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Geijsel, F.P.; Slegers, P.J.C.; Stoel, R.D.; Krüger, M.L.

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# The Effect of Teacher Psychological and School Organizational and Leadership Factors on Teachers' Professional Learning in Dutch Schools

Femke P. Geijssel  
Peter J. C. Slegers  
Reinoud D. Stoel  
Meta L. Krüger

*University of Amsterdam*

## Abstract

In this study we examined the relative importance of teachers' psychological states, school organizational conditions (teacher collaboration and participative decision making), and the leadership practices (vision, individual consideration, and intellectual stimulation) of principals at their schools in explaining variation in teachers' professional learning. We examined teachers' learning by focusing on their participation in the following professional learning activities: keeping up to date (or collecting new knowledge and information), experimentation, reflective practice, and innovation. The data we used came from the Dutch School Improvement Questionnaire consisting of 54 items administered to teachers from 18 Dutch primary schools (grades 1–8). To test our theoretical model, data from 328 teachers were analyzed using structural equation modeling. As expected, results showed that psychological factors (teachers' sense of self-efficacy and internalization of school goals into personal goals) had strong effects on teachers' participation in the professional learning activities. Furthermore, differential effects of leadership practices and organizational conditions on the 2 psychological factors and the professional learning activities were found. To better understand change mechanisms in schools and based on our findings, we stress the need to conduct research using models that contain factors at both the school and teacher levels.

Research on school change has shown that altering teachers' practices is extremely difficult (Fullan, 2002). In their efforts to understand the complexity of educational change, researchers have reconceptualized teacher change by using perspectives in which teacher learning in the context of the school is considered a key component of school improvement (Bransford, Brown, &

Cocking, 1999; Putnam & Borko, 2000; Smylie & Hart, 1999). According to Clarke and Hollingsworth (2002), views of teachers as learners and schools as learning communities are both fundamental to these perspectives. As a consequence, the capacity of schools to enhance professional learning of teachers and transform large-scale reform into accountable student-oriented teaching practice has become a major focus in recent research (Hopkins, 2001; Slegers, Bolhuis, & Geijssel, 2005; Smylie, 1995; Toole & Louis, 2002).

In line with this focus, a wide range of studies of organizational learning, professional learning communities, and schools as learning organizations have been conducted (Bryk, Camburn, & Louis, 1999; Leithwood & Louis, 1998; Silins, Mulford, & Zarins, 2002). Many of these studies have used a system theory of change that links structural, cultural, and political dimensions of school workplace environments to professional learning. Results have shown that school organizational conditions such as participative decision making, teaming, teacher collaboration, an open and trustful climate, and transformational leadership can foster teachers' professional learning in schools.

Although these studies have suggested that schools can be supportive environments for professional learning, researchers have largely ignored the role of teachers' psychological states in explaining their learning. Research that has examined the influence of psychological states on teacher learning, however, has shown that individual factors such as personal teaching efficacy, teacher autonomy and perceived control, and teachers' sense making affect teachers' learning (Coburn, 2004; Richardson & Placier, 2001; Spillane, Reiser, & Reimer, 2002; van Veen, 2003).

Systematic research in which organizational and psychological antecedents of teachers' professional learning are examined in combination is missing (Kwakman, 2003; Smylie, 1988; Smylie, Lazarus, &

Brownlee-Conyers, 1996). The results of the few available studies have shown that individual factors have relatively large effects on learning. The influence of dimensions of school workplace environments on professional learning appears to be mediated by psychological factors. To increase the understanding of teachers' learning in the workplace and the implications of learning for school reform, more research is needed on the interplay between psychological factors and organizational conditions (Richardson & Placier, 2001; Smylie, 1988).

This study aimed to contribute to this line of research by examining the relative importance of school organizational conditions and leadership practices and teachers' psychological states in explaining variation in teachers' professional learning. We used theories of adult learning and change within organizations and research on teacher cognitions, workplace conditions, and leadership to identify several organizational and psychological factors that affect teacher learning. We present a structural model that hypothesizes relations among these variables and teacher learning. This model was tested using data from 328 teachers in 18 Dutch primary schools.

### **Teachers' Professional Learning**

Across theories of adult learning, a relatively consistent view of learning in the workplace has emerged (Jarvis, 1987; Marsick & Watkins, 1990; Smylie, 1995). Smylie (1995) reviewed adult learning theories for understanding teachers' professional learning and school reform and concluded that, in most adult learning theories, learning in the workplace is seen as an active and constructive process that is problem oriented, grounded in social settings and circumstances, and takes place throughout adults' lives. Inspired by this view and in line with situated cognitive perspectives on learning (Anderson, Greeno, Reder, & Simon, 2000; Clarke & Hollingsworth, 2002; Kwakman,

2003; Putnam & Borko, 2000), we view teacher learning as a constructive and socially and culturally situated process. From this perspective, the focus of teacher learning in our study is on professional activities within schools and on becoming a participant in a community of learners (Sfard, 1988; Ten Dam & Blom, 2006). This perspective implies that teachers take responsibility for their own professional functioning and acquire the necessary knowledge and repertoire of activities to participate critically in the social and cultural practices with regard to education. By participating in a variety of professional activities within the school, teachers stimulate both their own professional development and the development of the school and thus make a significant contribution to improving teaching and learning.

