior. Student misbehavior was negatively related to innovative work behavior via both work engagement and self-efficacy. Both student diversity and social support were positively related to innovative work behavior via work engagement. Red tape was negatively related to innovative work behavior via self-efficacy and social support was positively related to innovative work behavior via self-efficacy. Furthermore, the results illustrated that HC-HRM practices influence the effect of job demands and job resources on both work engagement and self-efficacy.

Practical implications

This report helps school managers to identify how they can increase work engagement and self-efficacy among their teachers and in turn teachers' innovative work behavior by optimizing the perceived work environment and by means of their HC-HRM practices. HC-HRM practices can be used to alter the effect of the perceived work environment on work engagement and self-efficacy.

Preface and acknowledgements

“A journey of a thousand miles begins with a single step.” Lao Tzu

Dear reader,

This thesis represents the final assignment in the fulfillment of my master degree in Operations Management and Logistics at Eindhoven University of Technology. A six-month project focussed on the profession that I have admired since my youth: teaching. The journey towards this moment was not always easy. But I have learnt that if the plan does not work, you have to change the plan but never the goal. I am sure that this made myself stronger and I appreciate all the things I have learnt during my academical career.

I would like to use this opportunity to express my gratitude to everyone involved.

First, I would like to thank my TU/e mentor and first supervisor Sonja Rispens for her professional guidance. Thank you for your effort during my research project and the critical feedback sessions. I am glad that I could write my master thesis within the Human Performance Management department with you as first supervisor. Your enthusiasm and support helped me to go through this project. Second, I want to thank my second supervisor Sarah Gelper for her feedback and encouragements. I admire your statistical knowledge, and the way you motivate and help students. Thanks for your support during this project.

Last but not least, I would like to thank my lovely parents and Henry for giving me the opportunities to discover and deploy my talents, for caring and for loving. I want to thank my family for showing interest and support. Many thanks to my friends for the good times during and outside academic life.

Senna Gofers

Weert, May 2020

Management Summary

Research background and main research question

For decades, innovative work behavior has been regarded as one of the critical components to the sustainability and success of organizations (Amabile, 1988; Konermann, 2011). Not only do organizations in highly competitive markets need to innovate, so do non-profit organizations, such as educational institutes. Education is becoming a leading factor in the sustainable development of a knowledge society (Trapitsin, Granichin, Granichina and Zharova, 2018). The continuous changes and innovations in technology depend for a high degree on the knowledge and skills of people which in turn rely on the education of our people (Trapitsin et al., 2018). Higher-order skills are increasingly integral to the workplace of today and tomorrow and require individuals to be creative and solve real-world problems by introducing innovative ideas (Dumont, Istance and Benavides, 2010; Fullan, 2006; OECD, 2008b). Education should prepare students *“for jobs that do not yet exist, to use technologies that have not yet been invented and to solve problems that we do not even know are problems yet”* (Dumont et al., 2010, p.24). Innovative education is crucial to promote students’ innovativeness and starts with innovative teachers: teachers who demonstrate innovative behavior (Arhipova and Kuchmaeva, 2018). It calls for an educational culture that values innovativeness and creativity and sees it as an asset in the classroom where teachers are key figures in constructing such an innovative climate (Ferrari, Chachia and Punie, 2009).

This study examined how innovative work behavior of teachers is affected by both individual and environmental characteristics and formulated guidelines for school management to increase innovative work behavior among their teachers. The main research question was: *What is the relation between job demands, job resources, work engagement, teacher self-efficacy and innovative work behavior and how can school management increase innovative work behavior among their teachers?*

Methodology

Based on the ability, motivation and opportunity framework for explaining employee behavior (Boxall and Purcell, 2008), a research model was constructed to gain more insight into innovative work behavior. In order to investigate the hypotheses, a cross-sectional survey study was performed among secondary school teachers. Empirical data was gathered using an online questionnaire that was sent via e-mail to secondary school teachers. In total, 80 teachers filled in the entire questionnaire. Hypotheses were tested with simple moderation and mediation models, all based on linear regression models.

The research model is shown in Figure 1.

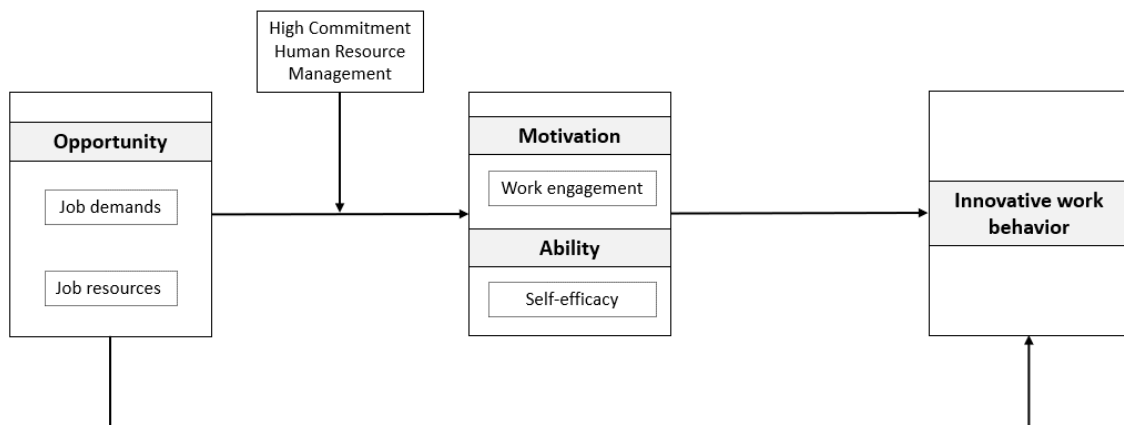


Figure 1: Research model

Results

The main findings of this study were that job demands and job resources affect innovative work behavior through changed levels of work engagement and teacher self-efficacy. From the examined job demands, student misbehavior in particular turns out to be an important negative predictor of innovative work behavior through lower levels of work engagement and self-efficacy. Administrative burden harms innovative work behavior through a lower level of self-efficacy, while student diversity foster innovative work behavior through higher levels of work engagement. From the examined job resources, social support seems to be an important positive predictor of innovative work behavior through higher levels of work engagement and self-efficacy.

Finally, high commitment human resource management (HC-HRM: HR practices to enhance employees’ levels of motivation, skills, empowerment and information) altered the relation between job demands and resources on the one hand, and work engagement and teacher self-efficacy on the other hand. The results showed that HC-HRM is especially important in mitigating the negative effects of job demands on teacher self-efficacy. For example, the negative relation between student misbehavior and teacher self-efficacy was weaker when HC-HRM was high. Moreover, in a high HC-HRM work environment, autonomy resulted in a higher level of work engagement than in a low HC-HRM work environment.

The main results are illustrated in Figure II.

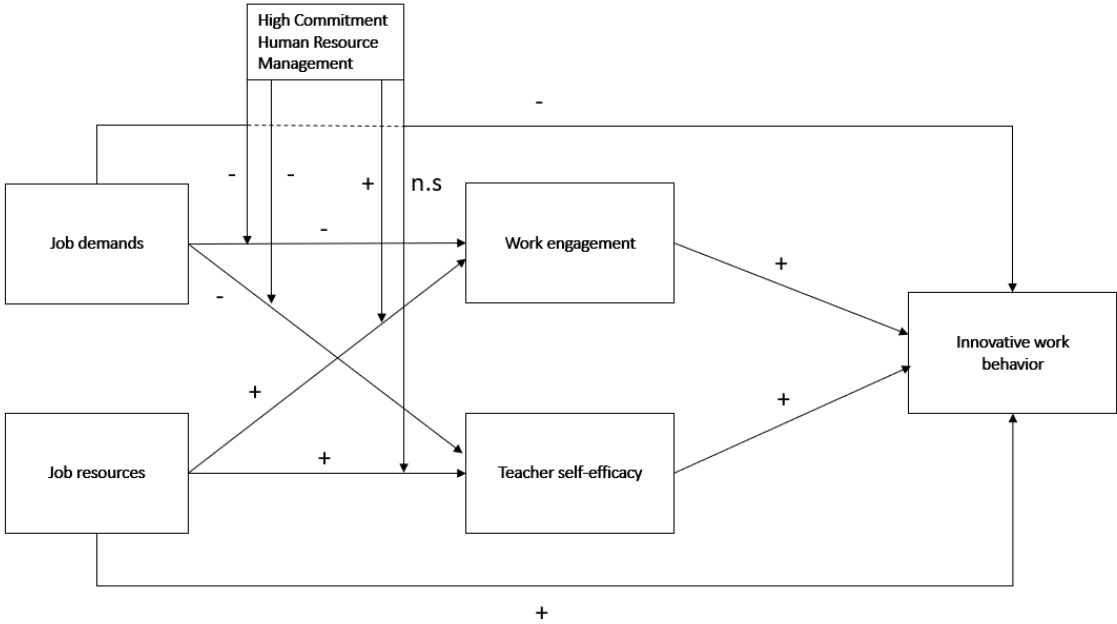


Figure II: Main findings

Recommendations

Teacher innovative work behavior is the result of an interaction between perceived work environment (job demands and job resources) and individuals characteristics (work engagement and teacher self-efficacy). School management should therefore combine different techniques to enhance innovative work behavior. By optimizing the perceived work environment, schools can increase innovative work behavior through changed levels of work engagement and teacher self-efficacy. School management

can change (the perception of) the work environment by optimizing job demands or increasing job resources in order to increase work engagement and self-efficacy, which will result in more innovative work behavior. Moreover, they can use HC-HRM practices in order to mitigate the negative effect of job demands and foster the positive effect of job resources on work engagement and teacher self-efficacy.

Schools may facilitate engagement and increase teacher self-efficacy by providing sufficient job resources. For example, social support from both colleagues and supervisors ensures that teachers feel more engaged and have more confidence in their abilities. Thus, supervisors have to make sure they show their support, use positive communication and interaction, and colleagues have to respect and support each other such that teachers have the courage to change their lessons and behavior. Besides social resources, there is evidence that, among others, participation in decision making, performance feedback, and task variety are important for teacher's work engagement and self-efficacy (Salanova et al., 2010; Skaalvik and Skaalvik, 2017).

School management can also focus on optimizing job demands. Optimizing demands (i.e. simplifying the job and making work processes more efficient) mitigate the negative impact of job demands on work engagement and self-efficacy (Demerouti and Peeters, 2018). This study shows that educational administrators should pay particular attention to student misbehavior. Although it might be difficult to change the level of certain job demands such as student misbehavior or administrative burden, school management can create high commitment human resource management (HC-HRM) practices aimed at providing opportunities for employees such that they can optimize job demands and give their best performance.

HC-HRM practices are aimed at enhancing employees' levels of motivation, skills, empowerment and information (Whitener, 2001). For example, by facilitating teachers' continuous professionalisation through training and development programmes that are explicitly linked to daily practices, school management can mitigate the negative effects of job demands that are difficult to change such as red tape and student misbehavior (Runhaar, 2017). Related to student misbehavior,

training programmes should provide guidelines to teachers how to deal with student misbehavior, which increases teachers' motivation and skills and allow them to better deal with job demands they encounter during their job which increases their self-efficacy.

Moreover, performance appraisal and reward is part of HC-HRM. Although the overall image is that teachers are highly intrinsically motivated because they are 'passionate beings', these notions do not mean that teachers should not be rewarded when they show extra effort. Extrinsic motivators, such as salary, are less common basic drivers for teachers, but non-financial 'bonuses' are highly appreciated (Rinke, 2008). Alternative work arrangements, allocation of an extra-curricular project and positive feedback are perceived as forms of recognition and teachers will reciprocate with higher willingness to deal with job demands (Boon and Kalshoven, 2014; Bos-Nehles and Veenendaal, 2019; Runhaar, 2017). In this way, performance appraisal and reward can mitigate the negative effect of perceived job demands on work engagement and self-efficacy.

Thereby, school management should critically reflect on what messages one wants to send to teachers. For example, if a school wants to highlight the importance of innovative work behavior, one should reflect on how this behavior is stimulated by HC-HRM practices; for instance, is innovative work behavior a recurrent item in performance interviews (Runhaar, 2017)? Here, team leaders are especially important because they have to create consensus and consistency, such that teachers receive the 'right message'. This in turn can mitigate the negative effect of job demands on work engagement and teacher self-efficacy.

Finally, teachers will be more innovative when they face student diversity in their classroom. Therefore, class composition could be based on diversity such as gender, grades and interests. However, a solid HC-HRM environment should be guaranteed because in low HC-HRM environments, high diversity will decrease teacher self-efficacy. This implies that teachers should receive training and development opportunities to be able to deal with student diversity.

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1. Introduction

For decades, innovative work behavior has been regarded as one of the critical components to the sustainability and success of organizations (Amabile, 1988; Konermann, 2011). Innovative work behavior is conceptualized as a multiple stage process of three idea-related discretionary tasks, namely idea generation, idea promotion and idea realization, in order to benefit performance (De Jong and Den Hartog, 2005; Janssen, 2000; Konermann, 2011). In this modern and highly competitive era, organizations increasingly depend on employee's efforts to innovate (Ahmed, Hassan, Ayub and Klimoski, 2018; Schuh, Zhang, Morgeson, Tian and van Dick, 2018). Research shows that innovative behavior is positively related to organizational outcomes, such as individual work performance and employee's efficiency and effectiveness (Dörner, Gassmann and Morhart, 2012; Shalley and Gilson, 2004). Innovative employees experience relatively low stress, enjoy more job satisfaction and higher personal growth (Janssen, 2004). Not only do organizations in highly competitive markets need to innovate, so do non-profit organizations, such as educational institutes.

The continuous changes and innovations in technology depend for a high degree on the knowledge and skills of people which in turn rely on the education of our people (Trapitsin, Granichin, Granichina and Zharova, 2018). Education is becoming a leading factor in the sustainable development of a knowledge society (Trapitsin et al., 2018). Research shows that this kind of society determines new requirements, of which the innovative nature of education is one of them (Arkhipova and Kuchmaeva, 2018). In the context of education, innovations are processes that usefully encourage the outcome and the quality of learning (Messmann and Mulder, 2011). Teacher innovative behavior is highly important for the further development of our knowledge society as well as for school organizations themselves (Thurlings, Evers and Vermeulen, 2015). There are three main reasons why innovative teacher behavior in schools is important (Thurlings et al., 2015). First, education is crucial to promote students' innovative and creative thinking (Andiliou and Murphy, 2010). Schools should act as a starting point for more innovative behavior of our citizens such that our society can stay competitive. Second, the

demands in our knowledge society are increasing for both students and their teachers: innovative work behavior is important in order to keep up to date. Finally, new technologies and insights about teaching require innovative work behavior. The environment in which schools operate is changing rapidly because of more varied student populations, higher social expectations, expanding knowledge fields and new responsibilities (Organisation for Economic Cooperation and Development, 2014). However, some authors argue that the teaching profession has not kept up with the pace of the changing environment and teachers lack to be innovative (e.g. Dumont, Istance and Benavides, 2010; Guerriero, 2017).

The aim of this study was to get a deeper understanding of innovative work behavior among teachers. Innovative work behavior is behavior that goes beyond formal job description and is a complex product of interactions between individual and environmental characteristics (Katz, 1964; Nishii, Lepak and Schneider, 2008). This study explained innovative work behavior from the ability, motivation and opportunity (AMO) framework, which assumes that employee behavior is described as a function of individual characteristics (ability and motivation) and environmental characteristics (opportunity) (Boxall and Purcell, 2008). For ability to show innovative work behavior, I used teacher self-efficacy, which is defined as *“beliefs in their own capabilities to successfully perform specific teaching and learning related tasks within the context of their own classrooms”* (Dellinger et al., 2008, p. 751). For motivation to be innovative, work engagement was used. Work engagement is defined as *“a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption”* (Schaufeli, Salanova, González-Romá and Bakker, 2002, p.74). Finally, the perceived work environment modelled by job demands and job resources, was used for opportunity to show innovative work behavior. Further, this study examined whether high commitment human resource management (HC-HRM) influences the effects of JD-R on work engagement and teacher self-efficacy. HC-HRM is a combination of HR practices to enhance employees’ levels of motivation, skill, empowerment and information and creates opportunities such that the employee can give their best performance for the organization (Goud-Williams, 2004; Whitener, 2001).

Using data from 80 secondary school teachers in The Netherlands, I answered the following research question: *What is the relation between job demands, job resources, work engagement, teacher self-efficacy and innovative work behavior and how can school management increase innovative work behavior among their teachers?*

2. Theoretical framework

This chapter provides the theoretical framework for this study. First, innovative work behavior and its relevance will be described, followed by an explanation of the ability, motivation and opportunity framework (Section 2.1). In Section 2.2, the Job Demands – Resources model and its relationship with innovative work behavior will be discussed. Next, the relation between JD-R, work engagement and teacher self-efficacy will be discussed (respectively Section 2.3 and 2.4). In the subsequent sections, the relation between work engagement (Section 2.5), teacher self-efficacy (Section 2.6) and innovative work behavior and their mediating role are discussed (Section 2.7). Finally, the moderation of HC-HRM on the relation between JD-R and both work engagement and teacher self-efficacy will be discussed (Section 2.8). In Section 2.2 to 2.8, hypotheses will be formulated which build the conceptual framework of this study. Figure 1 illustrates the basic conceptual research model, which can serve as a guideline through this chapter.

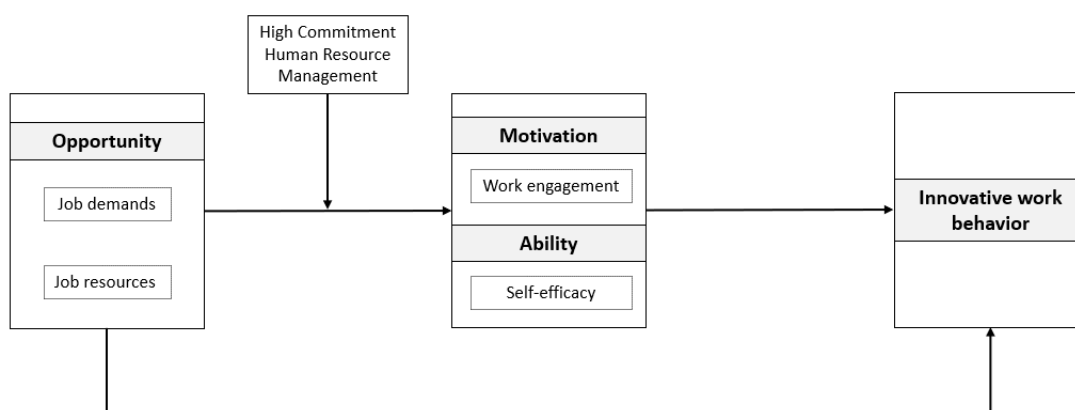


Figure 1: Research model

2.1 Innovative work behavior and the ability, motivation, opportunity framework

2.1.1 Defining innovative work behavior

In a knowledge-based society, innovation is regarded as one of the critical components for the success and sustainability of an organization (Kontoghiorghes, Awbrey and Feurig, 2005). A knowledge society is a society in which the economic and cultural level is characterised by a high degree of dependency on people's abilities and skills to create technological and scientific knowledge (Hornidge, 2011). Innovation in organizations depends on employees' behavior. For an employee to show innovative behaviour, creativity is needed to initiate and develop innovations (Amabile, 1988).

Janssen (2003) conceptualized innovative work behavior as a set of three idea-related discretionary tasks namely i) idea generation, ii) idea promotion and iii) idea realization. Idea generation is the production of new ideas or a new solution for a recurrent or recent problem, useful for the organization (Amabile et al., 1996; Scott and Bruce, 1994). This is also called creativity. Idea promotion is the exchange of these ideas or solutions, and idea realization refers to the implementation of ideas within the organization (Scott and Bruce, 1994).

Innovative work behavior in the world of education has similarities and differences with innovative work behavior in other workplaces. In general, innovative products and processes are required to address emerging problems and challenges. In the context of education, innovations are processes that usefully enhance the outcome and the quality of learning (Messmann and Mulder, 2011). In both settings, innovative work behavior is an intentional self-initiated behavior with three stages: idea generation, idea promotion and idea realization (Janssen, 2003). Moreover, in both settings innovative work behavior could help to diminish potential harmful consequences of and concerns about change (Janssen, 2000; Lecat et al., 2018). However, in business organizations, employees are more often fostered by management to be innovative and innovative work behavior often results in the introduction and application of new physical products (Messmann and Mulder, 2011). In these workplaces, the result of an innovation is often (physically) visible, and thus employees can see that

their efforts of being innovative lead to something new which can trigger them to show innovative behavior. In the end, innovative work behavior in those workplaces is assumed to have positive financial consequences for the organization (De Jong and Den Hartog, 2005). This is in contrast to the education setting, in which the link between innovative work behavior and financial consequences is not obvious. Moreover, teacher innovative work behavior in general does not result in physical products, which might feel that putting effort in showing innovative behavior has not much impact or is not necessary. The motivation for innovative behavior and the factors that foster or hinder innovative behavior can thus be different between the education setting and other workplaces.

