



Teachers' Innovative Behaviour: The Importance of Basic Psychological Need Satisfaction, Intrinsic Motivation, and Occupational Self-Efficacy

Andrea Klaijisen^a, Marjan Vermeulen^b and Rob Martens^a

^aWelten Institute – Research Centre for Learning, Teaching and Technology, Open University of the Netherlands, Heerlen, The Netherlands; ^bWelten Institute – Research Centre for Learning, Teaching and Technology, Open University of the Netherlands and KPC Group, 's-Hertogenbosch, The Netherlands

ABSTRACT

Teachers' innovative behaviour and professional development are important aspects of high-quality education. It is often thought that motivation influences teachers' innovative behaviour and professional development. The main purpose of this study is to gain more insight into motivational processes contributing to teachers' innovative behaviour. Using Self-Determination Theory, both intrinsic motivation and basic psychological need satisfaction are addressed. From an organizational psychology perspective, occupational self-efficacy is also included in the hypothesized model. Online survey data from teachers in primary, secondary, and vocational education in the Netherlands ($n = 2,385$) are analysed using structural equation modeling. Results show that basic psychological need satisfaction affects both intrinsic motivation and occupational self-efficacy, and that the latter strongly supports innovative behaviour.

ARTICLE HISTORY

Received 29 October 2014

Accepted 12 December 2016

KEYWORDS

Innovative behaviour;
occupational self-efficacy;
self-determination theory;
teachers

Our current society is often characterized as a knowledge society, in which it has become essential to develop, use, and share knowledge (Hargreaves & Lo, 2000). Teachers are expected to prepare their students for learning and working in this knowledge society. To do so effectively, teacher professional development has become a lifelong responsibility (Scheerens, 2010). It is essential to deal with the high demands placed upon teachers. For example, teachers are expected to be able to use different methods, change their teaching approaches when needed, acquire the skills necessary to make use of digital resources in class, and know how to use information management systems in order to monitor the learning performance of students (Schleicher, 2012). It is important that new ideas are brought into schools to deal with societal, technological, and educational challenges. The extent to which teachers themselves bring in these new ideas is not only determined by their professional skills and knowledge, but also by their motivation and feelings of efficacy (Pyhältö, Pietarinen, & Soini, 2012). In order to understand more about the relevance of these two psychological aspects, as well as their interrelatedness, this study takes a closer look at different motivational processes that affect the extent to which teachers develop, promote, and implement new ideas. In other words, this study focuses on the impact of interrelated aspects of motivation and self-efficacy on teachers' innovative behaviour at work.

Innovative Behaviour

A recent study among employees from public and private organizations in Denmark, Norway, and Sweden revealed that innovative behaviour is high among teaching staff (Bysted & Hansen, 2015). Individual innovative behaviour is important for high-performance organizations (Carmeli, Meitar, & Weisberg, 2006). It can be described as a type of extra-role behaviour that is necessary for organizations to survive (Tuominen & Toivonen, 2011). In this study, innovative behaviour at work is defined as “the intentional creation, introduction, and application of new ideas within a work role, group or organisation, in order to benefit role performance, the group or the organisation” (Janssen, 2000, p. 288). Innovative behaviour thus goes beyond creativity, because it not only includes generating ideas, but also the adoption and implementation of those ideas or solutions (Scott & Bruce, 1994). In the case of teachers, innovative behaviour has also been described as self-initiated actions such as bringing forth, developing, applying, promoting, or modifying new ideas (cf. Thurlings, Evers, & Vermeulen, 2015).

Several studies in different sectors have been conducted that sought to gain more understanding of factors that influence or support innovative behaviour at work (e.g., De Jong & Kemp, 2003; De Jong & Den Hartog, 2007; Hartmann, 2006; Janssen, 2005; Knol & Van Linge, 2009; Nederveen Pieterse, Van Knippenberg, Schippers, & Stam, 2010). However, relatively few studies focus specifically on teachers’ innovative behaviour and its determinants (Thurlings et al., 2015). Studies among teachers point to different determinants such as function or task, and self-efficacy (Runhaar, 2008), work engagement (Konermann, 2011), job control and creative requirements (Binnewies & Gromer, 2012), and openness, motivation, job satisfaction, and interaction within the job (Messman & Mulder, 2011). Although these studies show that different motivational factors may contribute to innovative behaviour, they also give rise to more questions, for example with regard to the combined effect of different motivational factors. The aim of this study is therefore to increase our understanding of the impact of motivational constructs on teachers’ innovative behaviour while taking into account the interrelatedness of those motivational constructs. This knowledge is helpful in creating stimulating environments in which teachers’ motivation and innovative behaviour can flourish.

Self-Determination Theory: A Focus on Intrinsic Motivation

Although creativity and innovative behaviour are not interchangeable, studies on the relationship between intrinsic motivation and creativity provide interesting insights into the importance of intrinsic motivation. Amabile, Conti, Coon, Lazenby, and Herron (1996), for example, showed that intrinsic motivation functions as a mechanism between contextual factors and creativity. Intrinsic motivation might therefore be an important aspect in predicting innovative behaviour.

This study builds on Self-Determination Theory (SDT), a leading theory on human motivation in which several types of motivation are identified, out of which intrinsic motivation is seen as a powerful type of motivation leading to several positive outcomes. Being intrinsically motivated means doing something for its inherent satisfaction, and is frequently measured by self-reports of interest and enjoyment in performing the activity at hand (Ryan & Deci, 2000). The degree to which people feel their environment supports their basic psychological needs is central in the support of intrinsic motivation (Deci & Ryan, 2008). Self-Determination Theory posits that all individuals have three innate, psychological needs: the need for competence, the need for autonomy, and the need for relatedness. The need for competence reflects the desire to feel competent and effective. The need for autonomy reflects the desire to experience freedom and volition. The need for relatedness concerns the desire to interact with, care for, and be connected to others. Environments in which these basic needs are insufficiently met are considered to have a negative impact on intrinsic motivation. External control, for example, hampers feelings of autonomy, which consequently may have a diminishing effect on intrinsic motivation (Deci & Ryan, 2000).