To improve schools as places for teachers to learn, it is important to acknowledge that not all teacher learning promotes professional development and school improvement. Acknowledging this raises the important question of which professional activities can improve teachers' participation in school practice and thus what type of teacher learning needs to be promoted. Using several adult learning theories and a conception of teaching as a complex, dynamic, and reflective practice, Smylie (1995) distinguished four learning outcomes that are crucial for enabling teachers to deal with the rapid changes with which they are faced: conceptual change, reflective thinking, experimentation, and innovation. Kwakman (2003) found types of professional learning activities that were similar to those Smylie referred to as teacher learning outcomes. Like Smylie, she identified experimenting and reflection as important activities teachers perform individually as part of their work to improve their practice and promote student learning. Furthermore, Kwakman identified keeping up to date as a third individual learning activity; this included gaining new

knowledge by reading professional literature and undertaking many kinds of training and thus keeping up to date with new insights and developments such as teaching methods, curriculum, and education and teaching in general. Although keeping up to date as a learning activity differs from Smylie's conceptual change as a learning outcome, both concepts stress the importance of teachers obtaining new information, insights, and developments from different sources as part of the professional knowledge base underlying their work.

Based on the above-mentioned conception of learning through participation, we examined teachers' professional learning by focusing on their participation in the following professional learning activities: keeping up to date (or collecting new knowledge and information), experimentation, reflective practice, and innovation. According to the taxonomy of adult learning as Jarvis (1987) presented, innovation (changed practice) and keeping up to date involve nonreflective learning, and experimentation and reflective practice represent higher-order reflective learning. Given this conceptualization, in this study teachers' professional learning thus refers to the participation of teachers in a variety of activities within the school that promote both nonreflective (keeping up to date, changed practice) and reflective (experimentation and reflective practice) learning.

To identify which organizational conditions and psychological factors affect these professional learning activities, theories that adopt an interactionist perspective of the relations between teachers as learners and their work environments are needed. In the following sections, we use theories of adult learning and change and empirical research on teacher cognitions, workplace conditions, and leadership practices to hypothesize relations between teachers' psychological states, school organizational conditions, leadership practices, and teachers' professional learning activities.

## Teachers' Psychological States

One of the most comprehensive adult learning theories is Bandura's (1986) social cognitive theory. In this theory human learning and functioning are explained in terms of a triadic reciprocity: individual behavior, cognitions, and environmental conditions operate as interacting determinants of one another. According to Bandura (1997), one important construct, perceived self-efficacy, mediates learning and behavior. Self-efficacy is a future-oriented belief about the competence a person expects to display in a given situation. As Bandura (1986) noted, evidence suggests that people who see themselves as efficacious set themselves challenges that enlist their interest and involvement in activities. They are also more likely to take risks and to experiment, and they are more creative in their learning, thinking, and work. Research on the effects of teachers' sense of self-efficacy has confirmed these results by showing that teachers' efficacy beliefs are related to their professional learning and to their enhancement of student achievement (Bandura, 1993; Goddard, Hoy, & Hoy, 2000). Based on these findings, we predicted in hypothesis 1 that sense of self-efficacy would have a positive effect on teachers' participation in professional learning activities.

In addition to sense of self-efficacy, teacher commitment to the school as an organization has been identified as positively related to increased effort, performance, and professionalism. According to Porter et al. (1974), organizational commitment can be generally characterized by at least three factors, including: (1) a strong belief in and acceptance of the organization's goals and values, (2) a willingness to exert considerable effort on behalf of the organization, and (3) a desire to maintain organizational membership. Research on teacher commitment as a key aspect of a school's capacity for reform has often suggested that Porter's first component is an element of teacher motivation and that the-

ories of motivation can predict the causes and consequences of teacher commitment (Leithwood, Jantzi, & Steinbach, 1999). Motivational processes are a function of one's personal goals and of beliefs about one's capacities and one's context (Bandura, 1986; Ford, 1992). Therefore, in this study we considered teachers' beliefs in and internalization of the school goals and values as an element of teacher motivation. In line with this view on teacher commitment, we assumed that teachers are more motivated if they have internalized school goals and values as their personal goals.

Personal goals motivate action when a person's evaluation of present circumstances is different from the desired state and may influence learning. Furthermore, Bandura (1986) argued that individuals are more likely to develop a positive sense of self-efficacy in settings where there are challenging and attainable goals with specific standards. To promote self-efficacy, goals must also be concrete and clear and include short-term objectives that are understood as valuable within the context of longer-term goals. Therefore, examining the relation between teacher motivation and teacher participation in learning activities, one would expect that the more teachers have internalized a school's goals and values as their personal goals, the more these goals would enhance teachers' learning and their sense of self-efficacy. Research has shown that teachers' internalization of school goals into personal goals influences their professional learning activities, both directly and via teacher self-efficacy (Geijsel, Slegers, Leithwood, & Jantzi, 2003; Leithwood et al., 1999; Wolbers & Woudenberg, 1995). From this background, we derived the following hypotheses: teachers' internalization of school goals into personal goals will have a positive effect on their participation in professional learning activities (hypothesis 2), and the effect of teachers' internalization of school goals into personal goals on their participation in professional learning activ-

ities will be mediated partly by sense of self-efficacy (hypothesis 3).