2.1.2 The relevance of teacher innovative work behavior

Teacher innovative work behavior is important because it triggers new ideas that support teachers in solving problems they encounter in their job, as well as improving their performance and in turn contributes to the whole school (Carmeli et al., 2006). Moreover, as mentioned in the introduction, teacher innovative behavior is important because (i) it is crucial to promote students' creative and innovative thinking, (ii) teachers have to keep up to date in a rapidly changing society and (iii) new technologies and insights about teaching require innovative behavior (Thurlings et al., 2015). But also changes in our society necessitate innovativeness in education. For example, higher-order thinking skills are increasingly integral to the workplace of today and tomorrow (Dumont et al., 2010). This means that people need to learn to generate and process complex information, to be creative, to be adaptable and flexible and to be able to identify and solve real-world problems by introducing new ideas (Dumont et al., 2010; Fullan, 2006; OECD, 2008b). Education should prepare students *"for jobs that do not yet exist, to use technologies that have not yet been invented and to solve problems that we do not even know are problems yet"* (Dumont et al., 2010, p.24). Innovative education is crucial to promote students' innovative, creative and higher-order thinking (Andiliou and Murphy, 2010). And innovative education starts with innovative teachers: teachers who demonstrate innovative behavior (Arkhipova and Kuchmaeva, 2018). It calls for an educational culture that values innovativeness and

creativity and sees it as an asset in the classroom where teachers are key figures in constructing such a creative climate (Ferrari, Chachia and Punie, 2009).

2.1.3 Antecedents of innovative work behavior: the AMO-framework

Behavior that goes beyond formal job description is fundamental for an organization to function (Katz, 1964). As already mentioned in 1964 *“an organization which depends solely upon its blue-prints of prescribed behavior is a very fragile social system”* (Katz, 1964, p.132). Employee behavior is a function of the way employees perceive themselves and their environment (Schneider, 1983). Innovative behavior is a complex product of interactions between individual and environmental factors (e.g. Nishii et al., 2008; Woodman, Sawyer and Griffin 1993).

The ability, motivation and opportunity model (AMO) is a model that elaborates on the idea that employee behavior is the result of both individual and environmental factors (Bos-Nehles, Van Riemsdijk and Looise, 2013; Boxall and Purcell, 2008). In this framework, employee behavior is considered as a function of their ability (A), motivation (M) and opportunity (O). Ability is described as the skills and capabilities requisite for showing specific employee behavior, motivation is the impetus toward a behavior and opportunity is considered as the contextual constraints relevant to this behavior (Hughes, 2007). Applied to innovative work behavior, this means that employees should be capable of being innovative (i.e., they have the required skills and abilities), they are motivated to show innovative behavior (e.g. a positive state of well-being) and they are provided with sufficient resources and opportunities to be innovative (Rehman and Ahmad, 2015).

Some authors argue that all three components of the AMO framework must be present for showing certain behavior (e.g., Lepak, Liao, Chung and Harden, 2006; Siemsen, Roth and Balasubramanian, 2008). They describe performance (P) as a multiplicative model of ability, motivation and opportunity: $P = f(A \times M \times O)$. Innovative work behavior in the multiplicative model is expected to be nonexistent when any of the factors would be absent. Other researchers assume that performance is better described by an additive function of A, M and O in which each antecedent will have a direct

contribution regardless of other antecedents: $P = f(A + M + O)$ (Boxall and Purcell, 2003). In the additive model, innovative work behavior would occur even when two of the components are absent, for example when an employee does not have any skills and resources for being innovative. In practice, it is often neither multiplicative nor additive but a combination of both (Bos-Nehles et al., 2013). For example, some authors argue that ability is a prerequisite for specific behavior to occur, while motivation and opportunity are essential but only after sufficient ability is ensured (e.g. Bos-Nehles et al., 2013).

In this study, teacher self-efficacy was used for ability to show innovative behavior. For motivation to show innovative work behavior, work engagement was used. Finally, for opportunity to show innovative work behavior, the JD-R model of Demerouti and Bakker (2003) was used to assess the perceived work environment.

2.2 Job Demands – Resources model

In order to show innovative behavior, teachers need support of their environment: job- and organizational-related factors influence employees' innovativeness (Shalley and Gilson, 2004). The Job Demands – Resources (JD-R) model of Demerouti and Bakker (2001) was used to assess the perceived work environment.

The JD-R model proposes that all job characteristics can be classified in two main categories: job demands and job resources. Job demands are the aspects of the job that require continuous effort and job resources are the aspects of the job that helps an employee to achieve their goals and to deal with job demands (Bakker and Demerouti, 2018).

2.2.1 Job demands and innovative work behavior

Job demands refer to *“those physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort”* (Bakker et al., 2004, p. 86). Based on literature on mental fatigue, the JD-R model assumes that demanding aspects of work lead to constant overtaxing and finally result in exhaustion (Bakker et al., 2004).

According to the distraction arousal theory (Teichner, Arees and Reilly, 1963) job demands decrease the level of innovative behavior. People have limited cognitive resources and they devote some of these resources to cope with job demands. When job demands are higher, more of these resources are devoted to these job demands, leaving fewer cognitive resources available for other tasks. Idea generation, promotion and realization also requires cognitive resources and thus authors argue that job demands lower innovative work behavior (e.g. Byron et al., 2010). Moreover, they argue that reduction of cognitive resources available results in the use of simpler cognitive strategies which are likely to result in the creation of more common, less original ideas (Byron et al., 2010; Staal, 2004).

In this study, the focus was on two job demands that are common for different kind of workplaces, namely red tape and work pressure, and two job demands that are specifically related to the education setting, namely student misbehavior and student diversity.

Red tape - rules, regulations, and procedures that remain in force and entail a compliance burden, but do not advance the legitimate purposes the rules were intended to serve - (Bozeman, 2000, p.12) is a common phenomenon in public services. The term red tape origins from early 18th century where red tape has been used to tie official documents (Bozemann, 1993). Red tape consists of two important components, namely compliance burden and lack of functionality (Van Loon et al., 2016). Compliance burden refers to the time and effort a person must put into complying with the rules. These rules might be complex or frustrating or may require excessive effort or time (Van Loon et al., 2016). Lack of functionality indicates whether the rules serve the purpose for what they intended to regulate, i.e. when the rules' perceived effectiveness is not high (Van Loon et al., 2016). Lack of functionality implies that only written and formalized rules is not enough (Borry, 2016). Several studies suggest that professionals in education increasingly must deal with administrative burden (Noordegraaf and Steijn, 2014; Steijn and Van der Voet, 2019). In the Netherlands, 44% of secondary school teachers perceive high or extremely high levels of administrative burden (Van den Berg et al., 2017).

Complying with rules and administrative tasks lead to less available resources for discretionary behavior. If these rules are not functional, performance will be reduced (Bozeman and Feeney, 2011; Foster & Jones, 1978). It is likely that scarcity of time and energy due to red tape results in using the remaining cognitive resources for completing formal tasks rather than engaging in activities beyond them, such as innovative behavior (Bozeman and Feeney, 2011). Hence, the hypothesis is:

H_{1a}: Red tape is negatively related to innovative work behavior.

Work pressure relates to quantitative aspects of demands in terms of the amount and pace of work (Van Woerkom et al., 2016). A high work pressure impedes teachers to improve their teaching practice (Tack and Vanderlinde, 2019). Educational researchers in different countries have reported an increasing workload in the teaching profession (Buchanan, 2010; Skaalvik and Skaalvik, 2017a). Research shows that four in five secondary school teachers in The Netherlands perceive a high to extremely high work pressure (Van den Berg, Van den Berg and Scheeren, 2017). According to Ohly, Sonnentag and Pluntke (2006), a mid-level of experienced work pressure has the highest positive relation with innovativeness, but too high work pressure leads to high level of stress which in turn reduces innovative behavior (Van Dyne, Lehn and Cummings, 2002). If employees experience high levels of work pressure, it is likely that they use routine actions to accomplish their required tasks because they are less likely to reflect on their working behavior, preventing them from creative experimentation. Moreover, innovative behavior may further increase work pressure because it is time consuming in the beginning. Therefore, the hypothesis is:

H_{1b}: Work pressure is negatively related to innovative work behavior.

Student misbehavior (also called discipline problems) and student diversity are job demands specifically related to the education setting. These job demands require a lot of energy that interfere with the learning processes and with teachers' goal attainment (Skaalvik and Skaalvik, 2016). A high level of student misbehavior and student diversity (e.g. there is a large difference between the weakest and strongest pupil in one class) require higher effort to sustain an expected performance level than

when these demands have a lower level (Hakanen et al., 2006). Numerous studies in education have shown that discipline problems and student diversity are associated with stress, lower levels of commitment and lower self-efficacy (Fernet et al., 2012; Hakanen et al., 2006; Skaalvik and Skaalvik, 2017a, 2018). This suggests that these job demands are perceived as stressful and may hinder extra-role performance such as innovative behavior (Fernet et al., 2012). The hypotheses are:

H_{1c}: Student misbehavior is negatively related to innovative work behavior.

H_{1d}: Student diversity is negatively related to innovative work behavior.

2.2.2 Job resources and innovative work behavior

Job resources are “those physical, psychological, social, or organizational aspects of the job that are either functional in achieving work goals, reduce job demands or stimulate personal growth and development” (Bakker et al., 2004, p.86).

Job resources are important predictors of extra-role performance, such as innovative behavior (Bakker et al., 2004). According to the JD-R model, a lack of job resources precludes actual goal accomplishment which in turn causes frustration and failure (Bakker et al., 2004). Employees cannot achieve their work goals and develop themselves further in their job when the environment lacks resources (Bakker et al., 2004). When organizations do not provide their employees with resources, employees will withdraw from their work and motivation and engagement will be reduced in the long-term (Bakker et al., 2004; Demerouti and Bakker, 2001). This in turn takes away one of the primary mechanisms by which innovative behavior is supported. Because innovative behavior is not formally rewarded, employees will most probably reduce their discretionary inputs on innovativeness in contrast to lower in-role performance, which do have formal consequences (Schnake, 1991). In this section, the relation between autonomy, social support and innovative work behavior will be discussed.

Autonomy is one of the main antecedents of innovative work behavior (Hammond et al., 2011). Autonomy refers to the degree of control of an employee over how to carry out their job (Hackman,

1980). Autonomy gives employees the opportunity to experiment with different methods and work approaches. It enables teachers to generate and implement new ideas in their teaching profession. Additionally, when employees have more control over carrying out the job, they feel more responsible for their work and will come up with new ideas to solve problems and implement new working approaches (Li, Huang and Tsai, 2009; Ohly et al., 2006). Thereby, when employees perceive more autonomy, they tend to participate more in knowledge sharing which can result in new practices (Cabrera, Collins and Salgado, 2006). Based on this, the following hypothesis was formulated:

H_{2a}: Autonomy is positively related to innovative work behavior.

Social interaction and support from colleagues and supervisors is another job resource that fosters innovative behavior (Messmann and Mulder, 2011). Positive communication and interaction with colleagues promote idea generation, but also idea promotion and sometimes idea realization (Messmann and Mulder, 2011). When employees discuss with each other how a common work-related problem can be approached, this is likely to result in new ideas. Additionally, communicating about experiences with a new working method and the steps that are necessary to realize an idea enhances idea promotion and idea realization respectively (Messmann and Mulder, 2011). Literature also emphasizes the importance of guidance, support and feedback from colleagues and supervisors (Binnewies and Gromer, 2012; Eteokleous, 2008; Noefer et al., 2009). These aspects do not only promote innovative work behavior, but a lack of guidance and support even hinder teacher innovative work behavior (Eteokleous, 2008; Mohammad and Harlech-Jones, 2008). Supervisory support and feedback can cause a feel of appraisal of an employee's work effort and affect idea generation, promotion and sometimes facilitates realization (Binnewies and Gromer, 2012; Noefer et al., 2009). Because innovative behavior is discretionary behavior and there are no guidelines about what is good or wrong, some feelings of uncertainty may appear. Supervisory support helps employees with higher self-efficacy beliefs and thus can mitigate the feelings of uncertainty (Stetz, Stetz and Bliese, 2006). Moreover, employees who felt valued by their organization have a higher affective attachment that in turn lead to proactive behavior (Noefer et al., 2009). This results in the following hypothesis:

2.3 Work engagement

Work engagement is defined as *“a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption”* (Schaufeli et al., 2002, p.74). Work engagement is a positive dimension of well-being and a cognitive-affective motivation at work (Agarwal, Datta and Blake-Bear, 2012; Maslach, Schaufeli and Leiter, 2001). Work engagement is characterized by high levels of energy and willing to do the work (vigor), enthusiasm and pride (dedication) and full concentration during work (absorption) (Maslach et al., 2001). In this study, work engagement is seen as a motivational antecedent of innovative work behavior. Work engagement is generally be regarded as a function of both job demands and job resources (e.g., Demerouti et al., 2001; Schaufeli and Bakker, 2004). This will be discussed in the following subsections.

2.3.1 Relation between JD-R and work engagement

Almost twenty years ago, the JD-R model was introduced to understand burnout, mental distancing (i.e. cynicism and lack of enthusiasm) and reduced personal efficacy (Schaufeli, 2017). Afterwards, the model was supplemented with work engagement. Nowadays, the JD-R model is often used in models to explain work engagement (e.g. De Spiegelaere et al., 2010; Hakanen et al., 2006; Huhtala and Parzefall, 2007).

The JD-R model integrates two basic psychological processes, namely the stress process and the motivational process (Schaufeli, 2017). The stress process is spared by excessive job demands and lacking resources. When job demands are too high and are not compensated by job resources, this may lead to negative outcomes such as low organizational commitment and engagement (Schaufeli, 2017). But there are also job demands that are perceived as hindrance demands, demands that hinder an individual to achieve his or her valued goals, which are likely to result in a lower level of work engagement (Cavanaugh, Boswell, Roehling and Boudreau, 2000). Although some individuals perceive a specific job demand as hindering, others may not. Therefore, the perception of the job demand is

important. As mentioned before, 44% of secondary school teachers in the Netherlands perceive high of extremely high levels of administrative burden and 80% perceive a high to extremely high work pressure (Van den Berg et al., 2017). These job demands inhibit a teacher's ability to achieve valued goals. Moreover, student misbehavior and student diversity interfere with the learning processes and with a teacher's goal attainment (Skaalvik and Skaalvik, 2016; Tack and Vanderlinde, 2019). All four demands can be perceived as undesirable constraints and emotional stress which hinders an individual to achieve his or her goals and, in turn, dedication, enthusiasm and vigor of a teacher for his or her job (Skaalvik and Skaalvik, 2016; Tack and Vanderlinde, 2019). They increase teachers' efforts to meet demands which induce mental and physical costs and in turn well-being (Dawson, O'Brien and Beehr, 2015). Thus, the hypothesis is:

H₃ : Job demands (a) red tape, (b) work pressure, (c) student misbehavior and (d) student diversity are negatively related to work engagement.

On the other hand, job resources have inherent motivational quality (Schaufeli, 2017). The motivational process is triggered by abundant job resources and leads to, among others, work engagement and extra-role behavior (Schaufeli, 2017). Work engagement is primarily promoted by those working conditions that support employees by building identification with and dedication to work. These working conditions are also called job resources. Based on the JD-R theory, job resources stimulate personal growth, learning and development and are functional in achieving work goals (Demerouti et al., 2001). They are necessary for achieving work goals and for dealing with job demands and foster intrinsic motivation. This in turn leads to a positive outcome for the employee, leading to engagement (Hakanen and Roodt, 2010).

Teaching experiences may be positively affected by job resources. Teacher autonomy may concern the freedom to choose teaching methods and educational strategies. Autonomous behavior has an internal perceived locus of causality and are often performed out of interest or personal importance (Skaalvik and Skaalvik, 2014). It is assumed that a teacher who has the freedom to choose teaching methods, goals and educational strategies is more dedicated and enthusiastic to his or her work.

Previous studies show that positive and supportive social relations are associated with the feeling of belonging and work engagement (Hakanen et al., 2006; Simbula, Guglielmi and Schaufeli, 2011; Skaalvik and Skaalvik, 2017a). Social support from both teacher's immediate supervisor and from close colleagues are positively associated with teacher's work engagement (Aldridge and Fraser, 2016; Skaalvik and Skaalvik, 2016). Therefore, the hypothesis is:

H₄: Job resources (a) autonomy and (b) social support are positively related to work engagement.

2.4 Teacher self-efficacy

In literature, occupational self-efficacy is defined as an individual's conviction that (s)he can cope with difficulties (s)he encounters in her or his job (Schyns and Von Collani, 2002). Bandura (1993) mentions that it is a form of self-evaluation that influences decisions about what behaviors to undertake and the amount of effort and persistence to put forth when faced with difficult or challenging situations. Occupational self-efficacy has often been studied in the context of educational improvements and teacher learning within schools (e.g. Runhaar, 2008; Tschannen-Moran and Woolfolk, 2001).

In an educational setting, occupational self-efficacy is called teacher self-efficacy. Teacher self-efficacy is defined as *"beliefs in their own capabilities to successfully perform specific teaching and learning related tasks within the context of their own classrooms"* (Dellinger et al., 2008, p. 751). Teacher self-efficacy is phrased in terms of *can do* rather than *will do*: the latter suggest an intention (Bandura, 2006). Research shows that teacher self-efficacy consists of three components (Skaalvik and Skaalvik, 2014, 2019; Tschannen-Moran and Woolfolk, 2001). First, the confidence in the ability to have students follow classroom rules or control disruptive behavior is an important part of teacher self-efficacy. The other two components are efficacy of student engagement and efficacy for instructional strategies. These are defined as the confidence in the ability to promote student understanding and motivation, and the confidence in the ability to use effective strategies for teaching respectively (Tschannen-Moran and Woolfolk, 2001).

2.4.1 Relation between JD-R and teacher self-efficacy

Based on Bandura's social cognitive theory, self-efficacy is influenced by conditions within the environment (Bandura, 1993). Self-efficacy depends on job demands which can cause physiological arousal, for example the perception of obstacles, time allocated to and difficulty of a task (Skaalvik and Skaalvik, 2016). Prior research show that student misbehavior is associated with lower teacher self-efficacy (Collie et al., 2012; Fernet et al., 2012; Klassen et al., 2012; Skaalvik and Skaalvik, 2016). They found that job demands that interfere with teachers' goal attainment and learning and instructional processes are most strongly related to teacher self-efficacy. The perception of job demands that hinders a teacher's teaching profession might result in less confidence in themselves and therefore lower teacher self-efficacy. Moreover, job demands related to the social-psychological aspects of teaching, such as managing student behavior and diversity, rather than instructional problems (e.g. teaching new material to students) decreases teacher self-efficacy because it is perceived as an overly challenging job demand (Dicke et al., 2018). This leads to the following hypothesis:

H₅ : Job demands (a) red tape, (b) work pressure, (c) student misbehavior and (d) student diversity are negatively related to teacher self-efficacy.

Job resources can improve teacher self-efficacy (e.g. Aldridge and Fraser, 2016; Tschannen-Moran and Woolfolk Hoy, 2007). When autonomy is high, employees view work outcomes as a result of their own efforts or initiatives, rather than instructions from someone else. Moreover, they have the feeling that management has confidence in them by giving them freedom to choose how to carry out the job. Consequently, employees perceive themselves as more capable and thereby increasing their self-efficacy (Wang and Netemeyer, 2002). Social support from colleagues and supervisors also contributes to self-efficacy. When a teacher receives verbal interactions about his or her performance, or prospects for success from colleagues and management, feeling of capability and thus self-efficacy increases.

This leads to the following hypothesis:

H₆ : Job resources (a) autonomy and (b) social support are positively related to teacher self-efficacy.

2.5 The relation between work engagement and innovative work behavior

Innovative work behavior is seen as discretionary behavior that goes beyond formal role expectations in that it is not explicitly expected of teachers (Janssen, 2000). Thus, motivation lies at the heart of innovative work behavior (Scott and Bruce, 1994).