Teachers' Intrinsic Motivation and Basic Psychological Need Satisfaction

Intrinsic motivation in general is positively associated to higher levels of job satisfaction and well-being (Ilardi, Leone, Kasser, & Ryan, 1993). Teachers' intrinsic motivation is also considered to be important for educational performance. Some researchers, for example, established positive relations between teachers' intrinsic motivation and students' achievement (Knowles, 1999), students' interest and persistence (Radel, Sarrazin, Legrain, & Wild, 2010), and students' motivation (Lam, Cheng, & Ma, 2009).

Given the importance of teachers' motivation, it is of vital interest to understand the conditions that support or hinder this. Within SDT, basic psychological need satisfaction is considered necessary for supporting intrinsic motivation. Unfortunately, relatively little is known about the degree to which teachers feel their basic psychological needs are being met (LaPointe, 2006). LaPointe's study, one of the few examples in which teachers' level of basic psychological need satisfaction is measured, found a weak but positive relationship between school characteristics and teachers' overall basic psychological need satisfaction.

More recently, a few additional studies have addressed teachers' intrinsic motivation and their basic psychological need satisfaction. Lam, Cheng, and Choy (2010) studied how school support relates to teachers' motivation and willingness to implement an educational innovation, namely project-based learning. The results of their study indicate that teachers were more motivated to persist with project-based learning when they perceived their school to be supportive of their need for feeling competent and autonomous. In addition, Wagner and French (2010) focused on how early childhood teachers' motivation to change and improve their teaching practices is influenced by the systems they work in. Their findings also support the idea that feelings of competence, autonomy, and relatedness are important for teachers' intrinsic motivation to develop themselves professionally and to improve their teaching practices.

All three basic psychological needs are relevant for intrinsic motivation, although autonomy and competence are considered to be more relevant than relatedness (Deci & Ryan, 2000; Koestner & Losier, 2002). Relatedness might be of less importance due to the fact that people often also engage in intrinsically motivated solitary activities (Deci & Ryan, 2000). However, and as shown, for example, by Wagner and French (2010), in some cases relatedness does appear to be relevant for intrinsic motivation (Ryan & Deci, 2000). We therefore hypothesize the following:

Hypothesis 1: Satisfaction of the three basic psychological needs is positively related to teachers' intrinsic motivation.

Self-Efficacy Beliefs at Work

As already mentioned, SDT is a leading theory on human motivation, with a focus on intrinsic motivation. However, a large number of other theories on motivation exist, with several different focal points (see, for example, Boekaerts, Van Nuland, and Martens [2010] and Eccles and Wigfield [2002] for a theoretical overview). One of those other focal points is expectancies or beliefs concerning self-efficacy, such as Bandura's (1997) theory on self-efficacy.

Many studies have shown the importance of self-efficacy on human achievement in various contexts, such as education, health, and business (Bandura, 1997). Self-efficacy is defined as an individual's judgement of how well he or she "can execute courses of action required to deal with prospective situations" (Bandura, 1982, p. 122). It refers to acquired cognitions and is directed at new tasks or future activity. It differs from the need to feel competent (i.e., one of the basic psychological needs), which is an affective experience, based on previous or current experiences, such as mastering a task (Van den Broeck, Vansteenkiste, de Witte, Soenens, & Lens, 2010).

There are numerous studies that focus on teachers' feelings of self-efficacy. This self-efficacy is often considered to be aimed at a specific task or context, focusing for example on instructional strategies, classroom management, and student engagement (Tschannen-Moran & Woolfolk Hoy, 2001).

Sometimes the object of feelings of self-efficacy is more specific, for example regarding the use of digital learning materials (Vermeulen, Van Acker, Kreijns, & Van Buuren, 2015) or behaviour management strategies (Reupert & Woodcock, 2011).

From an organizational psychology perspective, this study focuses on the occupational self-efficacy of teachers. Occupational self-efficacy can be described as people's belief in their own abilities to face occupational challenges and act successfully in various situations and work-related tasks (Schyns & von Collani, 2002), regardless of their current work environment (Abele & Spurk, 2009). Relatively little is known about teachers' occupational self-efficacy. Konermann (2011), however, studied Dutch teachers' occupational self-efficacy and found that it mediates the positive relationship between teachers' work engagement and their innovative behaviour at work. In addition, studies on occupational self-efficacy in different professional settings have shown positive relations with task performance and organizational citizenship behaviour (König, Debus, Häusler, Lendenmann, & Kleinmann, 2010) and with intrinsic job motivation (Fletcher, Hansson, & Bailey, 1992). Jungert (2012) studied the relationship between occupational self-efficacy and autonomous motivation, which entails intrinsic motivation. In his study among research and development professionals and care giving workers, a weak but positive relationship between both constructs was found. Given these findings regarding motivation and occupational self-efficacy, we hypothesize the following:

Hypothesis 2: Occupational self-efficacy relates positively to teachers' intrinsic motivation.

In terms of behavioural intentions, self-efficacy beliefs are considered to be proximal variables: variables that are close to the behaviour at hand (e.g., Fishbein & Ajzen, 2010). Proximal variables are affected by so-called distal variables, such as school characteristics and individual teacher characteristics (see, for example, Kreijns, Van Acker, Vermeulen, & Van Buuren, 2013). Basic psychological need satisfaction, that is, an individual's perception of the extent to which he or she feels the environment satisfies his or her basic psychological needs, can be viewed as a distal variable that is expected to influence self-efficacy as a proximal variable. Empirical studies that examine both basic psychological need satisfaction and occupational self-efficacy are lacking. However, previous studies in different settings have related psychological need satisfaction to other forms of self-efficacy. Findings of a study among executive and middle managers from a high tech company showed that basic psychological need satisfaction predicts self-efficacy (Moen & Skaalvik, 2009). Recently, in an educational setting, Diseth, Danielsen, and Samdal (2012) found that secondary school students' feelings of basic psychological needs predicted their academic self-efficacy. Given these effects of basic psychological need satisfaction on other aspects of self-efficacy, the following hypothesis is formulated:

Hypothesis 3: Satisfaction of the three basic psychological needs is positively related to teachers' occupational self-efficacy.