### School Organizational Conditions

Although psychological factors appear to be strongly related to teacher learning, the organizational design of schools also matters (Kwakman, 2003; Rowan, Raudenbush, & Kang, 1991). In debates about school reform, a more "organic" form of management, involving the developing of staff collaboration and participative decision making, is assumed to increase the commitment of the teaching staff and their identification with the school, which in turn will lead to improved teaching and learning (Rowan, 1990). Theories of adult learning and change within organizations have also identified organizational conditions that promote learning in the workplace, such as opportunities for individuals to work with and learn from similar and dissimilar others and the nature of interactions among individuals with whom one works (Bandura, 1986; Marsick & Watkins, 1990). Cooperative, friendly, and collegial relationships; open communication; and free exchange of ideas may provide emotional and psychological support for teachers' work and promote critical reflection, experimentation, and other types of learning (Smylie, 1995; Smylie et al., 1996). Collaboration also provides: opportunities for teachers to work together to solve problems, feedback and information, and assistance and support (Kwakman, 2003; Rosenholtz, 1991; Slegers, van den Berg, & Geijsel, 2000). Studies of the effects of the school organization on teachers' motivation and changed practice have shown that teacher collaboration—when strongly related to daily classroom practices and pupil learning—has strong positive effects on professional development and change (Bakkenes, de Brabander, & Imants, 1999; Bryk et al., 1999; Geijsel, Slegers, van den Berg, & Kelchtermans, 2001; Leithwood, 2000; Little, 1990; Rosenholtz, 1991; Rowan, 1995; Silins et al., 2002;

Smylie, 1988). Therefore, we predicted that collaboration would have a positive effect on teachers' participation in professional learning activities (hypothesis 4).

Teacher participation in decision making, as a condition that supports an organic form of school organization, can add to personal goals and teachers' sense of self-efficacy and thus motivate teacher learning. Participative decision making may increase teachers' ownership of organizational goals and can reinforce the extent to which teachers have internalized school goals and values as their personal goals (Slegers et al., 2005; Smylie, 1988; Smylie et al., 1996). As such, this type of decision making may provide standards teachers can use to evaluate their own practice and may clarify instructional goals, if the decision making concerns issues that are strongly related to teaching and student learning. Bandura (1986) argued that increased perceptions of self-efficacy may result from specific feedback related to individual performance and from challenging and attainable goals. Therefore, one would expect participative decision making to relate positively to teachers' internalization of school goals into personal goals and thus to enhance teachers' sense of self-efficacy. Positive effects of participative decision making on teacher motivation have been found in several empirical studies (e.g., Jongmans, Slegers, Biemans, & de Jong, 2004; Rowan, Raudenbush, & Cheong, 1993; Smylie et al., 1996). On the basis of these findings, we predicted that the positive effect of participative decision making on teachers' participation in professional learning activities would be mediated by teachers' internalization of school goals into personal goals and sense of self-efficacy (hypothesis 5).

### Leadership Practices

Transformational leadership is one of the most prominent contemporary approaches to leadership that has emerged in response to the more competitive global environ-

ment and large-scale changes. Drawing on the work of Burns (1978) concerning political leadership, Bass (1985) developed a model of transformational leadership that conceptualized transactional and transformational forms as separate but interdependent dimensions. Transactional leadership is generally sufficient for maintaining the status quo, but transformational leadership focuses on development for the purpose of change. Such leadership motivates followers to do more than they originally expected and often even more than they thought possible (Bass & Avolio, 1994).

Based on the work of Bass (1985), research on transformational leadership in educational settings identified three core dimensions of transformational leadership in schools: vision building through initiating and identifying a vision for the school's future, providing individual support, and providing intellectual stimulation (Geijsel, Slegers, & van den Berg, 1999; Leithwood & Jantzi, 2006; Leithwood et al., 1999; Nguni, Slegers, & Denessen, 2006).

Many researchers have viewed vision as a critical component of transformational leadership. According to Bennis and Nanus (1985, p. 89), a vision is "a mental image of a possible and desirable future state of the organization." A vision clarifies the setting of organizational goals and provides the direction of change. Through initiating and identifying a vision, school leaders contribute to vision building in the school that generates excitement, builds emotional attachment, and reinforces the personal and social identification of followers with the organization and thus increases collective cohesion. As a consequence, individuals may feel increased self-efficacy, may be more willing to internalize organizational goals and values as their personal goals, and may have more confidence in their ability to attain the vision.

Individual support or consideration represents an attempt to understand, recognize, and satisfy followers' concerns and needs while treating each follower uniquely. Acting

as a role model, coaching, delegating challenging tasks, and providing feedback are common ways of helping followers elevate their personal potential. Through individual consideration, school leaders may help to link teachers' current needs to the school's goals and mission and enhance teachers' sense of self-efficacy.

Through intellectual stimulation, transformational school leaders encourage teachers to question their own beliefs, assumptions, and values and enhance teachers' ability to solve individual, group, and organizational problems. An intellectually stimulating school leader arouses teachers' awareness and recognition of their own beliefs and personal values as well as those of their colleagues.

Research on effects of transformational leadership on teachers' commitment and extra effort has shown that such leadership practices influence teachers' self-efficacy and internalization of student goals into personal goals (e.g., Geijsel et al., 2003; Leithwood & Jantzi, 2006; Nguni et al., 2006). The vision building and providing individual support dimensions appear to have stronger effects on teachers' psychological states than the intellectual stimulation dimension of transformational leadership. We thus expected that the positive effect of transformational leadership on teachers' participation in professional learning activities would be mediated by teachers' internalization of school goals into personal goals and by their sense of self-efficacy (hypothesis 6).