Teachers emphasize that work engagement is necessary to become innovative (Georgsdottir and Getz, 2004; Messmann and Mulder, 2011; Shalley and Gilson, 2004). Engaged teachers are teachers with a high level of vigor and enthusiasm which initiate positive emotions in their work (Salanova, Schaufeli, Xanthopoulou and Bakker, 2010). According to the broaden and build theory these positive emotions enhance the creativity of thought (Fredrickson, 2000). Positive emotions generate non-specific, broadened cognitive changes and eventually may lead to behavioral changes (Fredrickson, 2000). Over time, these changes in thoughts and actions build long-term psychological, social and physical resources (Fredrickson, 2001). People who experience and express positive emotions more frequently are more resourceful (Lyubomirsky, King and Diener, 2003) and are more likely to function at optimal levels (Mauss et al., 2011). Moreover, positive emotions build and foster new ideas and result in a higher willingness to be innovative (Hakanen and Roodt, 2010). Innovative work behavior requires a certain level of internal force that pushes the employee to persevere in the face of challenges inherent in the creative work (Huhtala and Parzefall, 2007; Shalley and Gilson, 2004). It requires cognitive and emotional investments, so individuals must perceive pride in what they are doing, and regard the extra effort worthwhile (Agarwal et al., 2012). Additionally, idea generation, promotion and implementation require teachers to concentrate and become absorbed in their work (Agarwal et al., 2012). Thus, vigor (high levels of energy), absorption (being fully concentrated during work) and dedication (a sense of likeability and pride) is required to embrace an innovative work approach. This is in line with research of Bakker and Bal (2010) who found positive correlations between the three dimensions of work engagement and innovative behavior: engaged teachers are more innovative (Konermann, 2011). Hence, the hypothesis is:

H₇ : Work engagement is positively related to innovative work behavior.

2.6 The relation between teacher self-efficacy and innovative work behavior

Teacher self-efficacy is assumed to have a positive effect on innovative work behavior (e.g. Runhaar, 2008; Thurlings et al., 2015). According to Bandura's (1993) social cognitive theory, human functioning is a dynamic interplay of personal, behavioral and environmental influences. Central within this theory is the idea that behavior is influenced by *"people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances"* (Bandura, 1986, p.391). Bandura (1986) termed such judgment 'self-efficacy' and argued that actions are better predicted by what people believe they can achieve than by their objective capabilities. According to the social cognitive theory, self-efficacy beliefs influence our choices, persistence and effort (Bandura, 1993). It guides the choice of activities that one is willing to undertake (Carmeli and Schaubroeck, 2007).

Innovative work behavior can be accompanied by feelings of uncertainty and can be perceived as difficult (Carmeli and Schaubroeck, 2007; Hsiao et al., 2014). Higher self-efficacy makes it possible to better cope with these negative side effects of innovative work behavior. Individuals with a higher level of self-efficacy have more control over one's actions and feel better equipped to address the challenges and uncertainty that comes along with generating and implementing new ideas in the workplace (Richter et al., 2012). They perceive difficult situations as challenges to be mastered rather than threats to be avoided (Bandura, 1993). They will tend to undertake activities that are comprised of new and creative practices and approaches problem solving in a more innovative rather than patterned way (Bandura, 1993). Additionally, individuals high in self-efficacy feel more confident in their skills and knowledge to generate and implement ideas and thus are more likely to choose to engage in innovative behavior (Newman et al., 2018). Moreover, employees' confidence in their personal ability to achieve goals facilitate their creativity by enabling them to devote their energy and time to their work (Zhang and Bartol, 2010). Finally, individuals generally tend to return to behaviors they are familiar with (Kwasnicka et al., 2016). Low self-efficacy increases the chance of returning to

original behaviors and so decreases the chance of employing new, innovative behavior (Kwasnicka et al., 2016). Therefore, the hypothesis is:

H₈ : Teacher self-efficacy is positively related to innovative work behavior.

2.7 Mediating effects of work engagement and teacher self-efficacy on the relation between JD-R and innovative work behavior

In recent years, work engagement has been shown to be an important mediator on the relation between JD-R and organizational outcomes (Bakker and Xanthopoulou, 2013; De Spiegelaere et al., 2014). Following the JD-R model assumptions, employees often feel more positive about their work and in return are more likely to engage in activities that are beyond the formal task descriptions when both job resources and job demands are high (Bakker et al., 2004). Innovative work behavior is one of those discretionary behaviors (Welch, 2011). If schools send out signals of commitment toward their teachers, these teachers will reciprocate with higher levels of discretionary behaviors such as innovative work behavior (Bos-Nehles and Veenendaal, 2019; Wright and Nishii, 2013). For example, access to training and development programs can improve a teacher's skills and abilities (in this study self-efficacy) while support and availability of resources can increase motivation (in this study work engagement).

A supportive work environment (characterised by job demands and job resources) influences employees' well-being and motivation (Bakker et al., 2004; Dediu, Leka and Jain, 2018; De Spiegelaere et al., 2014; Shalley and Gilson, 2004). Job demands and resources are two significant constructs that determine the level of work engagement (Bakker et al., 2004). Job- and organizational-related factors influence employees' innovative behavior often indirectly with individual characteristics (Shalley and Gilson, 2004). Research on innovative work behavior frequently assume that antecedents as autonomy foster innovative work behavior through increased levels of work engagement (Shalley and Gilson, 2004; Shalley, Zhou and Oldham, 2004). In the same way, high job demands such as work pressure hinder innovative work behavior through decreased levels of work engagement. For example, when

resources are high, employees are more positive about their work and consequently are more likely to engage in extra-role activities such as innovative behavior (Organ, 1988). Job resources do not only enable employees to be innovative, but it also fosters their overall motivation and engagement (De Spiegelaere et al., 2014). On the other hand, job demands that are considered as stressors negatively affect work engagement (Byron et al., 2010; Huhtala and Parzefall, 2007). Amabile et al. (2005) demonstrate that the more positive the employee is about his or her work environment, the higher work engagement is which in turn promotes creative thinking and innovativeness (Eisenberger and Aselage, 2009). In other words, it is through work engagement that job demands and job resources affect innovative work behavior. The corresponding hypotheses are:

H₉ : Work engagement mediates the negative relation between job demands and innovative work behavior.

H₁₀ : Work engagement mediates the positive relation between job resources and innovative work behavior.

Similarly to work engagement, I argue that teacher self-efficacy mediates the relation between JD-R and innovative work behavior. As discussed, the work environment can be an important factor in explaining innovative work behavior. However, only a supportive work environment is not enough (Boxall and Purcell, 2008). An individual needs to be able to be innovative. When teacher self-efficacy is low, a supportive work environment might not be sufficient for innovative work behavior. In other words: an optimal work environment will not lead to innovative work behavior as long as the individual has not the confidence in the ability for showing innovative work behavior. Bandura (1997) highlighted that employees review the effects of their actions which lead to new experiences. and the interpretation of these effects help to create their self-efficacy beliefs. Job demands and job resources contribute to or trigger new practices, and thus new experiences are affected by the work environment (Skaalvik and Skaalvik, 2019). Job demands that interfere with the instructional and learning process (e.g. student misbehavior and student diversity) or with teachers' goal attainment are strongly related

to teacher self-efficacy (Skaalvik and Skaalvik, 2019). For example, teaching experiences are negatively affected by student misbehavior and high work pressure (Collie et al., 2012; Skaalvik and Skaalvik, 2016, 2019). Several authors show that student misbehavior in turn is associated with lower teacher self-efficacy (Collie et al., 2012; Fernet et al., 2012; Skaalvik and Skaalvik 2016, 2019). On the other hand, job resources positively affect teaching experiences. For example, supportive relations are associated with feeling of belonging and job satisfaction (Hakanen et al., 2006; Skaalvik and Skaalvik, 2017a). These positive experiences are positively associated with teacher self-efficacy (Aldridge and Fraser, 2016; Tschannen-Moran and Woolfolk, 2007). In other words, it is through teacher self-efficacy that job demands, and job resources affect innovative work behavior. Hence, the hypotheses are:

H₁₁ : Teacher self-efficacy mediates the negative relation between job demands and innovative work behavior.

H₁₂ : Teacher self-efficacy mediates the positive relation between job resources and innovative work behavior.

2.8 Moderating effects of HC-HRM on the relation between JD-R, work engagement and teacher self-efficacy

High-Commitment Human Resource Management (HC-HRM) is a combination of HR practices to enhance employees' levels of motivation, skill, empowerment and information (Whitener, 2001). Human resource practices can be classified as "commitment" or "control" practices (Whitener, 2001; Wood and De Menezes, 1998). Control practices are rules, sanctions and rewards that aim to increase employees' efficiency, rely on strict work procedures and base rewards on outputs (Arthur, 1994). In contrast, commitment practices aim to increase effectiveness and productivity by providing conditions that encourage employees to identify with the organization's goals (Arthur, 1994). HC-HRM creates opportunities for each employee such that the employee can give their best performance for the organization (Gould-Williams, 2004). HC-HRM practices include among others, training and development, competitive compensation, recruitment and selection, and employee empowerment.

These practices influence employees' motivation and skills and allow them to improve job performance (Koneremann, 2011).

2.8.1 JD-R, work engagement and the moderating role of HC-HRM

HC-HRM influences how employees perceive their work environment, in particular employees' perceptions of job demands and job resources (Van de Voorde, Van Veldhoven and Veld, 2016). Employees feel more supported when they perceive HC-HRM high. Because of this support, employees believe that they are better able to cope with difficulties caused by job demands than when this support was not perceived (Koneremann, 2011). Moreover, employees are rewarded for their contribution towards the organization, and thus implicitly for dealing with specific job demands. Thereby, HC-HRM leads to positive perceptions of employees about their organization and these are interpreted by employees as signals of personified organization's commitment to them, which leads to more appreciation and exploitation of the available job resources (Bos-Nehles and Veenendaal, 2019). Furthermore, based on the social exchange theory which assumes that employees tend to return the organizations' favors when they perceive the organization to be supporting, employees will reciprocate with higher willingness to deal with job demands (Boon and Kalshoven, 2014; Bos-Nehles and Veenendaal, 2019). Finally, when employees perceive training and development opportunities as valuable and helpful, they will feel better prepared for coping with job demands and feel more appreciated for the job resources. If employees do not have the training, skills or knowledge on how to exploit job resources, it will have a less positive effect on work engagement than when they do have these skills. In this way, HC-HRM mitigates the negative effect of job demands on work engagement and fosters the positive effect of job resources on work engagement. In other words, in a high HC-HRM environment, job demands will less harm the vigor, dedication and absorption of teachers in their work and job resources will foster the vigor, dedication and absorption of teachers in their work, compared to work environments that are characterized by low HC-HRM. This resulted in the following hypotheses:

H₁₃ : HC-HRM moderates the relation between job demands (a) red tape, (b) work pressure, (c) student misbehavior and (d) student diversity and work engagement such that the negative relation is weaker when HC-HRM is high.

H₁₄ : HC-HRM moderates the relation between job demands (a) autonomy and (b) social support and work engagement such that the positive relation is stronger when HC-HRM is high.

2.8.2 JD-R, teacher self-efficacy and the moderating role of HC-HRM

HC-HRM, such as employee empowerment and training and development, enables and stimulates employees to take more self-control and increases self-efficacy (Tuckey, Bakker and Dollard, 2012). Moreover, these practices can extend employees' range of skills in their job. HC-HRM can improve teachers' performance and can help them to use their own skills and knowledge for fulfilling tasks. For example, training and development can learn teachers how to deal with job demands. With these new skills or knowledge, they are able to perform their tasks easier while facing job demands and they will reflect this feeling of success on themselves, resulting in more self-efficacy (Tuckey et al., 2012). In other words, when employees find it difficult to deal with job demands and do not feel supported by their organization, they feel helpless which decreases self-efficacy (Rheman and Ahmad, 2015). Further, HC-HRM stimulates employees to take more self-control through which employees are able to better exploit job resources, such as autonomy (Tuckey et al., 2012). This in turns will be positively reflected on employee's self-efficacy. Hence, the corresponding hypotheses are:

H₁₅ : HC-HRM moderates the relation between job demands (a) red tape, (b) work pressure, (c) student misbehavior and (d) student diversity and teacher self-efficacy such that the negative relation is weaker when HC-HRM is high.

H₁₆ : HC-HRM moderates the relation between job demands (a) autonomy and (b) social support and teacher self-efficacy such that the positive relation is stronger when HC-HRM is high.

3. Methodology

This chapter describes the research methodology. It provides an overview of the research design and procedure, followed by a sample description. Further, the measurement instruments will be discussed, and an overview of the data analyses will be given.

3.1 Research design and procedure

This study was based on quantitative data from secondary school teachers in The Netherlands. The sampling procedure belonged to non-probability sampling. Teachers received by email, either via the network of the researcher or indirectly via school management, an invitation to participate in this research. The questionnaire was written in Dutch. Because most items had to be translated from English to Dutch, the translated items were reviewed by the supervisor of this project. Before the final version was sent, a pre-test was held among five teachers to guarantee that all statements were unambiguous and that the software worked well. The questionnaire consisted of three parts: an introduction, questions about the constructs and social-demographic measures. The questionnaire ended with social-demographic measures, since participants might be convinced about the legitimacy of the study and therefore were more tended to share personal information (Oppenheim, 1986). Participants were kindly requested to fill in and submit the questionnaire between February 19th 2020 and March 16th 2020. A reminder was sent on March 6th 2020. Participants who did not fill in the entire questionnaire or wrongly answered the control question were excluded from analysis.

3.2 Respondents

In total, 86 respondents participated in the questionnaire. Two out of 86 participants (2,3%) who started the survey answered 'no' on the first question (*"Are you currently a teacher in secondary school?"*) and thus were excluded from analysis. Moreover, four of the participants (4,7%) did not fill in the entire survey. Because more than half of the data was missing, I decided to exclude these participants from analysis. This resulted in a final sample of 80 teachers (93.0%). 51% of the respondents was female. The average age was 41.38 years (SD = 11.46 years). Teaching experience varied from less than

or equal to five years (8.8%), 6-10 years (28.7%), 11-15 years (23.8%), 16-20 years (18.8%), 21-30 years (12.5%), to more than 30 years (6.3%). 38.7 % of the respondents were allowed to teach upper classes at secondary high school (in Dutch: eerstegraads bevoegd), 53.8% teaches lower classes at secondary school (in Dutch: tweedegraads bevoegd) and 7.5% were officially not (yet) allowed to teach. Further, most respondents taught an exact course (40.0%; e.g. mathematics, science and technology) or a language (31.3%; e.g. Dutch, English or French).

3.3 Measures

This section describes how the constructs were measured. For each construct, the internal consistency reliability was calculated. Internal consistency reliability refers to the extent to which all individual items of a measurement instrument measure the same underlying construct (Tavakol and Dennick, 2011). In this study, Cronbach’s alpha (α) is used to measure the internal consistency of a construct (Sekaran and Bougie, 2009). Based on the following rules of thumb (Table 1), I decided that the internal consistency is assumed to be sufficient if $\alpha \geq .7$ (Sekaran and Bougie, 2009).

Cronbach’s alpha (α)	Internal consistency
$.9 \leq \alpha \leq 1$	Excellent
$.8 \leq \alpha < .9$	Good
$.7 \leq \alpha < .8$	Acceptable
$.6 \leq \alpha < .7$	Questionable
$.5 \leq \alpha < .6$	Poor
$\alpha < .5$	Unacceptable

Table 1: Rules of thumb for Cronbach’s alpha (α)

3.3.1 Job demands

Red tape was measured by nine items based on a validated scale of Van Loon et al., 2016. Four items related to lack of functionality and five items evaluated compliance burden. Sample items for lack of functionality are “*The rules which I have to comply in my core activities help me do my job well*” and “*The rules which I have to comply in my core activities serve a useful purpose*”. Sample items for compliance burden are “*The rules which I have to comply in my core activities cause a lot of frustration*” and “*The rules which I have to comply in my core activities cause a lot of delay*”. Items were scored on

a 7-point scale (1 = totally disagree, 7 = totally agree). The reliability of both lack of functionality and compliance burden was sufficient (respectively $\alpha = 0.89$ and $\alpha = 0.81$). Based on the definition of red tape, which is considered as the situation in which both lack of functionality and compliance burden are high, the score on lack of functionality and compliance burden were multiplied (Van Loon et al., 2016).

Work pressure was measured by five items based on the eleven-item scale of Van Veldhoven and Meijman (1994). A sample item is *“My work requires working very hard”*. Items were rated on a 5-point scale (1 = never, 5 = always). The reliability was sufficient ($\alpha = .80$).

Student misbehavior and **student diversity** were both operationalized by three items based on a questionnaire of Skaalvik and Skaalvik (2019). Sample items are respectively *“Some students with behavior problems make it difficult to carry out lessons as planned”* and *“In my classes there is a huge difference between the best and the poorest students”*. Both constructs were measured on a 7-point scale (1 = totally disagree, 7 = totally agree). The reliability for student misbehaviour and student diversity was sufficient (respectively $\alpha = .94$ and $\alpha = .77$).

3.3.2 Job resources

Autonomy was measured with a short scale of three items developed by Bakker et al. (2004). The questions referred to decision authority, such as *“On my job, I have freedom to decide how I do my work”* (1 = totally disagree, 7 = totally agree). The reliability for the three items construct was not sufficient (Cronbach’s $\alpha = .64$). Although deleting one item would mean that the construct would consist of only two items, it was decided to delete the third item. This resulted in Cronbach’s $\alpha = .88$.

Social support (both from colleagues and supervisors) was measured using six items from the questionnaire of Van Veldhoven and Meijman (1994). Sample items are *“Can you ask your colleagues for help if necessary?”* and *“Do you feel appreciated for your work by your direct supervisor(s)?”* (1 = never, 5 = always). The reliability was sufficient ($\alpha = .73$).

3.3.3 Work engagement

Work engagement included nine measures divided among three dimensions: vigor, dedication and absorption. The scale is validated by reducing the Utrecht Work Engagement Scale from seventeen to nine items by using confirmatory factor analysis (Schaufeli et al., 2002). Sample items are *“At my work, I feel bursting with energy”*, *“I am proud on the work that I do”* and *“I feel happy when I am working intensely”* (1 totally disagree, 7 = totally agree). The reliability was sufficient (Cronbach’s $\alpha = .88$).

3.3.4 Teacher self-efficacy

Teacher self-efficacy was measured using the short form of Teachers’ Self-Efficacy Scale (TSES) (Tschannen-Moran and Woolfolk Hoy, 2001). It consists of three factors that measures a teacher’s confidence i) to manage the classroom (e.g. *“I can control disruptive behavior in the classroom”*) ii) to use instructional strategies (*“I can provide an alternative explanation for example when students are confused”*) and iii) to increase student engagement (*“I can get students to believe they can do well in school work”*). These items measure teachers’ beliefs in their capabilities to carry out specific tasks. The items were answered on a 7-point scale (1 = totally uncertain, 7 = totally certain). The reliability was sufficient ($\alpha = .93$).

3.3.5 HC-HRM

HC-HRM was measured using fourteen items from the scale developed by Sanders, Dorenbosch and De Reuver (2008). This scale measures HC-HRM from an employee’s perspective. Items were related to i) training and Development, ii) competitive compensation, iii) recruitment and Selection and iv) employee empowerment (Yousaf, Sanders and Yustantio, 2018). Examples are: *“ I am given a real opportunity to improve my skills through education and training programs”*, *“There is a strong link between how well I perform in my job and the likelihood of receiving recognition and praise”*, *“This organization prefers to promote from within”* and *“I am provided the opportunity to suggest improvements in the way things are done”* (1 totally disagree, 7 = totally agree). The reliability was sufficient ($\alpha = .73$).

3.3.6 Innovative work behavior

Innovative work behavior was measured with a validated questionnaire developed by Janssen (2003). Nine items were distributed across three items: idea generation, idea promotion and idea realization. Sample items are *“Searching out new working methods, techniques or instruments”*, *“Making important organizational members enthusiastic for innovative ideas”* and *“Introducing innovative ideas into the work environment in a systematic way”* (1 = never, 5 = always). Janssen (2003) found high intercorrelations between the subscales and therefore an overall scale of innovative work behavior is created. The reliability was sufficient ($\alpha = .93$).

3.3.7 Control variables

Gender and age were considered as control variables because they are generally considered to be important controls in innovative work behavior literature (e.g., Janssen, 2003, 2004). In a secondary school setting, differences among courses or lower and upper classes might play a role as well. Additional analyses were used to see whether there were differences in means (see Appendix 2). Although there were some small differences in the mean level of innovative work behavior among groups, sample size was rather small to test if these differences were significant and therefore these were not included in the regression analyses. Regression analyses with and without control variables gender and age were performed. Since there were no large differences between the results, I decided to perform the analyses without control variables because of the complexity of the model in combination with sample size. Hence, all the analyses in Section 4 were performed without control variables.