Intrinsic motivation, self-efficacy, and innovative behaviour among teachers

People who enjoy their work are more likely to come up with ideas for improvements and contribute to the implementation of new ideas (De Jong & Kemp, 2003). Furthermore, intrinsically motivated employees are more likely to try and find ways to improve methods or activities at work, resulting in higher job performance (Jung, Chow, & Wu, 2003). Although empirical evidence needs strengthening, intrinsic motivation seems to be an important predictor for teachers' innovative behaviour as well (e.g., Messman & Mulder, 2014). Therefore the following hypothesis is formulated:

Hypothesis 4: Teachers' intrinsic motivation relates positively to teachers' innovative behaviour at work.

Self-efficacy is closely related to behaviour (Fishbein & Ajzen, 2010). It is a predictor for different kinds of teacher behaviour and relevant in explaining the influence of teachers' perception of their work environment on their behaviour or activities. There are numerous studies on teachers' feelings of self-efficacy, but few studies have focused on their occupational self-efficacy (e.g., Konermann, 2011; Runhaar, 2008). These studies indicate that occupational self-efficacy among teachers

might be relevant in explaining innovative behaviour. To further examine the relevance of occupational self-efficacy in explaining teachers' innovative behaviour, the final hypothesis focuses on the expected relation between these two constructs.

Hypothesis 5: Occupational self-efficacy relates positively to teachers' innovative behaviour.

The Present Study

This study aims to contribute to the body of knowledge on teachers' innovative behaviour, in order to gain more understanding of how it is affected by different and possibly interacting psychological processes leading to teachers' individual innovative behaviour at work.

The main question addressed in this study is how basic psychological need satisfaction, occupational self-efficacy, and intrinsic motivation contribute to teachers' innovative behaviour. Based on theory and empirical findings we constructed a model (Figure 1) that assumes that the support of the three basic psychological needs contributes positively to feelings of intrinsic motivation and occupational self-efficacy, which in turn both lead to teachers' innovative behaviour. In other words, in this model, as in SDT, basic psychological need satisfaction serves as a predictor for motivational constructs that affect behavioural outcomes. The examination of this model is accompanied by the previously mentioned hypotheses regarding the positive effects of each of the constructs.

Methods

Data Collection

An online questionnaire was administered among teachers in the Netherlands. In order to obtain a reliability level of 95%, a minimum number of 1,152 respondents was sought, equally divided between primary, secondary, and vocational education. As response rates on anonymised online surveys are expected to be around 5%, a large group of teachers had to be addressed. Therefore, a database compiled by the Onderwijs Innovatie Groep (Education Innovation Group) and comprising 37,888 Dutch school employees was used to invite teachers by email to participate in the online questionnaire. As the response of teachers working in vocational education lagged behind in comparison to teachers working in primary and secondary education, a reminder was sent to this group after two weeks. The questionnaire was closed two weeks after this reminder. The study was performed in the autumn of 2011.

Participants

In sum, 3,573 school employees started the questionnaire. Of that number, 245 did not belong to the target group of teachers. The questionnaire was fully completed by 2,385 of the remaining 3,328

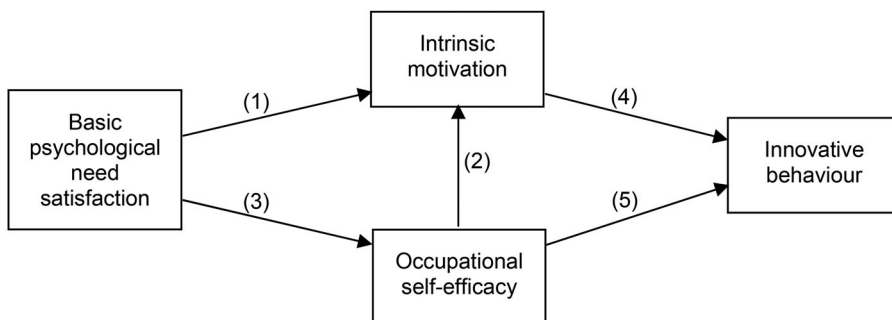


Figure 1. Conceptual model with the accompanying hypotheses in brackets.

respondents, resulting in a final response percentage of 6.3% for the purpose of this study. From the participating teachers, 690 worked in primary education, 1,414 in secondary education, and 255 in schools for vocational education. The remaining 26 teachers worked in other types of education, such as special education. The respondents – 1,130 men and 1,255 women – ranged in age from 20 to 67 years ($M = 49.18$, $SD = 10.06$).

The number of respondents in this study is equivalent to approximately 1% of the total population of teachers in primary, secondary, and vocational education in the Netherlands. Compared to the total population of teachers in the Netherlands, the response group comprises slightly more teachers of 45 years of age or above. The number of male teachers working in secondary and vocational education is somewhat over-represented in this study. Because the aim of the study does not involve a search for differences across certain groups based on age, gender, and type of school teachers mainly teach at (primary, secondary or vocational education), these background variables were controlled for in the analyses.

Measures

All constructs reported in this study were mapped using existing scales on basic psychological need satisfaction at work, intrinsic motivation, occupational self-efficacy, and innovative behaviour at work. When needed, items were translated into Dutch and were reworded or adjusted while keeping as close as possible to the original meaning of the items. All items were measured using seven-point Likert type scales, ranging from 1 (not at all true) to 7 (very true).

Basic Psychological Need Satisfaction

Most work-related measures of basic psychological need satisfaction used in previous studies are *ad hoc* instruments that lack evidence of validity (Brien et al., 2012). An exception is the scale constructed by Van den Broeck et al. (2010) but, as Brien et al. (2012) point out, this scale also has certain weaknesses concerning the operationalization of some of its constructs.

In this study the original Basic Need Satisfaction at Work Scale was used, which aims to determine the extent of employees' psychological need satisfaction, that is, the satisfaction of the need for competence, autonomy, and relatedness in the workplace (Kasser, Davey, & Ryan, 1992). Because strong empirical evidence of the dimensionality of the Basic Need Satisfaction at Work Scale is lacking (Johnston & Finney, 2010), an explorative factor analysis (principal component analysis with varimax rotation) was performed in order to replicate the structure of the Basic Need Satisfaction at Work Scale. Due to a misfit of the factor solutions and low reliabilities, replicating the original factor structure was not possible. In other words, the distinction between the three basic psychological needs did not appear to be trustworthy. Instead, based on reliability analyses, factor analyses, and content analyses, a shortened version of the Basic Psychological Need Satisfaction at Work scale was constructed, with one factor consisting of 10 items. This scale contains items of all three original subscales (competence: 3 items, autonomy: 4 items, relatedness: 3 items). The factor has an eigenvalue of 4.71, accounting for 41.35% of the variance and with factor loadings ranging from .546 to .730. Table 1 shows the factor loadings of the individual items in the shortened version of the scale, ordered by the three needs as proposed by SDT. Cronbach's alpha for this constructed measure as used in the main analysis was .87. Examples of items include: "Most days I feel a sense of accomplishment from working" and "People at work care about me."