Although researchers have learned a great deal about the effects of transformational leadership on individual and organizational outcomes, little is known about the role that teamwork processes (such as collaboration, cohesion, communication, and conflict management) may play in the link between transformational leadership and individual, team, and organizational performance (Dionne, Yammarino, Atwater, & Spangler, 2004). Dionne et al. (2004) proposed a model of the relations among trans-

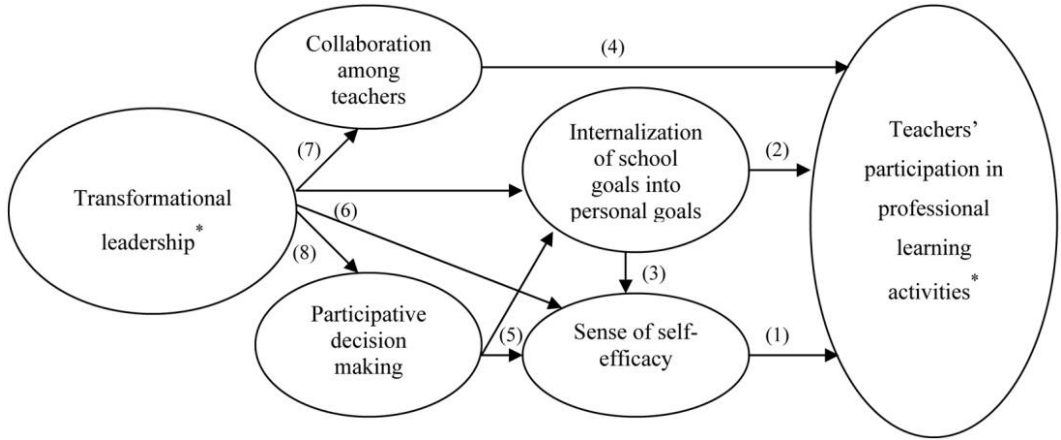


FIG. 1.—Theoretical model of the relations among teachers' psychological states, organizational conditions, leadership practices, and teachers' professional learning activities (with hypotheses indicated between brackets). \*For ease of presentation, the three exogenous and four endogenous variables are combined in one circle. The residual correlations between the outcome variables are all estimated.

formational leadership, teamwork processes and team performance. They expected that vision building, individual consideration, and intellectual stimulation would improve teamwork processes by producing shared vision, team commitment, an empowered team environment, and functional team conflict. Although evidence concerning these claims in schools is extremely thin, some research has suggested that transformational leadership can enhance teamwork processes such as teacher participation in decision making and collaboration (Leithwood et al., 1999; Slegers, Geijssels, & van den Berg, 2002). Based on these findings and our expectations about the effects of participative decision making and collaboration on teachers' psychological states and learning (see hypotheses 4 and 5), we predicted that the positive effect of transformational leadership on teachers' participation in professional learning activities would be mediated by teacher collaboration (hypothesis 7) and that the benefits of transformational leadership for teachers' internalization of school goals into personal goals, sense of self-efficacy, and participation in professional learning activities would be mediated by participative decision making (hypothesis 8).

A summary of the various paths

through which teachers' participation in professional learning is influenced, as we hypothesized, is presented in Figure 1. To understand the relative effect of psychological, organizational, and leadership factors on teachers' professional learning, we tested this model using a survey.

## Method

### Sample

The data we used to test our theoretical model came from the Dutch School Improvement Questionnaire administered to teachers in 18 elementary schools (student age 4–12 years) governed by one school board in the Netherlands. All schools were located in one city (about 150,000 citizens) in the eastern part of the Netherlands. The schools differed largely with regard to background characteristics (such as denomination, number of students and teachers, percentages of pupils with high and low socioeconomic status). The schools are similar to those in any (smaller) city in the Netherlands. As in the United States or other Western countries, teachers and administrators in these schools are concerned with school improvement and innovation in line with contemporary ideas of con-



structivism. Current educational policy in the Netherlands allows schools to make their own decisions about the extent and content of innovation. The school board in this study encourages its schools to move forward and also to keep up with national quality standards without requiring that they implement a specific program. So, each school in the sample chose its own manner of coping with the contemporary challenges such as multidimensional restructuring demands, tightened "output" controls due to accountability policies, and enhancing their capacity to improve teaching and learning.

All teachers in these schools participated in the survey. The questionnaire was submitted to 367 teachers. A total of 328 teachers returned the questionnaire—a response rate of 89.3%.

Background information on teachers and schools was provided by the administration office of the school board. Of the teachers responding to the survey, 16% were male and 84% were female (national percentages: 20% and 80%, respectively). Teachers in the sample varied in the size of their appointment (ranging from half a day to full time), years of experience in primary education (ranging from less than half a year to 45 years), and years of experience in the school in which they currently taught (ranging from 1 month to 37 years).