3.4 Data analysis

The survey was analysed using quantitative research analysis. IBM SPSS Statistics 26 was used for the statistical analysis of the data.

3.4.1 Data preparation

Before starting the analyses, data was checked on missing values or outliers. As mentioned in Section 3.2, four individuals filled in only half of the questionnaire and were therefore excluded from analysis. There were no outliers or other unrealistic values. Further, all items were transformed from string to numerical values based on the following scheme (Table 2):

Original value	New value	Original Value	New value
Fully disagree	1	Never	1
Disagree	2	Seldom	2
More or less disagree	3	Sometimes	3
Neutral	4	Often	4
More or less agree	5	Always	5
Agree	6		
Fully agree	7		

Table 2: Scheme for transforming items

Further, the following items were reversed (Table 3).

Construct	Item
Lack of functionality	LF_1, LF_2, LF_3, LF_4
Compliance burden	CB_2
Work pressure	WP_4

Table 3: Reversed items per construct.

3.4.2 Method of analysis

Figure 2 shows the conceptual framework that was analysed in this study. To test the hypotheses, several hierarchical regression models were used. It is important to note that the conceptual model, due to its complexity, was divided into sub models in order to estimate regression coefficients.

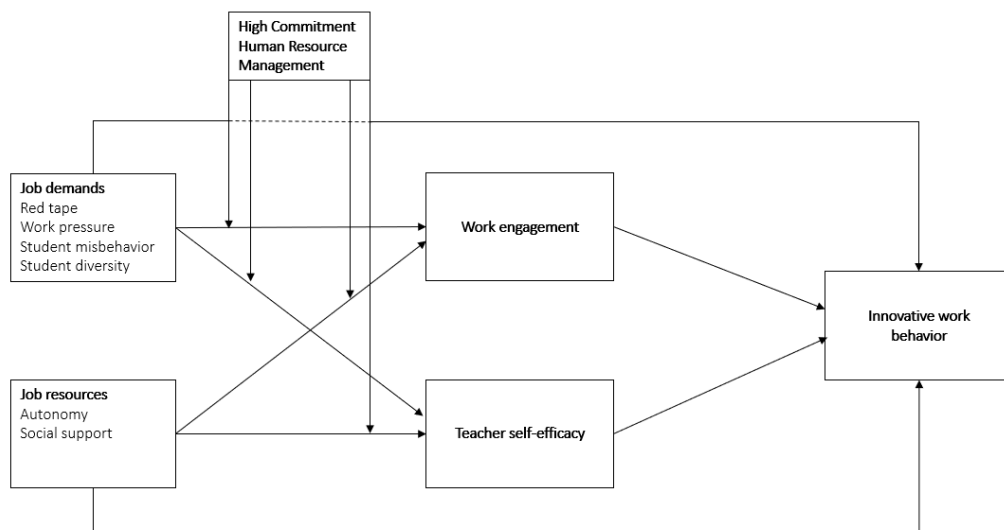


Figure 2: Conceptual framework

For the relation between JD-R and work engagement or teacher self-efficacy, a multiple linear regression was used. The same held for the relation between work engagement, teacher self-efficacy and innovative work behavior. For the moderation and mediation effects, this study used the PROCESS macro in SPSS developed by Hayes (2013). This resulted in simple mediation, simple moderation and first stage moderated mediation using respectively Model 1, 4 and 7 of the PROCESS macro. All of these models are based on Ordinary Least Squares (OLS) regression.

Before running the multiple regression analyses, it was checked for normality, linearity, independence of the error term and homoskedasticity (Hair et al., 2014). According to the Central Limit Theorem, which implies that whenever the sample size is larger than 30, the means approximate a normal distribution and thus the assumption of normality is met. Linearity was tested by creating added-variable plots. In all added-variable plots, there was no evidence that the data points did show a non-linear relationship. The assumption of independence of the error term was violated since the error term includes all omitted variables and residuals are by construction uncorrelated with the independent variables (Gelper, 2017). Consequently, the regression parameters cannot be interpreted as causal effects. The final assumption of heteroskedasticity was tested by the Breusch-Pagan (BP) test (Hair et al., 2014). When the BP test is significant, this indicates heteroskedasticity and thus heteroskedasticity-consistent standard errors were reported. Additionally, I checked for multicollinearity by using the Variance Inflation Factor. The rule of thumb I used was that whenever the VIF values are below two, multicollinearity is not a problem (O'Brien, 2007).

For mediation analysis, I used bootstrapping with 5,000 samples rather than the Sobel test (Sobel, 1982) because bootstrapping makes fewer unrealistic assumptions about the shape of the sampling distribution of the indirect effect, and is more powerful (Hayes, 2013; Williams and MacKinnon, 2008). More information about these models is given in Section 4.

Summarized, the hypotheses were tested using the following methods (Table 4):

Hypothesis	Method
H ₁ – H ₆	Multiple linear regression model
H ₇ – H ₁₂	Simple mediation model (Model 4 of Hayes, 2013)
H ₁₃ – H ₁₆	Simple moderation model (Model 1 of Hayes, 2013)
<i>Additional</i>	First stage moderated mediation (Model 7 of Hayes, 2013)

Table 4: Method of analysis

4. Results

This chapter provides both descriptive statistics and regression analyses results derived from the collected data. Based on the regression results, the hypotheses were either confirmed or rejected.

4.1 Descriptive statistics

Table 5 gives an overview of the descriptive statistics of the research constructs. Of all job demands, student diversity seemed on average most prominent ($M = 5.59$, $SD = .98$). Of all job resource, autonomy had the highest mean ($M = 5.19$, $SD = 1.08$). The mediators work engagement and teacher self-efficacy had an average score of 3.74 (out of 5.00) and 5.57 (out of 7.00) respectively. Finally, the average value of the dependent variable innovative work behavior was slightly higher than the midpoint of the scale ($M = 3.05$, $SD = .62$).

Descriptive statistics					
<i>Construct</i>	<i>Mean</i>	<i>SD</i>	<i>Min.</i>	<i>Max.</i>	<i>Answer range</i>
Job demands					
Red tape	14.21	7.38	4.00	36.00	1-49
Work pressure	3.43	.54	2.40	4.80	1-5
Student misbehavior	4.97	1.59	1.67	7.00	1-7
Student diversity	5.59	.98	2.67	7.00	1-7
Job resources					
Autonomy	5.19	1.08	2.00	7.00	1-7
Social support	3.81	.45	2.83	5.00	1-5
HC-HRM	4.28	.65	2.64	5.57	1-7
Work engagement	3.74	.46	2.56	5.00	1-5
Teacher self-efficacy	5.57	.76	3.08	7.00	1-7
Innovative work behavior	3.05	.62	2.00	5.00	1-5

Table 5: Descriptive statistics ($n=80$)

Table 6 shows the correlation among the constructs. Pearson's correlation coefficient (r) gives an indication of the linear relation between two metric variables (Nieuwenhuis, 2009).

Student misbehavior was negatively related to innovative work behavior ($r = -.28, p < .05$). Social support from colleagues and HC-HRM were positively related to innovative work behavior (respectively, $r = .25, p < .05$; $r = .31, p < .01$). Moreover, work engagement and teacher self-efficacy were positively related to innovative work behavior (respectively $r = .55, p < .01$; $r = .56, p < .01$).

Work engagement and teacher self-efficacy were positively correlated ($r = .56, p < .01$). Student misbehaviour and work engagement were negatively correlated ($r = -.24, p < .05$) while student diversity and work engagement were positively correlated ($r = .27, p < .05$). Social support and HC-HRM were both positive correlated with work engagement (respectively $r = .23, p < .05$ and $r = .31, p < .01$). Teacher self-efficacy was negatively correlated with both red tape and student misbehaviour (respectively $r = -.24, p < .05$ and $r = -.45, p < .01$) and positively correlated with social support ($r = .22, p < .05$) and HC-HRM ($r = .30, p < .01$).

Pearson's correlation matrix

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Innovative work behavior	-									
2. Work engagement	.55**	-								
3. Self-efficacy	.56**	.56**	-							
4. Red tape	.03	-.07	-.24*	-						
5. Work pressure	.10	.19	.02	-.07	-					
6. Student misbehavior	-.28*	-.24*	-.46**	.02	.06	-				
7. Student diversity	.00	.27*	-.07	.02	.31**	.40**	-			
8. Autonomy	-.13	.08	-.00	-.41**	-.30**	-.06	-.16	-		
9. Social support	.23*	.49**	.22*	.11	-.02	-.17	-.04	.25*	-	
10. HC-HRM	.31**	.53**	.40**	.13	.12	.05	.17	.17	.57**	-

Table 6: Pearson's correlation matrix ($n = 80$).

* Significant at the .05 level (2-tailed). ** Significant at the .01 level (2-tailed).

4.2 Regression results

4.2.1 Job demands, job resources and innovative work behavior

Multiple regression models were used to test whether job demands - a) red tape, b) work pressure, c) student misbehavior and d) student diversity - are negatively related to innovative work behavior (**Hypothesis 1**) and whether job resources - a) autonomy and b) social support - are positively related to innovative work behavior (**Hypothesis 2**).

Model 1 in Table 7 was used to test the relation between job demands and innovative work behavior. H_{1a} and H_{1b} were not confirmed. Neither red tape nor work pressure were related to innovative work behavior. Student misbehavior was negatively related to innovative work behavior ($B = -.13, p = .009$), confirming H_{1c} . Student diversity was positively related to innovative work behavior ($B = .06, p = .043$), thus in the opposite direction than proposed in H_{1d} .

Model 2 in Table 7 shows the relations between job resources and innovative work behavior. Autonomy was not related to innovative work behavior. Hence, H_{2a} was not confirmed. Social support was positively related to innovative work behavior, which confirmed H_{2b} ($B = .34, p = .028$).

These results were in line with a multiple linear regression in which there was controlled for both job demands and job resources (Model 3). All VIF-values were below two and therefore multicollinearity was not a problem (O'Brien, 2007).

Results multiple linear regression

DV: Innovative work behavior

	<i>Model 1</i>			<i>Model 2</i>			<i>Model 3</i>		
	<i>R² = .10</i>			<i>R² = .05</i>			<i>R² = .12</i>		
	<i>B</i>	<i>S.E</i>	<i>p</i>	<i>B</i>	<i>S.E</i>	<i>p</i>	<i>B</i>	<i>S.E</i>	<i>p</i>
Job demands									
Red tape	.003	.01	.752				-.001	.01	.904
Work pressure	-.10	.13	.440				.05	.14	.707
Student misbehavior	-.13	.05	.009				-.12	.05	.015
Student diversity	.06	.03	.043				.06	.04	.046
Job resources									
Autonomy				-.10	.07	.133	-.09	.08	.234
Social support				.34	.15	.028	.31	.17	.038
<i>Model significance</i>	<i>F = 2.94, p = .026</i>			<i>F = 2.73, p = .01</i>			<i>F = 3.53, p = .004</i>		
<i>Breusch-Pagan test</i>	<i>BP = 6.64, p = .156</i>			<i>BP = 5.97, p = .051</i>			<i>BP = 7.92, p = .224</i>		

Table 7: Results multiple linear regression on innovative work behavior.

4.2.2 Job demands, job resources, work engagement and teacher self-efficacy

The relation between job demands and job resources on work engagement (respectively **Hypothesis 3** and **Hypothesis 4**) and teacher self-efficacy (respectively **Hypothesis 5** and **Hypothesis 6**) was tested using multiple linear regression models. The results are shown in Table 8. When the Breusch-Pagan indicated heteroskedasticity, the heteroskedasticity-consistent standard errors and p-values were reported (see Appendix 3 for the results of the Breusch-Pagan tests). Although Pearson’s correlation matrix (Table 6) shows some correlation between the independent variables, all VIF-values were below two and therefore multicollinearity was not a problem (O’Brien, 2007).

Results multiple linear regression

	DV: Work engagement			DV: Teacher self-efficacy		
	<i>B</i>	<i>S.E</i>	<i>p</i>	<i>B</i>	<i>S.E</i>	<i>p</i>
Job demands						
Red tape	-.01	.01	.583	-.02	.01	.016
Work pressure	.07	.10	.458	-.01	.15	.964
Student misbehavior	-.12	.04	.006	-.25	.06	< .001
Student diversity	.20	.06	.001	.12	.08	.140
	<i>F = 4.84, p = .002, R² = .23</i>			<i>F = 4.82, p = .002, R² = .29</i>		
Job resources						
Autonomy	-.02	.08	.830	-.04	.08	.608
Social support	.51	.13	< .001	.40	.19	.042
	<i>F = 9.02, p < .001, R² = .24</i>			<i>F = 2.54, p = .047, R² = .05</i>		

Table 8: Results multiple regression JD-R on work engagement and teacher self-efficacy

There was no negative relation between red tape and work pressure on work engagement, so H_{3a} and H_{3b} were not confirmed. Student misbehavior was negatively related to work engagement (B = -.12, p = .006), which confirmed H_{3c}. Student diversity was positively related to work engagement (B = .20, p = .001), which was not in line with H_{3d}. From job resources, autonomy was not positively related to work engagement and thus H_{4a} was not supported. Further, social support was positively related to work engagement (B = .51, p < .001) and thus H_{4b} was confirmed. These results were also found in a model that controlled for both job demands and job resources (see Appendix 3).

Both red tape and student misbehavior were negatively related to teacher self-efficacy (B = -.02, p = .016 and B = -.25, p < .001 respectively), which confirmed H_{5a} and H_{5c}. However, there was not enough evidence that work pressure (H_{5b}) and student diversity (H_{5d}) were negatively related to teacher self-efficacy. Autonomy was not positively related to teacher self-efficacy, and thus H_{6a} was not confirmed. Social support was positively significantly related to teacher self-efficacy (B = .40 p = .042) which confirmed H_{6b}. However, when both job demands and job resources were included, the positive effect of social support on teacher self-efficacy was marginally significant (B = .35, p = .055, see Appendix 3).

4.2.3 Work engagement, teacher self-efficacy and innovative work behavior

To test whether work engagement and teacher self-efficacy were positively related to innovative work behavior (respectively **Hypothesis 7** and **Hypothesis 8**), the results of a simple mediation model were used, see Table 9 and Table 10. Path *b* indicates the direct effect of work engagement or teacher self-efficacy on innovative work behavior. Work engagement had a positive significant effect on innovative work behavior ($p < .001$), which confirmed H_7 . Additionally, we concluded that teacher self-efficacy increased innovative work behavior among teachers ($p < .001$) and thus, H_8 was also confirmed. The estimates had slightly different values because simple mediation regression analyses were executed for each independent variable based on a 5,000-sample bootstrap, and thus the estimate can fluctuate. However, in all situations work engagement and teacher self-efficacy positively significantly contributed to innovative work behavior.

4.2.4 Mediation of work engagement on the relation between job demands, job resources and innovative work behavior.

To test whether work engagement mediated the relation between job demands, job resources and innovative work behavior (respectively **Hypothesis 9** and **Hypothesis 10**), simple mediation analyses were performed. For all job demands and job resources (independent variables, IVs) simple mediation analyses with bootstrapping were performed with work engagement as mediator (M) and innovative work behavior as dependent variable (DV). These mediation analyses were performed according to Model 4 of the PROCESS analysis of Hayes (Hayes, 2013). This model is illustrated in Figure 3 and was performed for each independent variable. The model involves three paths. Path *a* represents the assumption that the IV is antecedent to M, whereas path *b* represents the assumption that M is antecedent to the DV. The indirect effect of the IV on the DV is calculated as the product of paths *a* and *b*. Path *c'* shows the direct effect of the IV on the DV after controlling for the proposed mediation. According to Hayes (2018) a mediation hypothesis is tested by estimating an inference about the indirect effect (product of paths *a* and *b*). An indirect effect quantifies the difference in DV attributable to a one-unit change in IV through the effect of IV on M, which in turns affects DV (Hayes, 2018).

Modern thinking about mediation analysis does not impose the requirement that there is a significant direct relation between IV and DV (Darlington and Hayes, 2017; Hayes, 2009; Hayes, 2018).

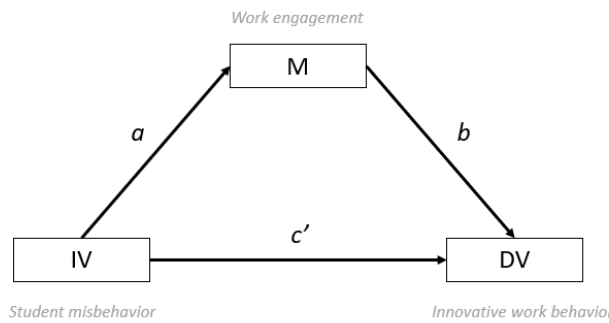


Figure 3: Simple mediation model (Model 4 in PROCESS analysis of Hayes, 2013)
In grey: example variables

Table 9 shows the results of the simple mediation analysis with work engagement as a mediator. Based on the 95% bootstrap confidence interval for the indirect effect (with 5,000 bootstrap samples), work engagement did not mediate the relation between red tape or work pressure on innovative work behavior. Therefore, H_{9a} and H_{9b} were not supported. Student misbehavior had a negative effect on innovative work behavior, via work engagement (95% CI [-.12, -.001]). This confirmed hypothesis H_{9c} which indicated that student misbehavior is negatively related to innovative work behavior through work engagement. The effect of student diversity on innovative work behavior via work engagement was also significant (95% CI [.03, .19]). However, this suggested a positive indirect effect of student diversity on innovative work behavior, which is not in line with hypothesis H_{9d}. Further, work engagement did not mediate the relation between autonomy and innovative work behavior, thus H_{10a} was not confirmed. Finally, social support had a positive effect on innovative work behavior via work engagement (95% CI [.18, .74]) and thus work engagement mediated the relation between social support and innovative work behavior which confirmed H_{10b}.

From Table 10 we can conclude that red tape negatively affected innovative work behavior via teacher self-efficacy (95% CI [-.03, -.003]). Thus, teacher self-efficacy mediated the relation between red tape and innovative work behavior which confirmed hypothesis H_{11a}. There was no evidence that teacher self-efficacy mediated the relation between work pressure and innovative work behavior, and thus H_{11b} was not supported. Student misbehavior negatively affected innovative work behavior via teacher

self-efficacy (95% CI [0.15, 0.06]) and thus hypothesis H_{11c} was accepted. As for work pressure, there was not enough evidence for the mediating role of teacher self-efficacy on the relation between student diversity and innovative work behavior. Therefore, H_{11d} was not confirmed. From job resources, teacher self-efficacy did not mediate the relation between autonomy and innovative work behavior (H_{12a} was not confirmed) but did mediate the relation between social support and innovative work behavior (95% CI [.02, .40]) and thus H_{12b} was confirmed. Thus, social support had a positive effect on innovative work behavior via teacher self-efficacy.

Mediation analysis

M = Work engagement, DV = Innovative work behavior

Independent variable (IV)	Path <i>a</i> IV predicting M			Path <i>b</i> M predicting DV			Path <i>c'</i> Direct effect IV on DV			Indirect effect IV on DV		
	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>B</i>	95% LB	95% UB
Job demands												
Red tape	-.005	.01	.514	.74	.13	<.001	.01	.01	.442	-.003	-.02	.01
Work pressure	.16	.10	.086	.74	.13	<.001	-.005	.11	.966	.12	-.01	.30
Student misbehavior	-.07	.03	.034	.69	.13	<.001	-.06	.04	.110	-.05	-.12	-.001
Student diversity	.13	.05	.014	.79	.13	<.001	-.10	.06	.106	.10	.03	.19
Job resources												
Autonomy	.04	.05	.464	.76	.13	<.001	-.10	.05	.061	.03	-.09	.12
Social support	.50	.10	<.001	.85	.15	<.001	.24	.15	.111	.42	.18	.74

Table 9: Results simple mediation model with mediator work engagement

Mediation analysis

M = Teacher self-efficacy, DV = Innovative work behavior

Independent variable (IV)	Path <i>a</i> IV predicting M			Path <i>b</i> M predicting DV			Path <i>c'</i> Direct effect IV on DV			Indirect effect IV on DV		
	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>B</i>	<i>S.E.</i>	<i>p</i>	<i>B</i>	95% LB	95% UB
Job demands												
Red tape	-.02	.01	.033	.50	.08	<.001	.02	.01	.067	-.01	-.03	-.003
Work pressure	.03	.16	.84	.46	.08	<.001	.10	.11	.35	.01	-.12	.16
Student misbehavior	-.22	.05	<.001	.45	.09	<.001	-.01	.05	.823	-.10	-.15	-.06
Student diversity	-.05	.09	.56	.46	.08	<.001	.02	.06	.683	-.02	-.09	.08
Job resources												
Autonomy	-.001	.08	.994	.46	.08	<.001	-.08	.05	.165	-.0003	-.07	.07
Social support	.37	.19	.047	.46	.08	<.001	.01	.13	.93	.17	.02	.40

Table 10: Results simple mediation model with mediator teacher self-efficacy

4.2.5 The moderating role of HC-HRM: a simple moderation analysis

In this final result section, the moderating role of high commitment human resource management (HC-HRM) was tested. Simple moderation analyses were used to test whether HC-HRM moderates the relation between (i) job demands and work engagement (**Hypothesis 13**), (ii) job resources and work engagement (**Hypothesis 14**), (iii) job demands and teacher self-efficacy (**Hypothesis 15**) and iv) job resources and teacher self-efficacy (**Hypothesis 16**).