Intrinsic Motivation

In order to assess the degree of intrinsic motivation teachers claim to have for their job, the Interest/Enjoyment scale consisting of seven items of the Intrinsic Motivation Inventory (Deci & Ryan, n.d.) was used and adjusted for the purpose of this study. Examples of items in this scale are: "I enjoy my work as a teacher" and "I would describe working as a teacher as very interesting." The reliability of the scale Intrinsic Motivation was improved by removing one item of the original scale ("Working as

Table 1. Factor analysis on the adjusted scale Basic Psychological Need Satisfaction at Work (principal component analysis, varimax, $n = 2,385$).

Item	Factor loading
I have been able to learn interesting new skills on my job (c)	.609
Most days I feel a sense of accomplishment from working (c)	.587
People at work tell me I am good at what I do (c)	.546
My feelings are taken into consideration at work (a)	.714
I feel like I can pretty much be myself at work (a)	.687
I am free to express my ideas and opinions on the job (a)	.647
I feel like I can make a lot of inputs to deciding how my job gets done (a)	.623
People at work care about me (r)	.730
I really like the people I work with (r)	.635
People at work are pretty friendly towards me (r)	.629

Note: (c) = item originally reflecting competence, (a) = autonomy, (r) = relatedness.

a teacher does not hold my attention at all”). This led to a scale that contained six items, with a Cronbach’s alpha of .90.

Occupational Self-Efficacy

Using the short version of the Occupational Self-Efficacy Scale (Schyns & von Collani, 2002), the degree to which teachers feel confident to face the challenges of changes and unforeseen situations was determined. The scale comprises eight items, such as: “If I am in trouble at work, I can usually think of something to do” and “I remain calm when facing difficulties in my job because I can rely on my abilities.” The reliability analysis of this scale led to a Cronbach’s alpha of .89.

Innovative Behaviour

Innovative behaviour at work was assessed using the Innovative Behaviour scale of De Jong and Hartog (2005). This scale determines the degree to which the respondent feels he or she behaves innovatively at work. It consists of eight items such as: “People I work with think of me as somebody who likes to do new things” and “I enjoy trying new approaches.” Cronbach’s alpha of this scale was .91. The internal consistencies of all scales as used in the main analysis are presented in Table 1.

Data Analysis

Because the measures used in this study were all based on self-reports of teachers and gathered at one single point in time, it was necessary to investigate the possibility of common-method variance. Therefore the so-called Harman’s one-factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) was performed. Unrotated principal axis factoring resulted in four factors explaining 54.13% of the variance. Each factor had an eigenvalue above 1.00. The first factor explained 31.77% of the variance. This means that this factor did not account for the majority of the variance. Furthermore, no general factor appeared that accounted for the majority of the covariance in the measures, indicating that absence of common-method variance for the sample seems plausible.

Structural equation modeling was used to test the path model presented in Figure 1 and its underlying hypotheses. The background variables gender, age and type of school teachers work in were added to model and controlled for in the analyses.

Structural equation modeling enables the testing of hypothesized models statistically in a way that allows for simultaneously examining all variables to determine the consistency of the model with the data (Byrne, 2012). This approach uses both factor analysis to model latent constructs (i.e., the measurement model) and path analysis to test the hypothesized relationships. Modeling was carried out by means of a strictly confirmatory approach (Jöreskog, 1993), using MPlus version 6.

Due to the multivariate non-normality of the data, a robust maximum likelihood estimation was used (Byrne, 2012; Kline, 2011). Model fit is therefore reported by means of a Satorra-Bendler chi square. The associated comparative fit index (CFI), the root mean square of error approximation

(RMSEA), and the standardized root mean square residual (SRMR) are reported as well. Model fit is considered acceptable when the CFI is .95 or above, the RMSEA is .08 or below, and the SRMR is .06 or below (Hu & Bentler, 1999).

Results

Table 2 shows the descriptive statistics of the constructs in the adjusted hypothesized model. The respondents scored the highest average on the scale Intrinsic Motivation ($M = 5.86$), but the individual scores ranged a fair amount ($SD = 1.11$). The lowest average was found on the scale Innovative Behaviour ($M = 5.04$), again with a fair amount of deviation between the individual scores ($SD = 1.13$).

All bivariate correlations between the theoretical constructs were significant ($p = 0.01$). The strongest correlational relationship was found between basic psychological need satisfaction at work and intrinsic motivation ($r = 0.53$). The weakest relationship found was the one between intrinsic motivation and innovative behaviour at work ($r = 0.33$).

Before testing the hypothesized structural relationships in the model, the fit of the measurement model was tested. For reasons of conciseness, these results are not reported here. By means of χ^2 , the CFI, the RMSEA, and the SRMR, the model fit of the proposed model was calculated. Teachers' age, gender, and the type of school they teach at were added as background variables to control for. The results of the model testing indicated an acceptable fit: $\chi^2(599) = 3,478.82$, $p = .00$, CFI = .918, RMSEA = .048, SRMR = .053.

The standardized regression coefficients are shown in Figure 2, which confirms that teachers' intrinsic motivation is positively related to their basic psychological need satisfaction (Hypothesis 1; $\beta = .451$, $p < .01$). The more teachers felt satisfied in their basic psychological needs, the more they felt intrinsically motivated. Furthermore, occupational self-efficacy is also positively related to intrinsic motivation (Hypothesis 2; $\beta = .210$, $p < .01$), although this effect is not as strong as the effect of basic psychological need satisfaction on intrinsic motivation. Occupational self-efficacy is also affected by basic psychological need satisfaction (Hypothesis 3). This is, in fact, the strongest effect found in this study ($\beta = .506$, $p < .01$) and indicates that the more teachers felt satisfied in their basic psychological needs, the more they felt confident in their ability to change whenever required. The effect of intrinsic motivation on innovative behaviour was weak but still significant (Hypothesis 4; $\beta = .120$, $p < .01$). In fact, innovative behaviour turned out to be affected more strongly by occupational self-efficacy (Hypothesis 5; $\beta = .444$, $p < .01$).