### Measures

The concepts in this study were operationalized and measured using existing scales and items (Geijsel, 2001; Geijsel et al., 2001; Jongmans et al., 2004; Kwakman, 2003; Leithwood, Dart, Jantzi, & Steinbach, 1993; Silins, 1994; van Woerkom, 2003) as well as additional newly formulated items. We carefully translated English items and adjusted them for appropriateness in the Dutch context. To verify the validity of the items, experts reviewed item formulations (i.e., senior administrators on the school board, an external change facilitator con-

nected to the schools, and two expert teachers). All items were included in the Dutch School Improvement Questionnaire for teachers. The teachers indicated the extent to which the item content applied to them on four-point scales. More detailed information about the items per variable can be found in Appendix A.

### Analyses

Originally, the questionnaire contained 114 items. We performed exploratory factor analyses and item analyses in SPSS to select the best items for each factor. This resulted in a decrease in the number of items to 64. In these initial analyses, we found that the items assessing "reflective practice" shared considerable variance with the items about "experimentation" and did not constitute a separate factor. We therefore removed some of the reflective practice items from the scale and combined some of these items with the items regarding experimentation to form one factor. This factor was termed experimentation/reflective practice.

We used *Mplus3* (Muthén & Muthén, 2004) to analyze the measurement and structural models. For evaluation of model fit, we investigated the matrix of discrepancies (i.e., the matrix of residual variances and covariances) as McDonald and Ringo Ho (2002) suggested. If the discrepancies are well scattered, the standardized root mean squared residual (SRMR) can be used to summarize this information. We also report the overall chi-square statistic with the associated *p*-value (i.e., the robust Yuan-Bentler chi-square statistic; Yuan & Bentler, 2000) and the root mean squared error of approximation (RMSEA). The fit of the model is considered acceptable when  $SRMR \leq .08$  and  $RMSEA \leq .06$  (Hu & Bentler, 1999). We compared nested models by using the scaled chi-square difference ( $\Delta\chi^2_{SB}$ ; Satorra & Bentler, 1999) with degrees of freedom (*df*) equal to the number of constrained parameters, and the Bayesian Information Criterion (BIC; Raftery, 1993),

TABLE 1. Overview of Scaled Variables

Components	Indicators	Variable Name (Short)	Items
Transformational leadership practices (TLP)	Initiating and identifying a vision	TLP-vision	5
	Offering individualized support	TLP-support	4
	Offering intellectual stimulation	TLP-stimulation	6
School organizational conditions (SOC)	Participative decision making	SOC-participative	5
	Collaboration among teachers	SOC-collaboration	8
Teachers' psychological states (TPS)	Internalization of school goals into personal goals	TPS-goals	5
	Sense of self-efficacy	TPS-efficacy	4
	Keeping up to date	PLA-keeping	4
Professional learning activities (PLA)	Experimentation/reflective practice	PLA-exp/refl	5
	Changed practice	PLA-changed	8

with smaller values of the BIC indicating a better-fitting model.

We constructed separate measurement models for the items in each group of factors (i.e., leadership, organization, psychological states, and professional learning) and combined these models to form one measurement model. In these analyses, an additional 10 of the 64 items were removed due to low or double factor loadings or strong residual covariance with other items.

The measurement model depicts the relations between the factors and the indicators, as well as the correlations between the factors. The resulting (combined) measurement model provides a good fit to the data. Although the chi-square was significant, the discrepancies were well scattered, and the SRMR and RMSEA were low (RMSEA = 0.040, SRMR = 0.056, BIC = 34451.28;  $\chi^2(1332) = 2043.139$ ,  $p = .00$ ). The theoretical concepts of our framework, indicators, shortened variable names, and number of items are summarized in Table 1.

The parameter estimates (i.e., the factor loadings, residual variances, and factor correlations) are presented in Appendix A. The proportion of explained variance for the individual items ranged from 0.21 to 0.77. Furthermore, the internal consistencies of the scales (provided in Appendix A) indicated that all factors had reasonable to good reliability (range = 0.66–0.88). Factor correlations indicated that all factors correlated positively, as expected.

Given the nested structure of our sample (teachers nested within schools), and the possible dependence between subjects within schools that may result, we computed the intraclass correlations. These correlations, provided in Appendix B, were significantly different from zero for all variables, which means that the teachers within a school were more similar to each other than to teachers from other schools. Ignoring the nested structure of the data would therefore lead to incorrect results. That is, standard errors would be underestimated, leading to a higher type I error rate (i.e., finding a parameter significant when it is actually zero in the population). Given the small number of schools ( $N = 18$ ) and the fact that the study focused on important regression parameters (fixed effects) and not on school-level variance (random effects), we decided to perform further analyses on the within-school covariance matrix by means of testing the “complex structure” in *Mplus* (Muthèn & Muthèn, 2004). This did result in a correction for the dependence inherent in the nested structure of the data but produced a loss of information concerning the school-level variance (as would be obtained in a full multilevel analysis including random effects). However, as we noted, the total number of schools was too small to obtain correct estimates of the school-level variance (Maas & Hox, 2004a, 2004b). Future research with a larger sample of schools might shed light on this.