Model 1 'Simple moderation model' of Hayes (2013) of the PROCESS macro was used to estimate the effect of this simple moderation (Figure 4). In this model, variable W moderates the relation between the independent variable (X) and the mediator (M). According to Hayes (2018), a linear moderation hypothesis is tested with an inference about the regression coefficient for the interaction term XW. If there was affirmative evidence of moderation, simple slope analysis was used to probe this moderating effect (Hayes, 2018).

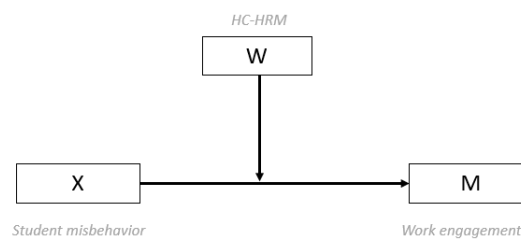


Figure 4: Simple moderation model (Model 1 in PROCESS analysis of Hayes, 2013)
In grey: example variables

For the construction of the interaction (product) between X and W, the variables were first mean centered in order to render the regression coefficients for those variables interpretable within the range of the data (Hayes, 2015). The conditioning values were set at -1SD, mean and +1SD (Aiken and West, 1991). The results are shown in Table 11.

HC-HRM moderated the relation between red tape and work engagement ($B = .02, p = .003$). Figure 5 illustrates this interaction effect. Given a certain level of red tape, teachers are more engaged when they perceive higher HC-HRM which confirmed H_{13a} . Simple slope analysis revealed that only the slope of high HC-HRM (+1SD) was significantly different from zero ($B = .02, p = .012$). Thus, in a high HC-HRM environment, red tape was positively related to work engagement. For more details about simple slope results, I refer to Appendix 4.

Results simple moderation analysis

Moderator W: HC-HRM

Independent variable X	Mediator M: Work engagement			Mediator M: Teacher self-efficacy		
	B	Std. Err.	p	B	Std. Err.	p
Job demands						
Red tape x HC-HRM	.02	.01	.003	.05	.01	< .001
Work pressure x HC-HRM	.14	.14	.340	.56	.25	.029
Student misbehavior x HC-HRM	-.02	.04	.567	.17	.06	.007
Student diversity x HC-HRM	-.04	.07	.552	.39	.12	.003
Job resources						
Autonomy x HC-HRM	-.25	.06	< .001	-.19	.12	.105
Social support x HC-HRM	-.21	.15	.183	-.44	.28	.118

Table 11: Results simple moderation analysis

The relation between autonomy and work engagement was also moderated by HC-HRM ($B = .02, p < .001$). High HC-HRM outperformed low HC-HRM in terms of work engagement, given a specific level of autonomy which confirmed H_{14b} . In work settings characterized by high HC-HRM, autonomy negatively affected work engagement, while there was a positive relation when there was low HC-HRM (see Figure 6). Both slopes of -1SD and +1SD were significantly different than zero ($B = .17, p = .003$ and $B = -.16, p = .003$ respectively). In a low HC-HRM environment, autonomy was positively related to work engagement, while in a high HC-HRM environment, autonomy was negatively related to work engagement. There were no significant interactions between HC-HRM and the other job demands or job resources on work engagement, so H_{13bcd} and H_{14b} were not supported.

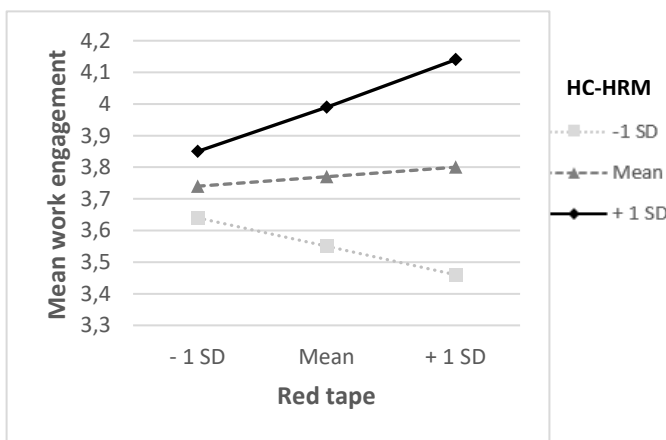


Figure 5: Interaction effect of HC-HRM on the relation between red tape and work engagement

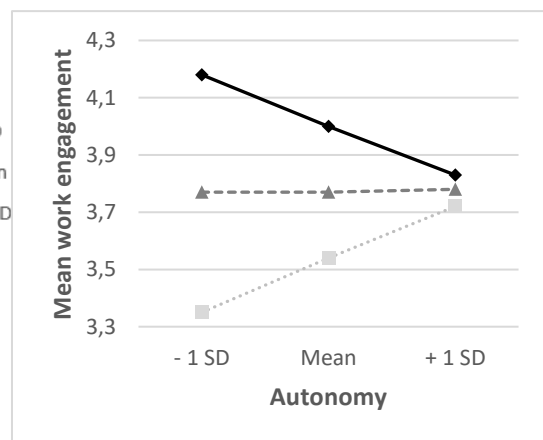


Figure 6: Interaction effect of HC-HRM on the relation between autonomy and work engagement.

For all job demands, HC-HRM moderated the relation between job demands and teacher self-efficacy. Teacher self-efficacy was highest when both red tape and HC-HRM were high, and lowest when red tape was high and HC-HRM was low. Red tape positively affected teacher self-efficacy in a high HC-HRM environment, and negatively affected teacher self-efficacy in a low HC-HRM environment (Figure 7). Thus, HC-HRM positively moderated the relation between red tape and teacher self-efficacy ($B = .05, p < .001$) which confirmed H_{15a} . The slope of -1SD was significantly different than zero ($B = -.05, p < .001$). The interaction of HC-HRM concerning work pressure and teacher self-efficacy was significant ($B = .56, p = .029$). Figure 8 shows that in a high HC-HRM environment, teacher self-efficacy was higher than in a low HC-HRM environment with a same level of work pressure. However, none of the slopes were significantly different than zero. For student misbehavior it holds that there was a negative relation between student misbehavior and teacher self-efficacy ($B = -.22, p < .001$) but this relation was less negative when teachers perceived higher HC-HRM ($B = .17, p = .007$) (see Figure 9). All slopes were significantly different than zero (see Appendix 4). This confirmed hypothesis H_{15c} . Further, for student diversity it holds that, given a certain level of student diversity, higher HC-HRM fostered teacher self-efficacy ($B = .39, p = .003$) (see Figure 10). The slopes of -1SD and +1SD were respectively significantly and marginal significantly different than zero ($B = -.27, p = .005$, and $B = .23, p = .085$). There were no significant interactions between job resources, HC-HRM and teacher self-efficacy and therefore H_{16ab} could not be confirmed.

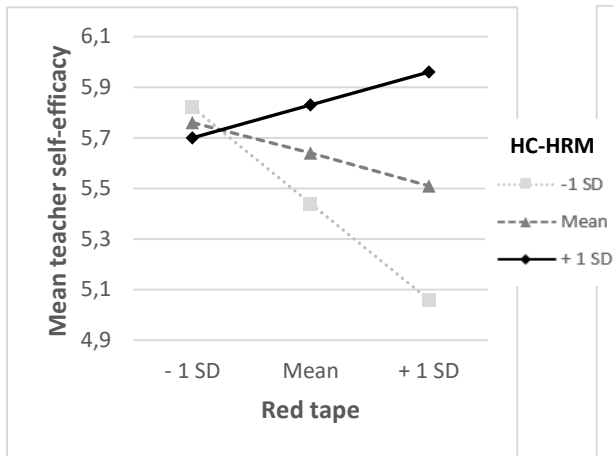


Figure 7: Interaction effect of HC-HRM on the relation between red tape and teacher self-efficacy

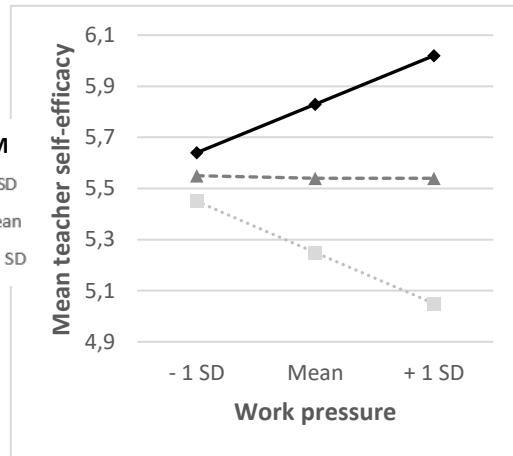


Figure 8: Interaction effect of HC-HRM on the relation between work pressure and teacher self-efficacy

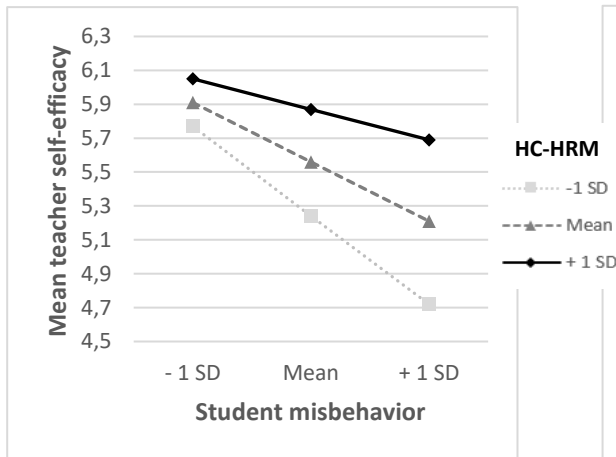


Figure 9: Interaction effect of HC-HRM on the relation between student misbehavior and teacher self-efficacy

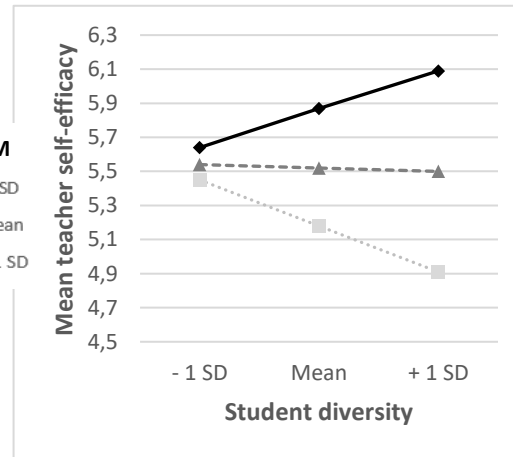


Figure 10: Interaction effect of HC-HRM on the relation between student diversity and teacher self-efficacy

4.3 Additional analysis: a moderated mediation analysis

After performing simple mediation and moderation models, I realized that it was possible to test my research model at once, using first stage moderated mediation analyses. However, the hypotheses were not formulated as such, and therefore I used it as an additional analysis. A first stage moderated mediation model could be used to assess whether, and how, the size of the indirect effect of X on Y through M depends on the moderator W (Edwards and Lambert, 2007; Hayes, 2015). It extends the combination of simple moderation and mediation models by assessing not only how the relation between X and M is dependent on W, but how the relation of X on Y via M, differs among values of W. This model allows the effect of X on M in a mediation model to be moderated by W (Hayes, 2015). A graphical representation is given in Figure 11.

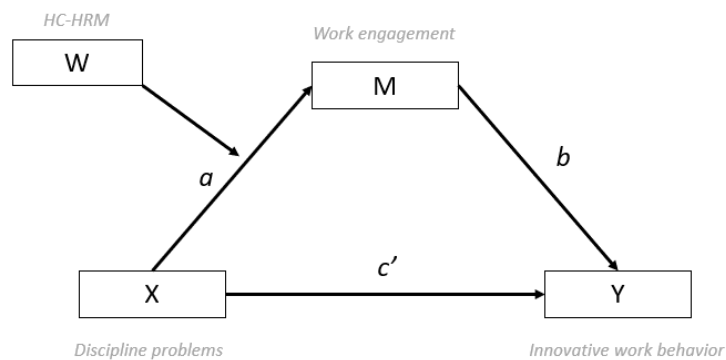


Figure 11: First stage moderated mediation model of Hayes (2015)

The index of moderated mediation was used to assess whether the size of the indirect effect differs among values of W (Hayes, 2015). In other words, it quantifies the relation between moderator W and the size of the indirect effect of X on Y through M (Hayes, 2015). The indirect effect is estimated as a linear function of W. For mathematical details about the index of moderated mediation, I refer to Appendix 5. A 95% bootstrap confidence interval for the index of moderated mediation was used to test for moderated mediation (Hayes, 2015).

From the results displayed in Table 12 I conclude that the size of the indirect effect of autonomy on innovative work behavior through work engagement decreases with higher levels of HC-HRM (95% CI [-.31, -.42]).

The indirect effect of red tape, student misbehavior and student diversity on innovative work behavior through teacher self-efficacy was also different for different values of HC-HRM (respectively 95% CI [.01, .04], [.17, .14] and [.01, .30]). The indirect effect of red tape on innovative work behavior through self-efficacy was higher in a high HC-HRM environment. For student misbehavior it holds that the indirect effect on innovative work behavior through teacher self-efficacy was stronger in a high HC-HRM environment. The same holds for student diversity. Here, the indirect effect on innovative work behavior through teacher self-efficacy was also conditional on HC-HRM: the indirect effect was increasing with higher HC-HRM.

Results first stage moderated mediation model

Dependent variable Y: Innovative work behavior

Moderator W: HC-HRM

Independent variable X	Mediator M: Work engagement			Mediator M: Teacher self-efficacy		
	<i>Index of moderated mediation</i>	<i>LLCI</i>	<i>ULCI</i>	<i>Index of moderated mediation</i>	<i>LLCI</i>	<i>ULCI</i>
Job demands						
Red tape	.02	-.001	.038	.03	.007	.043
Work pressure	.10	-.086	.388	.26	-.010	.527
Student misbehavior	-.02	-.087	.051	.08	.017	.139
Student diversity	-.03	-.120	.100	.18	.013	.300
Job resources						
Autonomy	-.19	-.310	-.042	-.09	-.211	.037
Social support	-.18	-.401	.130	-.20	-.425	.293

Table 12: Results first stage moderated mediation model. LLCI denotes the lower level of the 95% confidence interval, ULCI the upper level.

5. Discussion and conclusion

The aim of this study was to examine how innovative work behavior of teachers is related to both individual and environmental characteristics, using the AMO framework as theoretical background (Boxall and Purcell, 2008). It provided insights into the relation between job demands, job resources, work engagement, teacher self-efficacy and innovative work behavior. Organizations, both profit and non-profit, increasingly depend on employee's efforts to innovate (Ahmed et al., 2018). Teachers' innovative behavior is highly important for the further development of our knowledge society as well as for school organizations themselves (Thurlings et al., 2015). Further, I examined whether the presence of high commitment HRM (HC-HRM) practices altered the proposed negative relationships of job demands, and the proposed positive relationships of job resources, on work engagement and teacher self-efficacy. This study gives answer to the question: *What is the relation between job demands, job resources, work engagement, teacher self-efficacy and innovative work behavior and how can school management increase innovative work behavior among their teachers?*

The results of this study affirmed that the perceived work environment (the opportunity component within the AMO framework) affect innovative work behavior through changed levels of work engagement (motivation) and teacher self-efficacy (ability). This study showed that work engagement and teacher self-efficacy are positively related to innovative work behavior. Teachers who feel engaged are characterized by vigor (high level of energy and willing to do their work), dedication (enthusiasm and pride) and absorption (full concentration during work) (Maslach et al., 2001). Based on the broaden and build theory (Fredrickson, 2000), engaged teachers initiate positive emotions which build and foster new ideas (Hakanen and Roodt, 2010). Further, teachers high in self-efficacy have more control over one's actions and feel better equipped to address the challenges and uncertainty that comes along with generating and implementing new ideas in the workplace (Richter et al., 2012).

From the examined job demands, student misbehavior in particular turns out to be an important negative predictor of innovative work behavior through lower levels of work engagement and self-efficacy. When teachers are confronted with student misbehavior, e.g. when teaching is disrupted by students who lack discipline and teachers have to control students' behavior often, it requires a lot of energy to attain an expected performance level, and interferes with teachers' goal attainment which decreases work engagement and teacher self-efficacy, and in turn results in less innovative work behavior (Hakanen et al., 2005; Skaalvik and Skaalvik, 2016, 2019). Further, I conclude that red tape harms innovative work behavior through a lower level of self-efficacy. This indicates that teachers perceive the administrative burden as interfering with their goal attainment and reflect this on their own performance, which harms their self-efficacy and in turn innovative work behavior (Richter et al., 2012; Skaalvik and Skaalvik, 2016). For work pressure it holds that no evidence was found for the negative effect on innovative work behavior through changed levels of work engagement and self-efficacy. The results regarding student diversity were in opposite direction. This will be discussed in Section 5.1: Theoretical implications.

From the examined job resources, social support seems to be an important positive predictor of innovative work behavior through higher levels of work engagement and self-efficacy. Social support from colleagues and supervisors is associated with feelings of belonging and appraisal, and mitigate the feelings of uncertainty (Alridge and Fraser, 2016; Binnewies and Gromer, 2012; Stetz, Stetz and Bliese, 2006). This in turn increases innovative work behavior. The results of autonomy were not as expected and will be discussed in Section 5.1: Theoretical implications.

This study also investigated whether HC-HRM practices alter the relationships between JD-R, work engagement and teacher self-efficacy. HC-HRM practices aim to support employees by creating opportunities in order to enhance employees' levels of motivation, skills, empowerment and information (Whitener, 2001). The results showed that HC-HRM is especially important in mitigating

the negative effects of job demands (in particular on teacher self-efficacy) rather than fostering the positive effects of job resources.

For example, teacher self-efficacy is lowest when red tape is high and HC-HRM is low. A high HC-HRM environment mitigates the negative impact of red tape on teacher self-efficacy. The same holds for work pressure. This indicates that teachers in a high HC-HRM work context feel supported by their organization to deal with job demands such that their self-efficacy will be less negatively affected by job demands that interfere with teachers' goal attainment, learning and instructional processes. Additionally, red tape was the only job demand where empirical evidence was found for the interaction with HC-HRM on work engagement: given a certain level of red tape, high HC-HRM ensures that work engagement is higher compared to low HC-HRM.

For student misbehavior it holds that in both low and high HC-HRM environments student misbehavior negatively affects teacher self-efficacy. However, teachers perceive student misbehavior as less detrimental to their self-efficacy in a high HC-HRM work context compared to a low HC-HRM setting. Thus, when organizations create opportunities such that teachers can give their best performance to the organization, teachers are able to better perform their job while they are facing the negative consequences of student misbehavior, and will reflect these feelings of success on themselves, resulting in higher self-efficacy compared to organizations that do not create opportunities for their teachers.

Finally, for student diversity it holds that higher HC-HRM fosters teacher self-efficacy. Especially, student diversity is positively related to teacher self-efficacy in a high HC-HRM environment, while it is negatively related to teacher self-efficacy in a low HC-HRM environment. This indicates that although student diversity can increase teacher self-efficacy, it should be accompanied by conditions that encourage teachers to identify with the organization's goals and by opportunities that are interpreted as signals of personified organization's commitment, because otherwise student diversity will decrease teacher self-efficacy.

Summarized, innovative work behavior is a function of both the perceived work environment and individual characteristics (e.g. Nishii et al., 2008; Lecat et al., 2018). Job demands and job resources affect innovative work behavior through changed levels of work engagement and teacher self-efficacy. The way teachers perceive job demands and job resources is thus important for showing innovative work behavior. This indicates that it is important to consider the contextual constraints in order to promote innovative work behavior. Organizations can use HC-HRM as a powerful instrument to either mitigate the negative or foster the positive relations between the perceived work environment and work engagement or teacher self-efficacy, and thus also innovative work behavior.

5.1 Theoretical implications

This study contributes to existing literature by examining new relations and confirming prior results with respect to innovative work behavior. Using the AMO framework (Boxall and Purcell, 2008) as theoretical foundation, this study builds upon former research on innovative work behavior. In this framework, employee behavior is considered as a function of their ability (A), motivation (M) and opportunity (O).