Based on the results, all hypotheses are accepted. The strongest path in the model is the path from basic psychological need satisfaction via occupational self-efficacy to innovative behaviour. Feeling satisfied in their basic psychological needs supports teachers' feelings of confidence in facing the changes or unforeseen situations that might occur in their teaching job, which in turn predicts teachers' innovative behaviour at work.

After controlling for the background variables of gender, age, and school type, only few of these variables appeared to have significant effects on the latent variables in the conceptual model. The largest significant effect found concerned a small impact of age on innovative behaviour ($\beta = -.113$, $p < .01$). This indicates that younger teachers report that they more often behave in an innovative way.

Table 2. Means (M), standard deviations (SD), reliability coefficients and correlations among the studied constructs.

Construct	M	SD	1	2	3	4
1. Basic psychological need satisfaction	5.38	.90	.87			
2. Occupational self-efficacy	5.81	.77	.44*	.89		
3. Intrinsic motivation	5.86	1.11	.53*	.42*	.90	
4. Innovative behaviour	5.04	1.13	.37*	.46*	.33*	.91

Note: Reliability coefficients (Cronbach's alpha) are presented in italics; *Correlations significant at the .01 level (two-tailed).

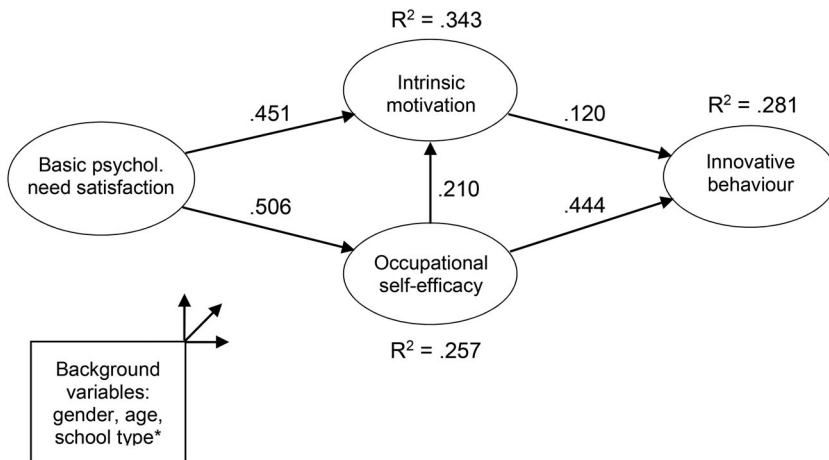


Figure 2. Final structural model representing the standardized relationships.

Note: *For the ease of exposition, only significant effects between the constructs are presented in this Figure ($p < .01$).

Conclusion and Discussion

Teacher professional development and innovative behaviour are important assets of a high-quality education that prepares students for learning, living, and working in a knowledge society. Many assume that motivational problems hinder teachers' professional development and readiness for innovation. However, the empirical underpinning of this claim is unclear. Nevertheless, motivation and self-efficacy appear to influence teachers' innovative behaviour (Thurlings et al., 2015) and the extent to which teachers introduce new ideas in their schools (Pyhältö et al., 2012). Therefore, the main focus of this study was to gain more insights into the relations between psychological processes leading to teachers' innovative behaviour at work, specifically intrinsic motivation, basic psychological need satisfaction, and occupational self-efficacy. As such, the model tested in this study is largely based on SDT (Deci & Ryan, 1985, 2000) and extends this theoretical framework with teachers' occupational self-efficacy. Combining SDT with (elements of) other theoretical models in explaining teacher behaviour has previously proven to be useful, for example in explaining their intentions to continue using e-learning technology (Sørebø, Halvari, Gulli, & Kristiansen, 2009) and their motivation to use digital learning materials (Kreijns, Vermeulen, Van Acker, & van Buuren, 2014).

Our model confirms that a sequence of motivational constructs does affect teachers' innovative behaviour. Our study also shows that teachers' basic psychological need satisfaction relates positively to intrinsic motivation toward working as a teacher (Hypothesis 1). This confirms one of the central ideas within SDT, namely that satisfaction of the basic psychological needs nourishes intrinsic motivation. However, replicating this construct as three separate psychological needs was not possible. The problem regarding the confirmation of three separate factors for autonomy, competence, and relatedness, however, is not unique to this study. Similar difficulties were found, for example, in a study among student teachers (Vermeulen, Castelijns, Cools, & Koster, 2012). Studies in other fields also encountered difficulties in replicating a three-factor structure of existing work-related basic need satisfaction scales (e.g., Dysvik, Kuvaas, & Gagné, 2013). Due to the fact that the three separate factors could not be reproduced, our study led to the construction of a short overall basic psychological need satisfaction scale, consisting of items from all three basic needs. Although the use of one basic need satisfaction factor makes it impossible to test the extent to which autonomy, competence, and relatedness separately influence intrinsic motivation, the use of one overall score for the three basic psychological needs is not uncommon (e.g., De Cooman, Stynen, Van den Broeck, Sels, & De Witte, 2013; Milyavskaya & Koestner, 2011; Vansteenkiste et al., 2007).

Intrinsic motivation was affected by teachers' basic psychological need satisfaction but, although weakly, also by occupational self-efficacy (Hypothesis 2). The importance of self-efficacy beliefs for human motivation has previously been pointed out by, for example, Bandura (1997). However, in the case of this study, the perceptions of their work environment in terms of the basic psychological need satisfaction has a stronger influence on teachers' intrinsic motivation.