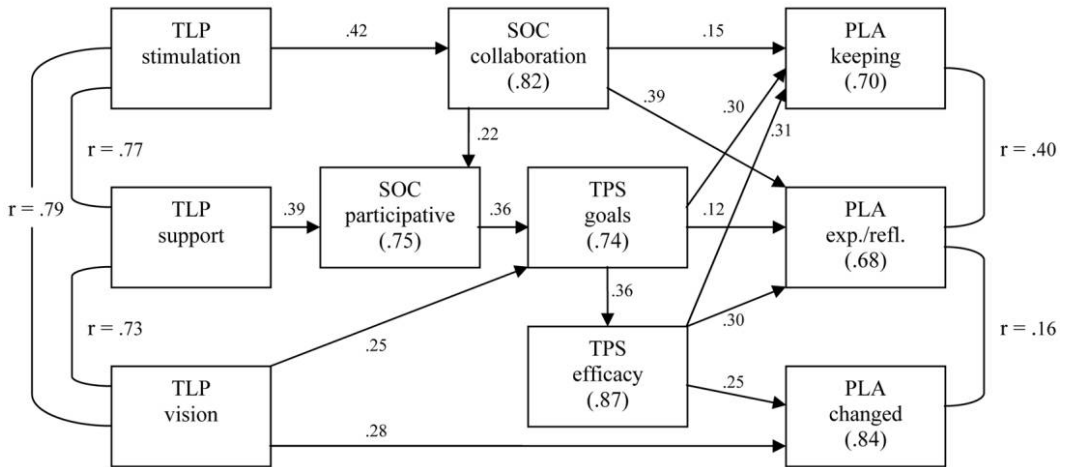


FIG. 2.—Completely standardized solution for the path analysis of professional learning activities explained by psychological, organizational, and leadership factors (residual variances are provided between brackets). For ease of exposition, only the structural part of the model is depicted.

The fit of the measurement model improved slightly when corrected for the nested structure of the data:  $\chi^2(1332) = 1917.685, p = .00$ ; RMSEA = 0.038, SRMR = 0.056, BIC = 34451.279). Introducing the structural relations to the measurement model according to the theoretical framework did not decrease the fit of the model significantly:  $\chi^2(1391) = 2000.095, p = .00$ ; RMSEA = 0.037, SRMR = 0.062, BIC = 34145.97;  $\Delta\chi^2_{5B}(59) = 33.12, p = .10$ ; note that this test can be regarded as an omnibus (i.e., multiparameter) test of the constrained parameters. In this model, the modification indices indicated one large model misspecification. This was the case for the effect of leadership's initiation and identification of a vision for the school (TL-vision) on changed practice as a professional learning activity (PL-changed). We hypothesized that this effect would be indirect. Adding this effect to the model resulted in a better-fitting model:  $\Delta\chi^2_{5B}(1) = 12.27, p = .00$ ;  $\chi^2(1390) = 1987.828, p = .00$ ; RMSEA = 0.036, SRMR = 0.059, BIC = 34140.256.

Based on the principle of parsimony, we constrained all nonsignificant effects to zero. The scaled chi-square difference test

indicated that the model fit did not significantly decrease:  $\Delta\chi^2_{5B}(13) = 12.44, p = .49$ ;  $\chi^2(1403) = 1997.747, p = .00$ ; RMSEA = 0.036, SRMR = 0.062, BIC = 34082.124. We again examined the modification indices, which resulted in the estimation of the theoretically meaningful effect of collaboration among teachers on participative decision making:  $\Delta\chi^2_{5B}(1) = 10.38, p = .00$ ;  $\chi^2(1402) = 1987.369, p = .00$ ; RMSEA = 0.036, SRMR = 0.060, BIC = 34077.080. The results of this final model will be presented in the next section.

## Results

The parameter estimates of the final model are presented in Figure 2. To facilitate interpretation, direct, indirect, and total effects are presented in Table 2.

Results of the final structural model showed psychological, organizational, and leadership factors to have joint effects on participation in professional learning activities, with percentages of explained variance of 32, 30, and 16, respectively, for experimentation/reflective practice, keeping up to date, and changed practice. A closer look at the results in Figure 2 shows that participation in professional learning activ-

TABLE 2. Direct, Indirect, and Total Effects of Explanatory Variables on the Three Dependent Variables

	Professional Learning Activities								
	Keeping up to Date			Experimenting/ Reflective Practice			Changed Practice		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Teachers' psychological states:									
Efficacy	.31		.31	.30		.30	.25		.25
Personal goals	.30	.11	.41	.12	.11	.22		.09	.09
School organizational conditions:									
Collaboration	.15	.03	.18	.39	.02	.41		.01	.01
Participative decision making		.15	.15		.08	.08		.03	.03
Transformational leadership practices:									
Stimulation		.08	.08		.17	.17		.00	.00
Support		.06	.06		.03	.03		.01	.01
Vision		.10	.10		.03	.03	.28	.02	.30

ities was directly influenced by teacher efficacy (hypothesis 1). The effect of teachers' internalization of school goals into personal goals on their participation in professional learning activities was direct for keeping up to date and experimentation/reflective practice but not for changed practice, which was somewhat different, as we predicted in hypothesis 2. The absence of the expected direct effect of teachers' internalization of school goals into personal goals on changed practice was compensated slightly by the indirect effect via teacher efficacy (.09; see Table 2), however, which supported hypothesis 3. In summary, teachers' sense of self-efficacy and their internalization of school goals into personal goals appeared to be the most important explanatory factors in our model (see also Table 2).

Besides these two psychological factors, collaboration among teachers had a direct effect on keeping up to date and experimentation/reflective practice—two types of participation in professional learning activities (in line with hypothesis 4). Collaboration seemed particularly important for experimentation/reflective practice (total effect of .41; see Table 2), which could be due to the more social nature of experimentation as opposed to keeping up to date. Although we also expected a direct effect of collaboration on teachers' changed prac-

tice, results did not confirm this expectation.