First, the literature on innovative work behavior generally focusses on limited aspects of possible antecedents. For example, there are many studies that only focus on contextual constraints and opportunities relevant to innovative work behavior, disregarding the motivation, skills and capabilities requisite for showing innovative work behavior (see e.g., Ahmed et al., 2018; Binnewies and Gromer, 2013; Bos-Nehles and Veenendaal, 2019). This study contributes to the existing literature by providing an integrated model in which both ability, motivation and opportunity aspects were considered.

Furthermore, this study added to the existing literature the mediating role of work engagement and self-efficacy on the relationship between job demands, job resources and innovative work behavior within the education setting. This study provided first insights in education-specific job demands (student misbehavior and student diversity) related to innovative work behavior. Moreover,

a recent literature study shows that scarcely any study thus far has explored any indirect relationship of teacher innovative behavior (Thurlings et al., 2015). Most research on innovative work behavior is focused on profit organizations. The educational context is often ignored in organizational research. To my best knowledge, no attempt thus far has been made to analyse innovative work behavior among secondary school teachers from the AMO perspective. Fullan (2007) mentions that schools and the educational context in general are subject to many innovations, which makes it interesting to analyse teachers' innovative work behavior. Thereby, schools are a good research subject since they are characterized by a controlled setting, i.e. a quite consistent organizational structure and a relatively homogenous set of organizational activities (Pil and Leana, 2009).

This study found no direct relation between autonomy and innovative work behavior, while in profit organizations autonomy is a positive predictor of innovativeness (De Spiegelaere et al., 2014). A plausible explanation might be that teachers already have freedom to choose how they carry out their teaching tasks. For example, they are free to choose their instructional and learning processes. It is fundamental to the teaching profession that every teacher has his or her own way of teaching, and therefore autonomy may not be perceived as something that triggers innovative work behavior. In profit organizations, autonomy is often an opportunity that the organization offers to their employees which enables them to experiment with new work approaches and methods (De Spiegelaere et al., 2014).

Especially, this study found that autonomy negatively affects work engagement under conditions of high HC-HRM. This suggests that the mechanism that explains the relation between autonomy and work engagement, might work differently in specific work contexts. It might be explained by the idea that teachers feel strongly supported by their organization in a high HC-HRM setting such that teachers do not feel the necessity to exploit autonomy and do not assign possible benefits of autonomy to themselves, which decreases work engagement.

There are some other findings that were not as expected. First, student diversity was positively related to work engagement, which is in contrast to prior research that characterized student diversity as a stressor that negatively affects work engagement (Skaalvik and Skaalvik, 2017a). A plausible explanation is that student diversity provides the motivational arousal and activates high strain and activation to cope with diversity in the classroom (Anderson et al., 2004; Baer and Oldham, 2006). It might stimulate personal growth and development which increases work engagement (Bakker et al., 2004). This can indicate that the mechanism through which job demands affect work engagement might be dependent on the type of job demand, or that there might be a curvilinear relation between student diversity and work engagement.

Another result that was not as expected relates to the finding that red tape was positively related to work engagement in high HC-HRM environments. This may indicate that high commitment human resource management, such as training and development or competitive compensation, supports teachers to overcome red tape, creating positive outcomes and emotions for the employee and thus increases work engagement (Scott and Pandey, 2005).

Next, this report emphasized the importance of HRM practices by showing that high commitment practices alter the relation between job demands, resources and work engagement or self-efficacy. For example, student diversity increases work engagement in a high HC-HRM context, while it decreases work engagement in a low HC-HRM environment.

Besides new insights, this study confirms that work engagement leads to positive organizational outcomes, such as innovative work behavior (Bakker and Bal, 2010; Thurlings et al., 2015; Welch, 2011). Moreover, it substantiates that self-efficacy is an important predictor of innovative work behavior (Hakanen and Roodt, 2010; Newman et al., 2018). Findings also show that in an educational setting, social support from colleagues and supervisors is one of the main antecedents of work engagement and self-efficacy (e.g. Binnewies and Gromer, 2012; Noefer et al., 2009). Further, this study gives evidence that employee behavior is not necessarily described by a multiplicative or additive

function of ability, motivation and opportunity, but a combination of both (Bos-Nehles et al., 2013). The results are in line with the assumption that innovative work behavior is a function of both perceived work environment and individual characteristics (e.g. Lecat et al., 2018; Nishii et al., 2008).

5.2 Practical implications

This study has several implications for the promotion of work engagement, self-efficacy and innovative work behavior of teachers. First, as with other human behavior, teacher innovative work behavior is not enhanced by only one factor. Innovative work behavior is influenced by the perceived work environment (job demands and job resources) and individual characteristics (work engagement and teacher self-efficacy). School management should therefore combine different techniques to enhance innovative work behavior.

The findings suggested that work engagement and teacher self-efficacy are important employee characteristics for organizations to consider in order to increase innovative work behavior. By changing the perceived work environment, schools can increase innovative work behavior through changed levels of work engagement and teacher self-efficacy. School management can change (the perception of) the work environment by optimizing job demands or increasing job resources in order to increase work engagement and self-efficacy, which will result in more innovative work behavior. This will be discussed next.

Schools may facilitate engagement and increase teacher self-efficacy by providing sufficient job resources. For example, this study shows that social support positively affects both work engagement and teacher self-efficacy. Teachers feel more engaged and have more confidence in their abilities when they receive support from both colleagues and supervisors. Thus, supervisors have to make sure they show their support, use positive communication and interaction, and colleagues have to respect and support each other such that teachers have the courage to change their lessons and behavior. Besides social resources, there is evidence that, among others, participation in decision making, performance feedback, and task variety are important for teacher's work engagement and

self-efficacy (Salanova et al., 2010; Skaalvik and Skaalvik, 2017). Another job resource that affects both work engagement and self-efficacy is person-job fit (Schaufeli, 2017; Skaalvik and Skaalvik, 2015). In an education setting, value consonance is a dimension of person-job fit and refers to the degree to which teachers feel that they share the prevailing values and norms at the school where they are teaching (Skaalvik and Skaalvik, 2011a). Literature shows that value consonance is positively associated with work engagement, but also with teacher self-efficacy (Skaalvik and Skaalvik, 2019). Therefore, schools should openly discuss goals, values and teaching practices with their teachers. Additionally, during recruitment and selection processes, school management can focus on value consonance. Because this study shows that work engagement and teacher self-efficacy are positively related to innovative work behavior, selecting teachers that share common goals can increase innovative work behavior.

Previous research shows that there are many job demands in the teaching profession that affects work engagement or teacher self-efficacy (Sherhoff et al., 2011; Skaalvik and Skaalvik, 2015). This study shows that educational administrators should pay particular attention to student misbehavior. School management can focus on optimizing those job demands (i.e. simplifying the job and making work processes more efficient) that negatively affect work engagement or teacher self-efficacy (Demerouti and Peeters, 2018). Although it might be difficult to change the level of certain job demands such as red tape or student misbehavior, school management can create high commitment human resource management (HC-HRM) practices aimed at providing opportunities for employees such that they can optimize job demands and give their best performance.

HC-HRM practices are aimed at enhancing employees' levels of motivation, skills, empowerment and information (Whitener, 2001). These practices increase effectiveness and productivity by providing conditions that encourage teachers to identify with organization's goals and are interpreted by teachers as signals of personified organization's commitment to them (Bos-Nehles and Veenendaal, 2019). For example, by facilitating teachers' continuous professionalisation through training and development programmes that are explicitly linked to daily practices, school management

can mitigate the negative effects of job demands that are difficult to change such as red tape and student misbehavior (Runhaar, 2017). Related to student misbehavior, training programmes should provide guidelines to teachers how to deal with student misbehavior, which increases teachers' motivation and skills and allow them to better deal with job demands they encounter during their job which increases their self-efficacy.

Moreover, performance appraisal and reward is part of HC-HRM. Although the overall image is that teachers are highly intrinsically motivated because they are 'passionate beings', these notions do not mean that teachers should not be rewarded when they show extra effort. Extrinsic motivators, such as salary, are less common basic drivers for teachers, but non-financial 'bonuses' are highly appreciated (Rinke, 2008). Alternative work arrangements, allocation of an extra-curricular project and positive feedback are perceived as forms of recognition and teachers will reciprocate with higher willingness to deal with job demands (Boon and Kalshoven, 2014; Bos-Nehles and Veenendaal, 2019; Runhaar, 2017).

Thereby, school management should critically reflect on what messages one wants to send to teachers. For example, if a school wants to highlight the importance of innovative work behavior, one should reflect on how this behavior is stimulated by HC-HRM practices; for instance, if innovative work behavior is a recurrent item in performance interviews (Runhaar, 2017). Here, team leaders are especially important because they have to create consensus and consistency, such that teachers receive the 'right message'.

Finally, teachers will be more innovative when they face student diversity in their classrooms. Therefore, class composition could be based on diversity such as gender, grades and interests. However, a solid HC-HRM environment should be guaranteed because in low HC-HRM environments, high diversity will decrease teacher self-efficacy. This implies that teachers should receive training and development opportunities to be able to deal with student diversity.

5.3 Limitations and future research

In addition to its strengths, this study also has some limitations related to its design and some measurements. First of all, I cannot draw any conclusions regarding causal relationships because this study had a cross-sectional design. However, a cross-sectional design has its advantages. Gathering data at a specific point of time ensures that participants cannot drop out after a first measurement. Moreover, research shows that work engagement and teacher self-efficacy is likely to remain relatively stable over a short time period (e.g. Schaufeli, Bakker and Salanova, 2006). Cross-sectional studies does not require a lot of time and can still be used to prove or disprove relationships. Since the aim of this study was not to find any causal relationships, I chose for a cross-sectional design. Future studies are advised to use a longitudinal design in order to obtain information about the causality of the relationships found in this study.

Second, the number of participants is limited. This harms the statistical power of the model. In multivariate research, the sample size should be preferably at least ten times as large as the number of variables or hypothesis in the study, which would imply in this study at least 90 respondents (Sekaran and Bougie, 2009). The research model is characterized by both mediation and moderation, which increases model complexity. Therefore, more respondents would be beneficial for the statistical power. This was one of the reasons that I decided to divide the research model in sub models. Efforts were made to attract school management to participate. However, most schools answered that the work pressure for their teachers was currently high and thus they did not want to participate. This might have resulted in non-response bias, in which teachers that are perceiving high workload are not included in the sample.

Third, because the research model was tested in sub models, moderation and mediation analyses were based on a single predictor at a time. Therefore, omitted variable bias – which occurs when a variable (which is correlated with an independent variable) is omitted – is unavoidable. Preferably, the research model would be tested at once, controlling for all other variables. However, additional analyses with multiple linear regression models including both job demands and job

resources did not show significant differences compared to simple linear regression models. Yet, results should be taken with caution since moderation and mediation models were estimated without controlling for other job demands or job resources. Structural equation modelling or other path analyses could be used to address this problem. In these models, it is also interested to test whether innovative work behavior is described by either an additive or multiplicative function of ability, motivation and opportunity, or a combination of both.

Moreover, the findings on autonomy should be interpreted with caution, since the construct only consisted of two items. Autonomy in an education setting should be measured more precise. For example, recent research shows that job autonomy is a multi-dimensional construct, namely autonomy regarding the (i) work method, (ii) work scheduling, (iii) work time, and (iv) place of work (De Spiegelaere, Van Gyes and Van Hootegem, 2016). Future research can focus on this operationalization of autonomy.

Fifth, one teacher's innovation may be another teacher's daily practice. Innovative work behavior can be interpreted differently by teachers. Although innovative work behavior is a validated scale (Janssen, 2003), it is hard to identify what innovative work behavior in education exactly comprises. However, it has been chosen to use self-reports for several reasons. First, an employee has much more information about the contextual, intentional and other backgrounds of his or her own job activities. Consequently, an employee's cognitive representation of his or her own innovative work behavior may be more subtle than those of the supervisor. Second, leader-reports may miss much genuine employee innovative activities. In general, the supervisor does not experience the teacher's innovative work behavior in the classroom. Finally, like many types of subjective performance appraisal, innovative work behavior is characterized as discretionary work behavior and thus differ among different raters. In further research, colleagues or supervisors could be asked how they perceive the innovative work behavior of their colleagues. In this way, common method bias will be

reduced, but still there will be a difference in interpretation of innovative work behavior among supervisors.

Finally, a suggestion for future research is to analyse differences between school systems or school contexts and to analyse the outcomes of innovative work behavior. For example, are there any differences between primary, secondary school and high school teachers? For the education setting, it would be interesting to quantify the effects of innovative work behavior on students, teachers and the school system itself.

Although this study had some limitations, it provided useful insights into innovative work behavior of teachers. Innovative education is crucial to promote students' innovativeness and starts with innovative teachers: teachers who demonstrate innovative behavior (Arkhipova and Kuchmaeva, 2018). Teachers should prepare students *“for jobs that do not yet exist, to use technologies that have not yet been invented and to solve problems that we do not even know are problems yet”* (Dumont et al., 2010, p.24). In this study I showed that innovative work behavior is a combination of individual characteristics (ability and motivation) and their perceived work environment (opportunity). The perceived work environment influences innovative work behavior through changed levels of work engagement and teacher self-efficacy. Schools can mitigate the negative impact of job demands and foster the positive impact of job resources on work engagement and self-efficacy, and in turn innovative work behavior, by means of their high commitment human resource management practices.

“It is the supreme art of the teacher to awaken joy in creative expression and knowledge.”

(Albert Einstein)

6. References

- Agarwal, U.A., Datta, S., Blake-Beard, S., & Bhargava, S. (2012). Linking LMX, innovative work behavior and turnover intentions: The mediating role of work engagement. *Career Development International* 17 (3), 208 – 230.
- Ahmed, F., Hassan, A., Ayub, U., & Klimoski, R.J. (2018). High Commitment Work System and Innovative Work Behavior: The Mediating Role of Knowledge Sharing. *Pakistan Journal of Commerce and Social Science* 12 (1), 29 - 51.
- Amabile, T.M. (1988). A model of creativity and innovation in organizations. *Research in Organizational Behavior* 22, 123-167
- Amabile, T.M., Conti, R., Coon, H., & Lazenby, J. (1996). Assessing the Work Environment for Creativity. *Academy of Management Journal* 39 (5), 1154 – 1184.
- Amabile, T.M., Barsade, S.G., Mueller, J.S., & Staw, B.M. (2005). Affect and Creativity at Work. *Administrative Science Quarterly* 50 (3), 367 – 403.
- Anderson, N., De Dreu, C.K.W., & Nijstad, B.A. (2004). The routinization of innovation research: a constructively critical review of the state-of-the-science. *Journal of Organizational Behavior* 25 (2), 147-173.
- Andiliou, A., & Murphy, K.P. (2010). Examining variations among researchers' and teachers' conceptualizations of creativity: A review and synthesis of contemporary research. *Educational Research Review* 5, 201 – 219.
- Aldrige, J.M., & Fraser, B.J. (2016). Teachers' Views of Their School Climate and Its Relationship with Teacher Self-Efficacy and Job Satisfaction. *Learning Environments Research* 19 (2), 291 – 307.
- Arkipova, M.Y., & Kuchmaeva, O.V. (2018). Social Demand of Russians for Innovation (according to sample survey). *Economic and Social Changes: Facts, Trends, Forecast* 11 (2), 69-83.
- Arthur, J.B. (1994). Effects of human resource systems on manufacturing performance and turnover. *Academy of Management Journal* 37, 670-687.
- Baer, M., & Oldham, G.R. (2006). The curvilinear relation between experienced creative time pressure and creativity: Moderating effects of openness to experience and support for creativity. *Journal of Applied Psychology* 91 (4), 963-970.
- Bakker, A.B., & Bal, M.P. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology* 83 (1), 189 – 206.
- Bakker, A.B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International* 13 (3), 209 – 223.
- Bakker, A.B., & Demerouti, E. (2018). Multiple Levels in Job Demands – Resources Theory : Implications for Employee Well-being and Performance. In E. Diener, S. Oishi, & . Tay (Eds.), *Handbook of well-being*. Salt Lake City, UT: DEF Publishers.
- Bakker, A.B., Demerouti, E., & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource management* 43 (1), 83 - 104.
- Bakker, A.B., & Xanthopoulou, D. (2013). Creativity and charisma among female leaders: The role of resources and work engagement. *The International Journal of Human Resource Management* 24 (14), 2760-2779.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist* 28 (2), 117 – 148.
- Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-Efficacy Beliefs of Adolescents*, 307-337.
- Baskaran, K., & Rajarathinam, M. (2018). Innovative Teaching Practices in Educational Institutions (ITPEI). *International Journal of Educational Science* 20 (1), 72-76.
- Benner, M.J., & Tushman, M.L. (2003). Exploitation, Exploration, and Process Management: the productivity dilemma revisited. *Academy of Management Review* 28 (2), 238-256.
- Binnewies, C., & Gromer, M. (2012). Creativity and innovation at work: the role of work characteristics and personal initiative. *Psicothema* 24 (1), 100-105.

- Boon, C., & Kalshoven K. (2014). How High-Commitment HRM relates to engagement and commitment: the moderating role of task proficiency. *Human Resource Management* 53 (3), 403-420.
- Borry, E. (2016). A New Measure of Red Tape: Introducing the Three-Item Red Tape (TIRT) Scale. *International Public Management* 19 (4), 573-593.
- Bos-Nehles, A.C., Van Riemsdijk, M.J., Looise, J.K. (2013). Employee perceptions of line management performance: applying the AMO theory to explain the effectiveness of line managers' HRM implementation. *Human Resource Management* 52 (6), 861-877.
- Bos-Nehles, A.C., & Veenendaal, A.A.R. (2019). Perceptions of HR practices and innovative work behavior: the moderating effect of an innovative climate. *International Journal of Human Resource Management* 30 (18), 2551-2683.
- Boxall, P., & Purcell, J. (2003). *Strategy and Human Resource Management*. London: Palgrave Macmillan.
- Bozeman, B. (2000). *Bureaucracy and Red Tape*, Upper Saddle River, NJ: Prentice Hall.
- Bozeman, B., & Feeney, M. (2011). *Rules and Red Tape: A Prism for Public Administration Theory and Research*. Armonk, NY: M.E. Sharpe
- Buchanan, J. (2010). May I be excused? Why teachers leave the profession. *Asia Pacific Journal of Education* 30 (2), 199-211.
- Byron, K., Khazanchi, S., & Nazarian, D. (2010). The relationship between stressors and creativity: a meta-analysis examining competing theoretical models. *Journal of Applied Psychology* 95 (1), 201-212.
- Cabrera, A., Collins, W.C., & Salgado, J.F. (2006). Determinants of individual engagement in knowledge sharing. *The International Journal of Human Resource Management* 17 (2), 245-264.
- Carmeli, A., Meitar, R., & Weisberg, J. (2006). Self-leadership skills and innovative behavior at work. *International Journal of Manpower* 27 (1), 75-90.
- Carmeli, A., Schaubroeck, J. (2007). The influence of leaders' and other referents' normative expectations on individual involvement in creative work. *The Leadership Quarterly* 18 (1), 35-48.
- Cavanaugh, M.A., Boswell, W.R., Roehling, M.V., & Boudreau, J.W. (2000). An empirical examination of self-reported work stress among U.S. managers. *Journal of Applied Psychology* 85 (1), 65-74.
- Chang, C.P., Chuang, H.W., & Bennington, L. (2011). Organizational climate for innovation and creative teaching in urban and rural schools. *Quality and Quantity: International journal of Methodology* 45, 934-951.
- Collie, R.J., Shapka, J.D., & Perry, N.E. (2012). School climate and social-emotional learning: Predicting teacher stress, job satisfaction, and teaching efficacy. *Journal of Educational Psychology* 104 (4), 1189-1204.
- Darling-Hammond, L. (2006). Constructing 21st- Century Teacher Education. *Journal of Teacher Education* 57 (3), 300-314.
- Darlington, R.B., & Hayes, A.F. (2017). *Regression analysis and linear models: concept, applications, and implementation*. New York, NY: The Guilford Press.
- Dawson, K.M., O'Brien, K.E., & Beehr, T.A. (2015). The role of hindrance stressors in the job demand-control-support model of occupational stress: A proposed theory revision. *Journal of Organizational Behavior* 37 (3), 397 – 415.
- Dediu, V., Leka, S., & Jain, A. (2018). Job demands, job resources and innovative work behaviour: a European Union Study. *European Journal of Work and Organizational Psychology* 27 (3), 310-323.
- De Jong, J.P.J., & Den Hartog, D.N. (2005). Determinanten van innovatief gedrag: een onderzoek onder kenniswerkers in het MKB (Determinants of innovative behaviour: an investigation among knowledge workers in SMEs). *Gedrag & Organisatie* 18 (5), 235-259.
- De Jong, J.P.J., & Den Hartog, D.N. (2010). Measuring Innovative Work Behavior. *Creativity and Innovation Management* 19 (1), 23-36.
- Dellinger, A.B., Bobbett, J.J., Olivier, D.F., & Ellet, C.D. Measuring teachers' self-efficacy beliefs: Development and use of the TEBS-Self. *Teaching and Teacher Education* 24 (3), 751 – 76.
- Demerouti, E., & Bakker, A.B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology* 86 (3), 499 – 512.