The relationship between basic psychological need satisfaction and occupational self-efficacy (Hypothesis 3) turned out to be the strongest relationship in the tested model. This illustrates that a work environment in which teachers' basic psychological needs are sufficiently met not only supports their intrinsic motivation, but also leads to other beneficial psychological outcomes. A possible explanation for the strong relationship between basic psychological needs and occupational self-efficacy may be that competence, as one of the basic psychological needs, and feelings of self-efficacy are expected to correlate highly (Van den Broeck et al., 2010). However, the construct of basic psychological need satisfaction also included autonomy and relatedness items, which together formed a larger part of the factor, with higher factor loadings than the competence items. Apparently, teachers who experience a higher degree of support of their basic psychological needs are more confident in their own ability to effectively face changes during the job. Hence, this basic psychological need satisfaction and occupational self-efficacy is not only relevant for innovative behaviour, that is, the self-initiated development of, sharing, and trying out of new ideas, but also for other change or innovation processes, such as implementing large-scale centralized curriculum innovations. This supports the findings of a Finnish study in which teachers' individual experiences and their intrinsic motivation, as well as challenges they encounter and the social context they work in (i.e., organizational support) contribute to achieve educational change (Kunnari & Ilomäki, 2016).

Our study shows that both intrinsic motivation and occupational self-efficacy serve as predictors for innovative behaviour. However, the relationship between intrinsic motivation and innovative behaviour (Hypothesis 4) is significant but weak, whereas the relationship between occupational self-efficacy and innovative behaviour (Hypothesis 5) is much stronger. This means that the model confirms that feeling confident in dealing with future changes in the teaching job leads to behaving more innovatively at work. The strong relationship between the two concepts can be explained by taking into account that both constructs involve possible changes affecting the teaching job. In the case of teachers' innovative behaviour, those changes are initiated by teachers who create, introduce or implement new ideas by themselves. In contrast, occupational self-efficacy refers to possible challenges or threats of changes that might occur within the job and that, for example, are necessary because of new educational policies or mandatory curriculum innovations. Higher confidence in facing those changes relates positively to teachers' perceived innovative behaviour at work.

The weak relationship between intrinsic motivation and innovative behaviour can be explained by the distinction Vallerand (1997) makes in his Hierarchical Model between motivation on a global, contextual, and situational level. The global level of motivation is the general motivational orientation an individual has in interacting with his environment, and can be considered as the motivational orientation on an individual's personality level. The contextual level refers to the motivational orientation in a specific life domain, such as work and leisure. The situational level of motivation refers to a specific activity at a given point in time. The Hierarchical Model postulates that the level in which the consequences are situated depends on the level of motivational orientations (general, contextual, or situational). For example, studies have shown that contextual motivations are the strongest predictors for consequences on a contextual level (Vallerand & Ratelle, 2002). Intrinsic motivation in this study can be considered as the measurement of a motivational orientation on a contextual level, while innovative behaviour as a specific type of professional behaviour can be conceived as a consequence on a more situational level.

Another possible explanation of the weak relationship between intrinsic motivation and innovative behaviour may be found in teachers' perceptions of the teaching job or, to put it differently, in

their professional orientation. Hoyle (1975) makes a distinction between so-called restricted and extended professional orientation. Teachers with a restricted professional orientation focus mainly on their own teaching practice in the classroom. Their involvement in other professional activities besides teaching is, for example, very limited, and they do not read professional literature on a regular basis. Teachers with a more extended professional orientation focus on the school organization as an important part of their teaching practice, show higher involvement in other professional activities, and regularly keep track of professional literature. Thus, professional orientation might affect the relationship between intrinsic motivation for the teaching job and innovative behaviour in the sense that with an extended professional orientation, the relationship between intrinsic motivation and innovative behaviour might be stronger.

Although the necessity for teachers to engage in self-initiated innovative behaviour might differ between countries and educational systems, the psychological determinants underlying intrinsic motivation, namely the satisfaction of the basic psychological needs, are claimed to be universal (Deci et al., 2001). This means that these motivational constructs and the effects found in this study are relevant for other countries as well.

Limitations

At this point, some limitations of this study have to be mentioned. First, although our model featured causal relationships, causality cannot be established as the model is fitted to correlational data. Second, the results are based on teachers' self-reports. It is conceivable that other sources of information, such as school principals or colleagues, might shed a different light, for example, on teachers' actual innovative behaviour. Third, this study only focuses on a few psychological constructs that might positively influence teachers' innovative behaviour. It is also important to examine other aspects, for example other types of motivation, professional orientation, and organizational factors such as school leadership. Professional orientation and work context have also been mentioned as factors that influence teachers' professional agency, that is, taking responsibility for individual problem solving, and contributing to the professional community by collaborating and coming up with new ideas, as well as combining, implementing, and monitoring this process (Pyhältö et al., 2012). Finally, although the number of respondents was high, the response rate calls for caution regarding conclusions about the generalizability of the findings. Additional research is needed to strengthen the empirical evidence on motivational factors that contribute to teachers' innovative behaviour.

Future Research and Practical Implications

Both motivation and self-efficacy are challenging constructs to measure in terms of reliability and validity. This also holds for the construct of basic psychological need satisfaction. As a result of the difficulties encountered in this study regarding the measurement of basic psychological need satisfaction, a shortened version of the Basic Psychological Need Satisfaction scale was created to measure teachers' overall satisfaction of their basic psychological needs. Nevertheless, this study shows that basic psychological need satisfaction functions as a predictor for both teachers' intrinsic motivation and their occupational self-efficacy. In addition it reveals that the concept of occupational self-efficacy is a stronger predictor of innovative behaviour than intrinsic motivation. Because teachers are key to good education, enhancing their feelings of occupational self-efficacy may therefore prove to be important to advance educational innovations.

This study shows that teachers' intrinsic motivation for their job and their level of occupational self-efficacy both appear to flourish in work environments that support their need for autonomy, competence, and relatedness. This requires work environments in which teachers experience enough opportunities to make their own professional choices and decisions, and in which they feel competent to act successfully, and connected to relevant others. Although co-workers may also exert a positive influence, research has shown that according to teachers, their supervisors or school principals

seem to play a key role in creating an autonomy-supportive work culture within schools (e.g., Grove, 2008; Wagner & French, 2010).

Disclosure statement

No potential conflict of interest was reported by the authors.