With regard to the effect of participative decision making on participation in professional learning activities via teachers' sense of self-efficacy and their internalization of school goals into personal goals (hypothesis 5), findings indicated that only teachers' personal goals were affected by participative decision making (.36; see Fig. 2): the more teachers felt that they had influence on and were part of decision-making processes, the more they appeared to internalize the school's goals and vision. The absence of a direct effect of participative decision making on teachers' sense of self-efficacy was slightly compensated by the indirect effect via teachers' internalization of school goals into personal goals ( $.36 \times .36 = .12$ ; see Fig. 2). Thus, as expected, participative decision making affected participation in professional learning activities via the two psychological factors included in this study.

Teacher collaboration also had an unexpected direct effect on participative decision making and can thus be considered a stimulating factor. We did not predict this effect and the related indirect effects of collaboration on the two psychological factors and participation in professional learning activities.

Contrary to our hypothesis regarding

the indirect nature of leadership effects, results showed that teachers' changed practice was directly influenced most by one transformational leadership dimension—vision (.28, see Table 2 and Fig. 2). The more teachers perceived school leadership as initiating and identifying a vision, the more they changed their practice in the direction of constructivism. The two psychological factors also appeared to be influenced by transformational leadership, but less directly than we expected (hypothesis 6). Teachers' internalization of school goals into personal goals was influenced directly by only one of the three dimensions of transformational leadership—vision (.25, see Fig. 2). Thus, vision as a leadership practice reinforced teachers' internalization of school goals into personal goals. Although we expected that both teachers' sense of self-efficacy and their internalization of school goals into personal goals would also be directly influenced by the other two transformational leadership practices—individual support and intellectual stimulation—the results did not confirm this. As Figure 2 shows, the effects of these transformational practices on the two psychological factors were indirect, through organizational factors.

With regard to the influence of leadership factors on aspects of the school organization, findings indicated that effects of transformational leadership practices were different than expected (hypotheses 7 and 8). Vision appeared to have no direct effect on teacher collaboration and participative decision making, whereas intellectual stimulation had a significant direct effect on teacher collaboration (.42; see Fig. 2). Individualized support had a significant direct effect only on participative decision making (.39; see Fig. 2). Individual support and intellectual stimulation had small indirect effects on teachers' self-efficacy, the internalization of school goals into personal goals, and their participation in professional learning activities (see Table 2), of which the indirect effect of intellectual

stimulation on experimentation/reflective practice (.17) was notable. Moreover, it should be noted that the chain of variables through which these effects of leadership practices were mediated differed. The effect of intellectual stimulation on keeping up to date and particularly on experimentation/reflective practice was mediated by collaboration, confirming hypothesis 7. The effect of individual support moved through participative decision making via the two psychological factors on keeping up to date, experimentation/reflective practice, and changed practice, confirming hypothesis 8. Overall, individual support appeared to have the smallest explanatory value of the factors in the model.

## Discussion and Conclusions

In this study we examined the relative importance of teachers' psychological states and school organizational conditions and leadership practices in explaining variation in teachers' professional learning. We conceptualized professional learning as the participation of teachers in a variety of learning activities within the school context. We focused on four learning activities: keeping up to date, changed practice, experimentation, and reflective practice, representing nonreflective as well as reflective learning. To identify factors affecting participation in these activities, we used theories of adult learning and change within organizations, in addition to research on teacher cognitions, workplace conditions, and leadership, to hypothesize relations among dimensions of leadership, the school organizational environment, teachers' psychological states, and their participation in professional learning activities. We tested a structural model with a sample of 328 Dutch primary school teachers in 18 schools. In this section, we discuss our most important results.

First, results showed that three of the four distinguished professional learning activities could be found in the data. Reflec-

tive practice did not emerge as a separate factor. This is similar to the results of Kwakman's (2003) study of teachers' participation in professional learning activities. Our results suggest that teachers perceive professional learning activities representing higher-order learning (experimentation and reflective practice) as related, whereas they view professional learning activities representing nonreflective learning (keeping up to date and changed practice) as separate. In other words, teachers seem to view reflective practice as an integral part of experimentation instead of a separate activity. Up to now, systematic research on the participation of teachers in a variety of learning activities within schools has been scarce. Although our research provides some insights into the nature and variation of teacher learning in the workplace, more research is needed that focuses more in depth on how learning activities are interrelated.

Second, our data offer considerable support for the effects of teachers' sense of self-efficacy on their participation in professional learning activities. On average, teachers with a stronger belief in their own capabilities are more involved in learning activities. Similar to Bandura (1993) and Goddard et al. (2000), we found that teacher efficacy is the only variable in the model that directly relates to all three professional learning activities in our study. Thus, sense of self-efficacy appears to be a relevant and important psychological factor for understanding teacher learning.