- Demerouti, E., & Peeters, M.C.W. (2018). Transmission of reduction-oriented crafting among colleagues: A diary study on the moderating role of working conditions. *Journal of Occupational and Organizational Psychology* 91 (2), 209-234.
- De Spiegelaere, S., Van Gyes, G., & Van Hootegem, G. (2016). Not all autonomy is the same. Different dimensions of job autonomy and their relation to work engagement and innovative work behavior. *Human Factors and Ergonomics in Manufacturing and Service Industries* 26 (4), 515-527.
- De Spiegelaere, S., Van Gyes, G., De Witte, H., Niesen, W., & Van Hootegem, G. (2014). On the relation of job security, job autonomy, innovative work behaviour and the mediating effect of work engagement. *Creativity and Innovation Management* 23 (3), 318-330.
- Dörner, N., Gassmann, O., & Morhart, F. (2012). Innovative work behavior: the roles of employee expectations and effects on job performance. *Doctoral dissertation*.
- Dumont, H., Istance, D., & Benavides, F. (2010). The Nature of Learning Using Research to Inspire Practice. *OECD Publishing, Paris*.
- Edwards, J.R., & Lambert, L.S. (2007). Methods for integrating moderation and mediation: A general analytical framework using moderated path analysis. *Psychological Methods* 12 (1), 1-22.
- Eisenberger, R., & Aselage, J. (2009). Incremental effects of reward on experienced performance pressure: positive outcomes for intrinsic interest and creativity. *Journal of Organizational Behavior* 30 (1), 95-117.
- Eteokleous, N. (2008). Evaluating computer technology integration in a centralized school system. *Computers & Education* 51 (2), 669-686.
- Fay, D., & Frese, M. (2001). The Concept of Personal Initiative: An Overview of Validity Studies. *Human Performance* 14 (1), 97 – 124.
- Fernet, C., Guay, F., Senécal, C., & Austin, S. (2012). Predicting intraindividual changes in teacher burnout: the role of perceived school environment and motivational factors. *Teaching and Teacher Education* 28 (4), 514 – 525.
- Ferrari, A., Cachia, R., & Punie, Y. (2009). Innovation and Creativity in Education and Training in the EU Member States. *Joint Research Centre Technical Notes*.
- Foster, J., & Jones, J. (1978). Rule Orientation and Bureaucratic Reform. *American Journal of Political Science* 22, 438-463.
- Fredrickson, B.L. (2000). Why positive emotions matter in organizations: Lessons from the broaden-and-build model. *The Psychologist-Manager Journal* 4 (2), 131 – 142.
- Fredrickson, B.L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist* 55 (3), 218-226.
- Fullan, M.M. (2007). Change Theory as a Force for School Improvement. In: *Intelligent Leadership*, 27-39. Springer, Dordrecht.
- Gagne, M., & Deci, E.L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior* 26 (4), 331-362.
- Gelper, S.E.C. (2017). *Multiple Regression*. In: *Lecture Slides Multivariate Statistics, Eindhoven University of Technology*.
- Georgsdottir, A.S., & Getz, I. (2004). How flexibility facilitates innovation and ways to manage it in organizations. *Creativity and Innovation Management* 13 (3), 166-175.
- Gong, Y., Huang, J.-C., & Farh, J.-L. (2009). Employee learning orientation, transformational leadership and employee creativity: the mediating role of employee creative self-efficacy. *Academy of Management Journal* 52 (4), 765 – 778.
- Gould-Williams, J. (2004). The effects of 'high commitment' HRM practices on employee attitude: The views of public sector workers. *Public Administration* 82 (1), 63 – 81.
- Guerrero, S. (2017). Pedagogical Knowledge and the Changing Nature of the Teaching Profession. *OECD Publishing, Paris*.
- Hackman, J.R. (1980). Work redesign and motivation. *Professional Psychology* 11 (3), 445 – 455.
- Hair, J.F., Black, W.C., Babin, B.J., & Anderson, R.E. (2014). *Multivariate data analysis*. Harlow, Essex: Pearson Education Limited.

- Hakanen, J.J., Bakker, A.B., Schaufeli, W.B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology 43* (6), 495 – 513.
- Hakanen, J.J., & Roodt, G. (2010). Using the Job Demands – Resources model to predict engagement: Analyzing a conceptual model. In *Work engagement: A handbook of essential theory and research*, 85 – 101.
- Hammond, M.M., Neff, N.L., Farr, J.L., Schwall, A.R., & Zhao, X. (2011). Predictors of individual-level innovation at work: A meta-analysis. *Psychology of Aesthetics, Creativity, and the Arts 5* (1), 90 – 105.
- Hayes, A.F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs, 76*, 408-420.
- Hayes, A.F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modelling. Retrieved from <http://www.afhayes.com/public/process2012.pdf>.
- Hayes, A.F. (2013). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. New York, NY: The Guilford Press.
- Hayes, A.F. (2015). An index and test of linear moderated mediation. *Multivariate Behavioral Research 50* (1), 1-22.
- Hayes, A.F. (2018). Partial, conditional, and moderated moderated mediation: quantification, inference, and interpretation. *Communication Monographs 85* (1), 4-40.
- Horng, J., Hong, J., Chanlin, L., Chang, S., & Chu, H. (2005). Creative teachers and creative teaching strategies. *International Journal of Consumer Studies 29* (4), 352-358.
- Hornidge, A. (2011). 'Knowledge Society' as Academic Concept and Stage of Development – A Conceptual and Historical Review. *Beyond the Knowledge Trap: Developing Asia's Knowledge-based economies*, World Scientific Publishing.
- Hsiao, H., Chang, J., & Chen, S. (2014). The influence of support for innovation on organizational innovation: Taking organizational learning as a mediator. *The Asia-Pacific Education Researcher 23*, 463-472.
- Hughes, J. (2007). The ability- motivation – opportunity framework for behavior research in IS. *Proceedings of the 40th Hawaii International Conference on System Sciences*.
- Huhtala, H., & Parzefall, M.R. (2007). A review of employee well-being and innovativeness: An opportunity for a mutual benefit. *Creativity and Innovation Management 16* (3), 299-306.
- Janssen, O., (2000). Job demands, perceptions of effort-reward fairness, and innovative work behavior. *Journal of Occupational and Organizational Psychology 73*, 287 – 302.
- Janssen, O., (2003). Innovative behaviour and job involvement at the price of conflict and less satisfactory relations with co-workers. *Journal of Occupational and Organizational Psychology 76* (3), 347 – 364.
- Janssen, O. (2004). How fairness perceptions make innovative behavior more or less stressful. *Journal of Organizational Behavior 25* (2), 201-215.
- Katz, D. (1964). The motivational basis of organizational behavior. *Behavioral Science 9* (2), 131-146.
- Klassen, R.M., Al-Dhafri, S., Mansfield, C.F., Purwanto, E., Slu, A., Wong, M.W., & Woods-McConney, A. (2012). Teachers' engagement at work: An international validation study. *Journal of Experimental Education 80*, 1-20.
- Konermann, J. (2011). Teacher's Work Engagement: A deeper understanding of the role of job and personal resources in relationship to work engagement, its antecedents and its outcomes. *Proefschrift Universiteit Twente*.
- Kontoghiorghes, C., Awbre, S.M., & Feurig, P.L. (2005). Examining the relationship between learning organization characteristics and change adaptation, innovation and organizational performance. *Human Resource Development Quarterly 16* (2), 185-212.
- Kwasnicka, D., Dombrowski, S.U., White, M., & Sniehotta, F. (2016). Theoretical explanations for maintenance of behaviour change: a systematic review of behaviour theories. *Health Psychology Review 10* (3), 277 – 296.
- Lecat, A., Beusaert, S., & Raemdonck, I. (2018). On the Relation Between Teachers' (In)formal Learning and Innovative Work Behavior: The Mediating Role of Employability. *Vocations and Learning 11*, 529 – 554.
- Lepak, D.P., Liao, H., Chung, Y., & Harden, E.E. (2006). A conceptual review of Human Resource Management Systems in Strategic Human Resource Management Research. *Research in Personnel and Human Resources Management 25*, 217-271.

- Li, Y., Huang, J., & Tsai, M. (2009). Entrepreneurial orientation and firm performance: The role of knowledge creation process. *Industrial Marketing Management* 38 (4), 440-449.
- Leong, C.T., & Rasli, R. (2013). The relationship between innovative work behavior on work role performance: an empirical study. *Social and Behavioral Sciences* 129, 592 – 600.
- Lyubomirsky S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin* 131 (6), 803-855.
- Maslach, C., Schaufeli, W.B., & Leiter, M.P. (2001). Job burnout. *Annual Review of Psychology* 52, 397 – 422.
- Mauss, I.B., Tamir, M., Anderson, C.L., & Savino, N.S. (2011). Can seeking happiness make people unhappy? Paradoxical effects of valuing happiness. *Emotion* 11 (4), 807-815.
- Messmann, G., & Mulder, R.H. (2011). Innovative Work Behaviour in Vocational Colleges: Understanding How and Why Innovations Are Developed. *Vocations and Learning* 4 (1), 63 – 84.
- Mohammad, R.F., & Harlech-Jones, B. (2008). Working as partners for classroom reform. *International Journal of Educational Development* 28 (5), 534-545.
- Newman, A., Tse, H.H.M., Schwarz, G., & Nielsen, I. (2018). The effects of employees' creative self-efficacy on innovative behavior: The role of entrepreneurial leadership. *Journal of Business Research* 89, 1-9.
- Nishii, L.H., Lepak, D.P., & Schneider, B. (2008). Employee attributions of the “why” of HR practices: their effects on employee attitudes and behaviors, and customer satisfaction. *Personnel Psychology* 61, 503 – 545.
- Noefer, K., Stegmaier, R., Molter, B., & Sonntag, K. (2009). Great many things to do and not a minute to spare: can feedback from supervisors moderate the relationship between skill variety, time pressure, and employees' innovative behavior? *Creativity Research Journal* 21 (4), 384-393.
- Noordegraaf, M., & Steijn, B. (2014). Professionals Under Pressure: The Reconfiguration of Professional Work in Changing Public Services. *Amsterdam University Press, Amsterdam*.
- OECD. (2014). Measuring Innovation in Education: A new perspective. OECD Publishing, Paris.
- Ohly, S., Sonntag, S., & Pluntke, F. (2006). Routinization, work characteristics and their relationships with creative and proactive behaviors. *Journal of Organizational Behavior* 27 (3), 257-279.
- Organ, D. (1988). Organizational Citizenship Behavior: The Good Soldier Syndrome. *Lexington Books, Lexington, MA*.
- Paauwe, J. (2009). HRM and Performance: Achievements, Methodological Issues and Prospects. *Journal of Management Studies* 45 (1), 129-142.
- Rheman, W., & Ahmad, M. (2015). AMO Framework and psychological empowerment: conceptual model decoding the black box between HRM and innovative work behavior. *Business Review* 10 (1), 86-100.
- Richter, A.W., Hirst, G., van Knippenberg, D., & Baer, M. (2012). Creative self-efficacy and individual creativity in team contexts: Cross-level interactions with team informational resources. *Journal of Applied Psychology* 97 (6), 1282-1290.
- Ren, F.F., & Zhang, J.H. (2015). Job Stressors, Organizational Innovation Climate, and Employees' Innovative Behavior. *Creativity Research Journal* 27 (6), 16-23.
- Runhaar, P.R. (2008). Promoting teachers' professional development. *Enschede: University of Twente*.
- Salanova, M., Schaufeli, W.B., Xanthopoulou, D., & Bakker, A.B. (2010). Gain spirals of resources and work engagement. In *Work engagement: A handbook of essential theory and research*, New York.
- Sanders, K., Dorenbosch, L., & de Reuver, R. (2008). The impact of individual and shared employee perceptions of HRM on affective commitment. *Personnel Review* 37, 412-425.
- Schaufeli, W.B. (2017). Applying the Job Demands – Resources model: A ‘how to’ guide to measuring and tackling work engagement and burnout. *Organizational Dynamics* 46, 120-132.
- Schaufeli, W.B., Bakker, A.B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire. A cross-national study. *Educational and Psychological Measurement* 66, 701-717.
- Schaufeli, W.B., Salanova, M., González-Romá, V., & Bakker, A.B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies* 3 (1), 71-92.

- Schnake, M. (1991). Organizational citizenship: A review, proposed model, and research agenda. *Human Relations* 44, 735-759.
- Schneider, B. (1983). Interactional psychology and organizational behaviour. In B.M. Staw & L.L. Cummings (Eds.), *Research in organizational behaviour*, 1-31. Greenwich, CT: JAI Press.
- Schuh, S.C., Zhang, X., Morgeson, F.P., Tian, P., & van Dick, R. (2017). Are you really doing good things in your boss's eyes? Interactive effects of employee innovative work behavior and leader-member exchange on supervisory performance ratings. *Human Resource Management* 57 (1), 397 – 409.
- Schyns, B., & Von Collani, G. (2010). A new occupational self-efficacy scale and its relation to personality constructs and organizational variables. *European Journal of Work and Organizational Psychology* 11 (2), 219-241.
- Scott, S.G., & Bruce, R.A. (1994). Determinants of Innovative Behavior: A Path Model of Individual Innovation in the Workplace. *Academy of Management Journal* 37 (3), 580 – 607.
- Scott, P.G., & Pandey, S.K. (2005). Red tape and public service motivation: Findings from a National Survey of Managers in State Health and Human Services Agencies. *Review of Public Personnel Administration* 25 (2), 2005.
- Sekaran, U., & Bougie, R. (2009). *Research Methods for Business: A skill building approach*. West Sussex: John Wiley & Sons Ltd.
- Shalley, C.E., & Gilson, L.L. (2004). What leaders need to know: A review of social and contextual factors that can foster or hinder creativity. *The Leadership Quarterly* 15 (1), 33 – 53.
- Shalley, C.E., Zhou, J., & Oldham, G.R. (2004). The Effects of Personal and Contextual Characteristics on Creativity: Where Should We Go from Here? *Journal of Management* 30 (6), 933 – 958.
- Siemsen, E., Roth, A.V., Balasubramanian, S. (2008). How motivation, opportunity and ability drive knowledge sharing: The constraining-factor model. *Journal of Operations Management* 25 (3), 426-445.
- Simbula, S., Guglielmi, D., & Schaufeli, W.B. (2010). A three-wave study of job resources, self-efficacy, and work engagement among Italian schoolteachers. *European Journal of Work and Organizational Psychology* 20 (3), 285 – 304.
- Skaalvik, E.M., & Skaalvik, S. (2014). Teacher Self-Efficacy and Perceived Autonomy: Relations with Teacher Engagement, Job Satisfaction, and Emotional Exhaustion. *Psychological Reports* 114 (1), 68 – 77.
- Skaalvik, E.M., & Skaalvik, S. (2016). Teacher Stress and Teacher Self-Efficacy as Predictors of Engagement, Emotional Exhaustion, and Motivation to Leave the Teaching Profession. *Creative education* 7 (13), 1785 – 1799.
- Skaalvik, E.M., & Skaalvik, S. (2017a). Still Motivated to Teach? A Study of School Context Variables, Stress and Job Satisfaction among Teachers in Senior High School. *Social Psychology of Education* 20 (1), 15 – 37.
- Skaalvik, E.M., & Skaalvik, S. (2019). Teacher Self-Efficacy and Collective Teacher Efficacy: Relations with Perceived Job Resources and Job Demands, Feeling of Belonging, and Teacher Engagement. *Creative Education* 10 (7), 1400 – 1424.
- Sobel, M.E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. *Sociological Methodology* 13, 290-312.
- Staal, M.A. (2004). *Stress, Cognition, and Human Performance: A Literature Review and Conceptual Framework*. NASA Ames Research Center, Moffett Field, CA.
- Steijn, B., & Van der Voet, J. (2019). Relational job characteristics and job satisfaction of public sector employees: When prosocial motivation and red tape collide. *Public Administration* 97 (1), 64 – 80.
- Stetz, T.A., Stetz, M.C., & Bliese, P.D. (2006). The importance of self-efficacy in the moderating effects of social support on stressor-strain relationships. *Work & Stress* 20 (1), 49-59.
- Tack, H., & Vanderline, R. (2019). Capturing relations between teacher educators' workplace context, work related basic needs satisfaction, and teacher educators' researcher disposition. *European Journal of Teacher Education* 42 (4), 459 – 477.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education* 2, 53-55.
- Teichner, W.H., Areas, E., & Reilly, R. (1963). Noise and human performance: A psychological approach. *Ergonomics* 6, 83-97.

- Thurlings, M., Evers, A.R. & Vermeulen, M. Toward a Model of Explaining Teachers' Innovative Behavior: A Literature Review. *Review of Educational Research* 85 (3), 430 – 471.
- Tondeur, J., Hermans, R., van Braak, J., & Valcke, M. (2008). Exploring the link between teachers' educational belief profiles and different types of computer use in the classroom. *Computers in Human Behavior* 24, 2541-2553.
- Trapitsin, S.Y., Granichina, O.A., Granichin, O.N., & Zharova, M.V. (2018). Ergatic System of Complex Safety of Subjects of Education. *IEEE International Conference IT & QM & IS*, 877 – 880.
- Tschannen-Moran, M., & Woolfolk, H.A. (2001). Teacher efficacy: Capturing an elusive construct. *Teacher and Teacher Education* 17 (7), 783 – 805.
- Tuckey, M.R., Bakker, A.B., & Dollard, M.F. (2012). Empowering leaders optimize working conditions for engagement: a multilevel study. *Journal of Occupational Health Psychology* 17 (1), 15-27.
- Van den Berg, D., Van den Berg, D., & Scheeren, J. (2017). Tevreden werken in het voortgezet onderwijs. *VOION, Heerlen*.
- Van Dyne, L., Lehn, K.A., & Cummings, A. (2002). Differential effects of strain on two forms of work performance: individual employee sales and creativity. *Journal of Organizational Behavior* 23, 57-74.
- Van Loon, N., Leisink, P., Knies, E., & Brewer, G. (2016). Red Tape: Developing and Validating a New Job-Centered Measure. *Public Administration Review* 76 (4), 662 – 673.
- Van de Voorde, F.C., Veld, M., & van Veldhoven, M.J.P.M. (2016). Connecting empowerment-focused HRM and labor productivity to work engagement: The mediating role of job demands and resources. *Human Resource Management Journal* 26 (2), 192-210.
- Van Veldhoven, M., & Meijman, T.F. Het meten van psychosociale arbeidsbelasting met een vragenlijst: de vragenlijst beleving en beoordeling van de arbeid (VBBA). *NIA, Amsterdam*.
- Van Woerkom, M., Bakker, A.B., & Nishii, L.H. (2016). Accumulative job demands and support for strength use: Fine-tuning the job demands-resources model using conservation of resources theory. *Journal of Applied Psychology* 101 (1), 141-150.
- Wang, G., & Netemeyer, R.G. (2002). The effects of job autonomy, customer demandingness, and trait competitiveness on salesperson learning, self-efficacy, and performance. *Journal of the Academy of Marketing Science* 30 (3), 217 – 228.
- Welch, M. (2011). The evolution of the employee engagement concept: Communication implications. *Corporate Communications* 16 (4), 328-346.
- West, M.A., & Anderson, N.R. (1996). Innovation in top management teams. *Journal of Applied Psychology* 81 (6), 680-693.
- Whitener, E.M. (2001). Do "high commitment" human resource practices affect employee commitment? A cross-level analysis using hierarchical linear modelling. *Journal of Management* 27 (5), 515-535.
- Williams, J., & MacKinnon, D.P. (2008). Resampling and distribution of the product methods for testing indirect effects in complex models. *Structural Equation Modelling: A Multidisciplinary Journal* 15 (1), 23-51.
- Wood, S., & De Menezes, L. (1998). High Commitment Management in the U.K.: Evidence from the workplace industrial relations survey, and employers' manpower and skills practices survey. *Human relations* 51, 485-515.
- Woodman, R.W., Sawyer, J.E., & Griffin, R.W. (1993). Toward a theory of organizational creativity. *Academy of Management Review* 18 (2), 293 – 321.
- Wright, P., & Nishii, L. (2013). Strategic HRM and organizational behavior: Integrating multiple levels of analysis. In D. Guest, J. Paauwe & P. Wright (Eds.), *HRM and Performance: Building the evidence base* (p.97-110). San Francisco, CA: Wiley.
- Yousaf, A., Sanders, K., & Yustantio, J.(2018). High commitment HRM and organizational and occupational turnover intentions: the role of organizational and occupational commitment. *The International Journal of Human Resource Management* 29 (10), 1661-1682.
- Zhang, X., & Bartol, K.M. (2010). Linking empowering leadership and employee creativity: The influence of psychological empowerment, intrinsic motivation, and creative process engagement. *Academy of Management Journal* 53, 107-128.