References

- Abele, A. E., & Spurk, D. (2009). The longitudinal impact of self-efficacy and career goals on objective and subjective career success. *Journal of Vocational Behavior*, 74, 53–62.
- Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39, 1154–1184.
- Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology*, 34, 2045–2068.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122–147.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Binnewies, C., & Gromer, M. (2012). Creativity and innovation at work: The role of work characteristics and personal initiative. *Psicothema*, 24, 100–105.
- Boekaerts, M., Van Nuland, H. J. C., & Martens, R. L. (2010). Perspectives on motivation: What mechanisms energise students' behaviour in the classroom. In J. Kleine Staarman, K. Littleton, & C. Wood (Eds.), *Handbook of educational psychology* (pp. 535–569). Bingley, UK: Emerald.
- Brien, M., Forest, J., Mageau, G. A., Boudrias, J.-S., Desrumaux, P., Brunet, L., & Morin, E. M. (2012). The basic psychological needs at work scale: Measurement invariance between Canada and France. *Applied Psychology: Health and Well-Being*, 4, 167–187.
- Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. New York, NY: Taylor and Francis Group.
- Bysted, R., & Hansen, J. R. (2015). Comparing public and private sector employees' innovative behaviour: Understanding the role of job and organizational characteristics, job types, and subsectors. *Public Management Review*, 17, 698–717.
- Carmeli, A., Meitar, R., & Weisberg, J. (2006). Self-leadership skills and innovative behavior at work. *International Journal of Manpower*, 27, 75–90.
- De Cooman, R., Stynen, D., Van den Broeck, A., Sels, L., & De Witte, H. (2013). How job characteristics relate to need satisfaction and autonomous motivation: Implications for work effort. *Journal of Applied Social Psychology*, 43, 1342–1352.
- 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, 235–259.
- De Jong, J. P. J., & Den Hartog, D. N. (2007). Leadership and employees' innovative behavior. *European Journal of Innovation Management*, 10, 41–64.
- De Jong, J. P. J., & Kemp, R. (2003). Determinants of co-workers' innovative behaviour: An investigation into knowledge intensive services. *International Journal of Innovation Management*, 7, 189–212.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York/London: Plenum Press.
- Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227–268.
- Deci, E. L., & Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology/Psychologie Canadienne*, 49, 14–23.
- Deci, E. L., & Ryan, R. M. (n.d.). *Intrinsic motivation inventory (IMI)*. Retrieved September 15, 2011, from http://www.psych.rochester.edu/SDT/measures/IMI_scales.php
- Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former Eastern Bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin*, 27, 930–942.
- Deci, E. L., & Vansteenkiste, M. (2004). Self-determination theory and basic need satisfaction: Understanding human development in positive psychology. *Ricerche di Psicologia*, 27, 17–34.
- Diseth, Å., Danielsen, A. G., & Samdal, O. (2012). A path analysis of basic need support, self-efficacy, achievement goals, life satisfaction and academic achievement level among secondary school students. *Educational Psychology*, 32, 335–354.

- Dysvik, A., Kuvaas, B., & Gagné, M. (2013). An investigation of the unique, synergistic and balanced relationships between basic psychological needs and intrinsic motivation. *Journal of Applied Social Psychology*, 43, 1050–1064.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53, 109–132.
- Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York: Psychology Press (Taylor & Francis).
- Fletcher, W. L., Hansson, R. O., & Bailey, L. (1992). Assessing occupational self-efficacy among middle-aged and older adults. *Journal of Applied Gerontology*, 11, 489–501.
- Grove, C. M. (2008). *The importance of values-alignment within a role-hierarchy to foster teacher's motivation for implementing professional development* (PhD thesis). University of Florida, Tallahassee, FL.
- Hargreaves, A., & Lo, L. (2000). The paradoxical profession: Teaching at the turn of the century. *Prospects*, 30, 1–16.
- Hartmann, A. (2006). The role of organizational culture in motivating innovative behaviour in construction firms. *Construction Innovation*, 6, 159–172.
- Hoyle, E. (1975). Leadership and decision-making in education. In M. Hughes (Eds.), *Administering education: International challenge*. London: The Athlone Press.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55.
- Ilardi, B. C., Leone, D., Kasser, R., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *Journal of Applied Social Psychology*, 23, 1789–1805.
- Janssen, O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology*, 73, 287–302.
- Janssen, O. (2005). The joint impact of perceived influence and supervisor supportiveness on employee innovative behaviour. *Journal of Occupational and Organizational Psychology*, 78, 573–579.
- de Jesus, S. N., & Lens, W. (2005). An integrated model for the study of teacher motivation. *Applied Psychology: An International Review*, 54, 119–134.
- Johnston, M. M., & Finney, S. J. (2010). Measuring basic needs satisfaction: Evaluating previous research and conducting new psychometric evaluations of the basic needs satisfaction in general scale. *Contemporary Educational Psychology*, 35, 280–296.
- Jöreskog, K. G. (1993). Testing structural equation models. In K. A. Bollen & J. S. Lang (Eds.), *Testing structural equation models*. Newbury Park, CA: Sage.
- Jung, D. I., Chow, C., & Wu, A. (2003). The role of transformational leadership in enhancing organizational innovation: Hypotheses and some preliminary findings. *The Leadership Quarterly*, 14, 525–544.
- Jungert, T. (2012). *The meaning of support from co-workers and managers in teams when working* (FOG-Report no 72). Linköping: Department of Behavioural Sciences and Learning (IBL), Linköping University.
- Kasser, T., Davey, J., & Ryan, R. M. (1992). Motivation, dependability, and employee-supervisor discrepancies in psychiatric vocational rehabilitation settings. *Rehabilitation Psychology*, 37, 175–187.
- Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology*, 102, 741–756.
- Kline, R. B. (2011). *Principles and practice of structural equation modelling*. New York: The Guilford Press.
- Knol, J., & Van Linge, R. (2009). Innovative behaviour: The effect of structural and psychological empowerment on nurses. *Journal of Advanced Nursing*, 65, 359–370.
- Knowles, K. T. (1999). *The effect of teacher engagement on student achievement and motivation (NELS:88, eighth-grade, tenth-grade)* (Doctoral dissertation). Dissertation Abstracts International, 60, 1010.
- Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being highly motivated: A closer look at introjection, identification, and intrinsic motivation. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 101–121). Rochester, NY: University of Rochester Press.
- Konermann, J. (2011). *Teachers' work engagement: A deeper understanding of the role of job and personal resources in relationship to work engagement, its antecedents, and its outcomes* (Doctoral dissertation). Retrieved from http://doc.utwente.nl/79200/1/thesis_J_Konermann.pdf
- König, C. J., Debus, M. E., Häusler, S., Lendenmann, N., & Kleinmann, M. (2010). Examining occupational self-efficacy, work locus of control and communication as moderators of the job insecurity—job performance relationship. *Economic and Industrial Democracy*, 31, 231–247.
- Kreijns, K., Van Acker, F., Vermeulen, M., & Van Buuren, H. (2013). What stimulates teachers to integrate ICT in their pedagogical practices? The use of digital learning materials in education. *Computers in Human Behavior*, 29, 217–225.
- Kreijns, K., Vermeulen, M., Van Acker, F., & van Buuren, H. (2014). Predicting teachers' use of digital learning materials: Combining self-determination theory and the integrative model of behaviour prediction. *European Journal of Teacher Education*, 37, 465–478.
- Kunnari, I., & Ilomäki, L. (2016). Reframing teachers' work for educational innovation. *Innovations in Education and Teaching International*, 53, 167–178.
- Lam, S., Cheng, R. W., & Choy, H. C. (2010). School support and teacher motivation to implement project-based learning. *Learning and Instruction*, 20, 487–497.