7. Appendices

Appendix 1 Survey

“Education is the most powerful weapon which you can use to change the world.”
(Nelson Mandela, 2003).

Beste docent(e),

Voor mijn afstudeeronderzoek aan de Technische Universiteit Eindhoven doe ik onderzoek rondom het innovatieve werkgedrag van docenten in het voortgezet onderwijs.

Innovatief werkgedrag in het onderwijs heeft betrekking op (nieuwe) gedragingen die de uitkomst en de kwaliteit van het onderwijs aanmoedigen. Innovatief werkgedrag heeft dus niet per se betrekking op ICT. Hierbij valt ook te denken aan nieuwe ideeën of werkmethoden die u wellicht uitprobeert om het leer- of leefklimaat te bevorderen.

Het onderwijs ondergaat in korte tijd veel veranderingen, denk aan klassendiversiteit en -grootte, gebruik van ICT, deep learning en de rol van coach. Onderzoek wijst uit dat innovatief werkgedrag van docenten om verschillende redenen belangrijk is, bijvoorbeeld: het promoot het innovatieve en creatieve denken bij leerlingen wat belangrijk is binnen een kenniseconomie.

Dit onderzoek focust zich op factoren die innovatief werkgedrag kunnen bevorderen of juist belemmeren. Het invullen van deze enquête zal ongeveer 10 tot 15 minuten duren. U krijgt stellingen voorgelegd waarbij gevraagd wordt naar uw mening. Deelname is vrijwillig. Alle door u verstrekte informatie wordt anoniem en strikt vertrouwelijk behandeld. De data wordt alleen gebruikt om uitspraken te doen op groepsniveau: individuele resultaten worden niet geanalyseerd. De individuele resultaten worden niet aan scholen en andere derden verstrekt. Er zijn geen goede of foute antwoorden. Kies het antwoord dat het meest bij u als docent past.

Voor vragen of opmerkingen kunt u contact opnemen via het volgende mailadres:
s.h.j.gofers@student.tue.nl

Bij voorbaat hartelijk dank voor uw tijd en medewerking.

Met vriendelijke groet,
Senna Gofers
s.h.j.gofers@student.tue.nl

Bent u momenteel werkzaam als docent in het voortgezet (speciaal) onderwijs?

- Ja
- Nee

De volgende stellingen hebben betrekking op enkele omgevingsfactoren.

Geef telkens aan in hoeverre u het (on)eens bent met de volgende stellingen.

Stelling 2 tot en met 10 hebben betrekking op regels waaraan u moet voldoen binnen uw functie. Denk hierbij aan administratieve verplichtingen en verslaglegging.

De regels waaraan ik moet voldoen in mijn kernactiviteiten ...							
	Helemaal oneens	Oneens	Een beetje oneens	Neutraal	Een beetje eens	Eens	Helemaal eens
(LF1) ... hebben een duidelijke functie voor mijn werkzaamheden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(LF2) ... dragen bij aan het doel van mijn werkzaamheden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(LF3) ... helpen me mijn werk goed te doen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(LF4) ... dienen een nuttig doel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CB1) ... veroorzaken veel druk op het werk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CB2) ... kunnen eenvoudig aan worden voldaan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CB3) ... vragen veel tijd om aan te voldoen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CB4) ... veroorzaken veel vertraging.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(CB5) ... veroorzaken veel frustratie.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hoe vaak moet u ...					
	Nooit	Zelden	Soms	Vaak	Altijd
(WP1) ... erg snel werken?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WP2) ... heel veel werk doen?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WP3) ... extra hard werken?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WP4) Hoe vaak heeft u genoeg tijd om uw werk af te maken?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WP5) Hoe vaak is uw werk hectisch?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Geef telkens aan in hoeverre u het (on)eens bent met de volgende stellingen.

	Helemaal oneens	Oneens	Een beetje oneens	Neutraal	Een beetje eens	Eens	Helemaal eens
(AUT1) Ik heb vrijheid bij het uitvoeren van mijn werkzaamheden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(AUT2) Ik kan zelf beslissen hoe ik mijn werk uitvoer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(AUT3) Ik kan deelnemen aan besluiten die mijn werk raken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

De volgende vragen hebben betrekking op de klassen en leerlingen die u lesgeeft. Geef telkens aan in hoeverre u het (on)eens bent met de stelling.

	Helemaal oneens	Oneens	Een beetje oneens	Neutraal	Een beetje eens	Eens	Helemaal eens
(SM1) Sommige leerlingen met gedragsproblemen maken het moeilijk om mijn les uit te voeren zoals ik dat had gepland.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SM2) Mijn lesgeven wordt verstoord door leerlingen die gebrek aan discipline hebben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SM3) Het controleren en corrigeren van het gedrag van leerlingen kost mij veel tijd en energie.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SD1) In mijn klassen zit een grote diversiteit wat betreft de capaciteiten van de leerlingen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SD2) In mijn klassen is een grote diversiteit aan leerling behoeften.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SD3) In mijn klassen is een groot verschil tussen de beste en zwakste leerlingen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

De volgende stellingen hebben betrekking op relaties met uw collega's en uw directe leidinggevende.

Onder directe leidinggevende wordt verstaan degene waarmee u uw beoordelingsgesprek voert.

	Nooit	Zelden	Soms	Vaak	Altijd
(SSC1) Ik kan op mijn collega's rekenen wanneer ik het in het werk wat moeilijk krijg.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SSC2) Ik kan mijn collega's om hulp vragen als dat nodig is.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SSC3) Ik voel mij in het werk gewaardeerd door collega's.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SSS1) Ik kan op mijn directe leidinggevende(n) rekenen wanneer ik het in het werk wat moeilijk krijg.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SSS2) Ik kan mijn directe leidinggevende(n) om hulp vragen als dat nodig is.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SSS3) Ik voel mij in het werk gewaardeerd door mijn directe leidinggevende(n).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

De volgende stellingen hebben betrekking op *human resource management* binnen uw organisatie.

	Helemaal oneens	Oneens	Een beetje oneens	Neutraal	Een beetje eens	Eens	Helemaal eens
(HRM1) Ik krijg de mogelijkheid om mijn vaardigheden te verbeteren middels educatie en training programma's.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM2) Ik heb genoeg werk gerelateerde training gekregen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM3) Ik krijg continue training waardoor ik mijn werk beter kan uitvoeren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM4) Human resource activiteiten helpen mij bij het ontwikkelen van mijn kennis en vaardigheden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM5) Mijn organisatie geeft de voorkeur aan interne promotie.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM6) Vacatures probeert mijn organisatie altijd op te vullen door interne medewerkers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(HRM7) Wanneer er een vacature komt, krijgen mensen binnen mijn organisatie dit eerder te weten dan buitenstaanders.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM8) Mijn baan geeft mij de mogelijkheid om zélf werk gerelateerde beslissingen te nemen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM9) Ik heb de mogelijkheid om verbeteringen aan te geven.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM10) Tussen mij en mijn leidinggevende(n) is sprake van een open communicatie betreffende mijn baan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM11) Ik word vaak gevraagd om deel te nemen bij beslissingen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM12) Er bestaat een duidelijke link tussen hoe ik presteer en de mate van erkenning of beloning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM13) Er bestaat een duidelijke link tussen hoe ik presteer en de mate van salarisverhoging.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(HRM14) Er bestaat een duidelijke link tussen hoe mijn team presteert en de mate van salarisverhoging.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hieronder volgen enkele stellingen over hoe u uw werk ervaart en over uw functioneren op het werk.

	Helemaal oneens	Oneens	Een beetje oneens	Neutraal	Een beetje eens	Eens	Helemaal eens
(WE1) Op mijn werk bruis ik van energie.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE2) Als ik werk, voel ik me fit en sterk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE3) Ik ben enthousiast over mijn baan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE4) Mijn werk inspireert mij.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE5) Als ik 's morgens opsta heb ik zin om aan het werk te gaan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE6) Wanneer ik heel intensief aan het werk ben, voel ik mij gelukkig.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE7) Ik ben trots op het werk dat ik doe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE8) Ik ga helemaal op in mijn werk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(WE9) Mijn werk brengt mij in vervoering.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hoe zeker bent u van uw eigen kunnen om ...							
	Totaal onzeker	Onzeker	Een beetje onzeker	Neutraal	Een beetje zeker	Zeker	Totaal zeker
(SE1) ... storend gedrag van leerlingen te controleren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE2) ... de verwachtingen van mij over het gedrag van leerlingen duidelijk te communiceren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE3) ... leerlingen de klassenregels op te laten volgen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE4) ... een leerling te kalmeren die storend is.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE5) ... goede opdrachten te ontwikkelen voor uw leerlingen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE6) ... verschillende beoordelingsmethoden te gebruiken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE7) ... op een andere manier uit te leggen wanneer leerlingen in verwarring zijn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE8) ... alternatieve instructie manieren te gebruiken in uw klas.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE9) ... leerlingen te laten geloven dat ze het goed kunnen doen op school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE10) ... leerlingen onderwijs te laten waarderen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE11) ... leerlingen die weinig interesse tonen in uw vak te motiveren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(SE12) ... leerlingen te helpen om kritisch na te denken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In de onderstaande stellingen wordt met innovatieve ideeën bedoeld: gedragingen die de uitkomst en de kwaliteit van het onderwijs aanmoedigen. Hierbij valt ook te denken aan nieuwe ideeën of werkmethoden die u wellicht uitprobeert om het leer- of leefklimaat te bevorderen. *Geef telkens aan hoe vaak onderstaande stellingen op u van toepassing zijn.*

	Nooit	Zelden	Soms	Vaak	Altijd
(INN1) Creëren van nieuwe ideeën voor lastige problemen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(INN2) Uitzoeken van nieuwe werkmethoden, technieken of middelen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(INN3) Genereren van originele oplossingen voor problemen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(INN4) Het mobiliseren van steun voor innovatieve ideeën.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(INN5) Het verwerven van goedkeuring voor innovatieve ideeën.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(INN6) Andere medewerkers enthousiast maken voor innovatieve ideeën.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(INN7) Innovatieve ideeën omvormen tot nuttige applicaties of toepassingen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(INN8) Het introduceren van innovatieve ideeën binnen de werkomgeving op een systematische manier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(INN9) Het evalueren van het nut van innovatieve ideeën.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Voor de statistische verwerking van de resultaten volgen ten slotte nog enkele sociaal-demografische vragen.

Geslacht

- Man
- Vrouw
- Genderneutraal
- Zeg ik liever niet

Leeftijd

_____ jaar

Ik ben:

- Tweedegraads bevoegd
- Eerstegraads bevoegd
- Anders, namelijk:

Bent u werkzaam in het voortgezet speciaal onderwijs?

- Ja
- Nee

Hoe lang geeft u al les in het voortgezet (speciaal) onderwijs?

- Minder dan 5 jaar
- Tussen de 5 en 10 jaar
- Tussen de 10 en 15 jaar
- Tussen de 15 en 20 jaar
- Tussen de 20 en 30 jaar
- Meer dan 30 jaar

Ik geef voornamelijk les aan de:

- Onderbouw
- Bovenbouw (vmbo 3/4, havo 4/5, vwo 4/5/6)

Ik geef les aan de volgende niveaus (meerdere antwoorden mogelijk):

- Praktijkonderwijs
- Basis
- Kader
- Mavo
- Havo
- Vwo
- Anders, namelijk:

De **meeste lessen** die ik verzorg, zijn aan klassen van het niveau (slechts één antwoord mogelijk):

- Praktijkonderwijs
- Basis
- Kader
- Mavo
- Havo
- Vwo
- Anders, namelijk:

Het vak waar ik het meeste les in geef, behoort tot de categorie (slechts één antwoord mogelijk):

- Talen
- Exacte vakken
- Maatschappij vakken
- Kunstvakken
- Lichamelijke opvoeding
- Anders, namelijk:

U geeft aan dat uw vak tot de talen behoort. In welk vak geeft u voornamelijk les? (Slechts één antwoord mogelijk).

- Nederlands
- Engels
- Frans
- Duits
- Spaans
- Klassieke talen
- Anders, namelijk:

U geeft aan dat uw vak tot de exacte vakken behoort. In welk vak geeft u voornamelijk les? (Slechts één antwoord mogelijk).

- Natuurkunde
- Scheikunde
- Wiskunde
- Biologie
- Algemene natuurwetenschappen
- Informatica
- Techniek
- Anders, namelijk

U geeft aan dat uw vak tot de maatschappij vakken behoort. In welk vak geeft u voornamelijk les? (Slechts één antwoord mogelijk).

- Aardrijkskunde
- Geschiedenis
- Levensbeschouwing
- Filosofie
- Maatschappijleer / Maatschappijwetenschappen
- Bedrijfseconomie
- Economie
- Verzorging
- Anders, namelijk

U geeft aan dat uw vak tot de kunstvakken behoort. In welk vak geeft u voornamelijk les? (Slechts één antwoord mogelijk).

- Beeldende kunst
- CKV
- Muziek
- Anders, namelijk

Einde vragenlijst!

Hartelijk dank voor uw tijd en deelname!

Mocht u geïnteresseerd zijn in de resultaten, dan kunt u een mail sturen naar:
s.h.j.gofers@student.tue.nl

*" The future of the world is in my classroom today."
(Ivan Welton Fitzwater)*

Appendix 2 Comparing means for different sociodemographic items

The following table shows differences in means between specific groups. However, since the sample size of some groups is small, no statistical tests are used to test whether these differences are significant.

		Mean	Std. deviation	Sample size
Experience	Less than or equal to 5 years	2.75	.62	7
	6 – 10 years	3.20	.71	23
	11 – 15 years	3.04	.56	20
	16 – 20 years	3.03	.56	15
	21 – 30 years	2.77	.51	10
	More than 30 years	3.58	.64	5
Level of classes	Lower classes*	2.99	.51	35
	Upper classes*	3.11	.71	45
Course	Exact	3.09	.78	32
	Art	3.50	.43	4
	Physical education	2.59	.06	3
	Society	3.10	.20	14
	Languages	2.97	.61	25
	Other	3.11	.00	2
Competence	First degree	2.95	.55	31
	Second degree	3.11	.68	43
	Other	2.67	.47	6

Table A. 1: Means for different sociodemographic items.

* Lower classes are in Dutch: onderbouw, upper classes are in Dutch: bovenbouw (vmbo 3/4, havo 4/5, vwo 4/5/6)

Appendix 3 Additional output on the relation between JD-R, work engagement and teacher self-efficacy

Table A. 2 shows the results of a Breusch-Pagan test for each of the models discussed in Section 4.2.2 Job demands, job resources, work engagement and teacher self-efficacy. When there is heteroskedasticity, the reported standard errors and p-values are based on the heteroskedasticity-consistent values.

	DV: Work engagement	DV: Teacher self-efficacy
Job demands included	BP = 16.08, df = 4, p = .003 Heteroskedasticity	BP = 9.52, df = 4, p = .049 Heteroskedasticity
Job resources included	BP = 9.84, df = 2, p = .007 Heteroskedasticity	BP = 4.48, df = 2, p = .106 Homoskedasticity
Both included	BP = 11.04, df = 6, p = .087 Homoskedasticity	BP = 14.16, df = 6, p = 0.028 Heteroskedasticity

Table A. 2: Breusch-Pagan test for different multiple linear regression models.

The results of a multiple regression model including both job demands and job resources are shown in Table A. 3.

Results multiple linear regression						
	DV: Work engagement			DV: Teacher self-efficacy		
	R ² = .422			R ² = .32		
	B	S.E	p	B	S.E	p
Job demands						
Red tape	-.001	.01	.815	-.03	.01	.019
Work pressure	.09	.09	.283	-.08	.17	.655
Student misbehavior	-.09	.03	.002	-.23	.06	< .001
Student diversity	.19	.05	< .001	.11	.09	.203
Job resources						
Autonomy	-.02	.04	.681	-.12	.09	.175
Social support	.45	.10	<.001	.35	.18	.055
	<i>F</i> = 8.90, <i>p</i> < .001			<i>F</i> = 3.43, <i>p</i> = .005		

Table A. 3: Results multiple regression JD-R on work engagement and teacher self-efficacy

Appendix 4 Results simple slope analysis

Simple slope analysis				
	Level of HC-HRM	Effect	Std. Error	p
Work engagement				
Red tape	- 1 SD	-.01	.01	.149
	Mean	.004	.01	.505
	+ 1 SD	.02	.01	.012
Autonomy	- 1 SD	.17	.06	.003
	Mean	.005	.04	.902
	+ 1 SD	-.16	.05	.003
Teacher self-efficacy				
Red tape	- 1 SD	-.05	.01	< .001
	Mean	-.02	.01	.108
	+ 1 SD	.02	.01	.173
Work pressure	- 1 SD	-.37	.21	.078
	Mean	-.01	.14	.956
	+ 1 SD	.36	.23	.12
Student misbehavior	- 1 SD	-.33	.05	< .001
	Mean	-.22	.04	< .001
	+ 1 SD	-.11	.05	.031
Student diversity	- 1 SD	-.27	.09	.005
	Mean	-.02	.08	.797
	+ 1 SD	.231	.13	.085

Table A. 4: Results simple slope analysis

Appendix 5 First stage moderated mediation model

The index of moderated mediation is based on the following model (Model 7 of Hayes).

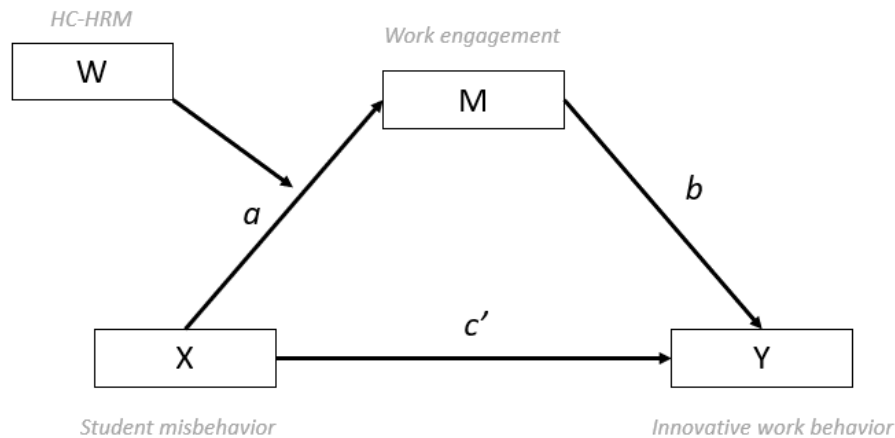


Figure A. 1: First stage moderated mediation model. (Model 7 in PROCESS analysis of Hayes, 2013)

First stage moderated mediation

Using linear regression analysis, the *first stage moderated mediation* model is estimated with the following equations:

$$(i) \quad \hat{M} = i_M + \alpha_1 X + \alpha_2 W + \alpha_3 XW$$

$$(ii) \quad \hat{DV} = i_Y + c'X + bM$$

From equations (i) and (ii), the indirect effect of X on Y is the product of effects of X on M ($\alpha_1 + \alpha_3 W$) and the effect of M on Y (b). This gives the following equation:

$$(iii) \quad (\alpha_1 + \alpha_3 W) * b = \alpha_1 b + \alpha_3 bW$$

Equation (iii) is a linear function of W. This implies that the indirect effect is a linear function of a moderator, and thus the mediation effect increases or decreases with changes in the moderator (Hayes, 2018). The weight $\alpha_3 b$ is called the *index of moderated mediation* and it quantifies the relation between moderator W and the size of the indirect effect of X on Y through M (Hayes, 2015). If the indirect effect is linearly unrelated to W, this leads to the expectation that $\alpha_3 b$ is equal to zero. This is the case when zero is in the 95% bootstrap confidence interval. When the size of the indirect effect does differ for some values of W than others, it is expected that $\alpha_3 b$ is unequal to zero (Hayes, 2015).