- Lam, S., Cheng, R. W., & Ma, W. Y. (2009). Teacher and student intrinsic motivation in project-based learning. *Instructional Science*, 37, 565–578.
- LaPointe, L. (2006). *The relationships between teacher need satisfaction and perceptions of school and classroom environments* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (Publication number AAT 3239862).
- Messman, G., & Mulder, R. (2011). Innovative work behaviour in vocational colleges: Understanding how and why innovations are developed. *Vocations and Learning*, 4, 63–84.
- Messmann, G., & Mulder, R. H. (2014). Exploring the role of target specificity in the facilitation of vocational teachers' innovative behaviour. *Journal of Occupational and Organizational Psychology*, 87, 80–101.
- Milyavskaya, M., & Koestner, R. (2011). Psychological needs, motivation, and well-being: A test of self-determination theory across multiple domains. *Personality and Individual Differences*, 50, 387–391.
- Moen, F., & Skaalvik, E. (2009). The effect from executive coaching on performance psychology. *International Journal of Evidence Based Coaching and Mentoring*, 7, 31–49.
- Nederveen Pieterse, A., Van Knippenberg, D., Schippers, M., & Stam, D. (2010). Transformational and transactional leadership and innovative behavior: The moderating role of psychological empowerment. *Journal of Organizational Behavior*, 31, 609–623.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903.
- Pyhältö, K., Pietarinen, J., & Soini, T. (2012). Do comprehensive school teachers perceive themselves as active professional agents in school reforms? *Journal of Educational Change*, 13(1), 95–116.
- Radel, R., Sarrazin, P., Legrain, P., & Wild, T. C. (2010). Social contagion of motivation between teacher and student: Analyzing underlying processes. *Journal of Educational Psychology*, 102, 577–587.
- Reupert, A., & Woodcock, S. (2011). Canadian and Australian pre-service teachers' use, confidence and success in various behaviour management strategies. *International Journal of Educational Research*, 50, 271–281.
- Runhaar, P. (2008). *Promoting teachers' professional development* (Unpublished doctoral dissertation). Universiteit Twente, Enschede, Netherlands.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25, 54–67.
- Scheerens, J. (Ed.). (2010). *Teachers' professional development: Europe in international comparison. An analysis of teachers' professional development based on OECD's teaching and learning international survey*. Luxembourg: Office for Official Publications of the European Union.
- Schleicher, A. (Ed.). (2012). *Preparing teachers and developing school leaders for the 21st century: Lessons from around the world*. Paris: OECD Publishing.
- Schyns, B., & von Collani, G. (2002). A new occupational self-efficacy scale and its relation to personality constructs and organizational variables. *European Journal of Work and Organizational Psychology*, 11, 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, 580–607.
- Sørebo, Ø., Halvari, H., Gulli, V. F., & Kristiansen, R. (2009). The role of self-determination theory in explaining teachers' motivation to continue to use e-learning technology. *Computers & Education*, 53, 1177–1187.
- Thurlings, M. C. G., Evers, A. T., & Vermeulen, M. (2015). Toward a model of explaining teachers' innovative behavior: A literature review. *Review of Educational Research*, 85, 430–471.
- Tschannen-Moran, M., & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17, 783–805.
- Tuominen, T., & Toivonen, M. (2011). Studying innovation and change activities in KIBS through the lens of innovative behaviour. *International Journal of Innovation Management*, 15, 393–422.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Eds.), *Advances in experimental social psychology*. San Diego: Academic Press.
- Vallerand, R. J., & Ratelle, C. F. (2002). Intrinsic and extrinsic motivation: A hierarchical model. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research*. Rochester, NY: University of Rochester Press.
- Van den Broeck, A., Vansteenkiste, M., de Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the work-related basic need satisfaction scale. *Journal of Occupational and Organizational Psychology*, 83, 981–1002.
- Vansteenkiste, M., Neyrinck, B., Niemiec, C. P., Soenens, B., De Witte, H., & Van den Broeck, A. (2007). On the relations among work value orientations, psychological need satisfaction and job outcomes: A self-determination theory approach. *Journal of Occupational and Organizational Psychology*, 80, 251–277.
- Vermeulen, M., Castelijns, B., Cools, Q., & Koster, B. (2012). Measuring student teachers' basic psychological needs. *Journal of Education for Teaching*, 38, 453–467.
- Vermeulen, M., Van Acker, F., Kreijns, K., & Van Buuren, H. (2015). Does transformational leadership encourage teachers' use of digital learning materials. *Educational Management Administration & Leadership*, 43, 1006–1025.
- Wagner, B. D., & French, L. (2010). Motivation, work satisfaction, and teacher change among early childhood teachers. *Journal of Research in Childhood Education*, 24, 152–171.

Copyright of Scandinavian Journal of Educational Research is the property of Routledge and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.