Teachers' internalization of school goals into personal goals also affects their participation in learning activities, particularly and most directly on the extent to which they keep up to date with new developments. These results suggest that internalization of school goals into personal goals, as an object of teacher commitment, can stimulate teachers to become aware of their desired future states (Bennis & Nanus, 1985) and corresponding actions and therefore can help teachers to deal successfully

with present rapid changes in education. Our findings also indicate that internalization of school goals into personal goals plays an important role in mediating the effects of organizational and leadership factors on teacher efficacy, confirming results of Leithwood et al. (1999), Geijsel et al. (2003), and Wolbers and Woudenberg (1995). Although teachers' internalization of school goals into personal goals does not have the same effects on their participation in professional learning activities as teacher efficacy, it may be a key variable for increasing the understanding of the interplay between psychological and organizational factors affecting teacher professional learning in the workplace.

Regarding the effect of these organizational factors on teachers' participation in learning activities, in debates about school reform, it is often assumed that more "organic" forms of organizational design (Rowan, 1990), including participative decision making and collaboration among teachers, will increase teachers' commitment and learning in schools. Our findings support this idea. Collaboration as perceived by teachers had a greater effect on experimentation/reflective practice than on keeping up to date and on changed practice. In addition, collaboration among teachers indirectly influenced teachers' psychological states and their participation in professional learning activities via participative decision making.

Participative decision making appeared to affect teachers' internalization of school goals into personal goals directly and professional learning activities indirectly (via teachers' psychological states). These results thus clearly show that teachers' psychological states and the school organizational environment interact to affect professional learning activities. Research to date, however, has focused primarily on either the individual or the organization, and little work has been conducted in which these elements are combined. More research combining organizational and

psychological explanatory factors is needed to validate our findings and to increase the understanding of the interplay between these factors in explaining teachers' participation in professional learning activities as a key to educational change.

Finally, the results lend credence to the argument that transformational leadership counts for teachers. When teachers experience transformational leadership practices, on the average, their commitment and their participation in professional learning activities increase.

The leadership dimensions in this study were rather highly correlated—about 75%. High correlations (above .80 or even .90) are the standard in studies of transformational leadership and have led to questions about the empirical value of distinguishing among dimensions (Avolio et al., 1999). In the present study, we tested whether the dimensions derived from theory on transformational leadership refer to distinguishable leadership practices as perceived by teachers. Our factor analyses confirmed that the items on initiating and identifying a vision, providing individualized support, and providing intellectual stimulation refer to three different leadership practices, and the correlations between the variables did not require higher-order factor analyses. Moreover, the structural analyses specified differential paths of influence for the different practices of transformational leadership. These tested paths of influence allow us to reflect on leadership effects identified in earlier research. This enables us to compare and interpret different effects of the three dimensions on specific school organizational and teacher psychological variables and in turn on the participation of teachers in different types of professional learning activities. This leads to a deeper analysis of leadership effectiveness regarding the professional learning of teachers.

As in other studies (Geijsel et al., 1999, 2003; Hallinger & Heck, 2002), our results confirm the critical role of vision in transformational leadership. The findings clearly

show that, through initiating and identifying vision, school leaders can reinforce the personal and social identification of teachers with the school, clarify the setting of personal goals, and enhance teachers' confidence in their ability to change their own practice. The results also show that vision does not affect teamwork processes such as collaboration as we had expected based on the model of Dionne et al. (2004). In our study we did not measure team vision and cohesion as defined by Dionne et al. This might explain why we did not find effects of vision on teamwork processes. Future research should include other and different teamwork processes such as team cohesion and team vision to test the role that teamwork processes may play in the link between initiating and identifying vision as a dimension of transformational leadership and teacher commitment and learning.

The other dimensions of transformational leadership (i.e., intellectual stimulation and individualized support) affect teacher psychological states and participation in learning activities via school organizational conditions, although the way they influence these variables differs. Valuing teachers' individual opinions, as leaders express when offering individual support, seems important for school leaders during decision-making processes as a motivator for teachers to keep investing their time and patience. Furthermore, individual support indirectly affects the extent to which teachers internalize a school's goals and values as personal goals. Our findings therefore confirm the claim that, through support and consideration to individual teachers, school leaders can link teachers' current needs to the school's organizational goals and mission.

Results also show that leaders' actions to stimulate learning increase teacher collaboration, which then seems to function as a catalyst for teachers' participation in learning activities, especially those that represent higher-order reflective learning. The effect of intellectual stimulation on

teachers' psychological states is, however, small and indirect. Based on these findings, we can conclude that intellectual stimulation contributes to work group processes such as collaboration, leading to an interactive context needed for teachers' higher-order learning.

Together these results indicate that, to be effective, school leaders need to use a combination of transformational leadership behaviors. Further research is needed to examine the relative effects of different transformational leadership dimensions on teamwork processes, teachers' psychological states, and professional learning in schools.

### Limitations and Future Research

The present study contributes to the development of models needed to understand how organizational design and teacher capacity influence teacher learning as scholars have advocated for years (Richardson & Placier, 2001; Rosenholtz, 1991; Smylie, 1988). Our study was limited, though, by the population of 18 schools, compelling us to analyze our data using within-school covariance; as a result, school-level variance was not included in the analyses. Thus, we could not identify teacher collaboration and participative decision making as organizational conditions or "design" characteristics but had to restrict ourselves to examining teachers' *perceptions* of the school organizational environment and leadership practices. Although most studies of school improvement and effectiveness have found small school-level variance (less than 20%), analyses that take the nested structure of the data into account are preferable. Hence, follow-up research is needed with a larger sample of schools, allowing for multilevel structural equation modeling to include the examination of interdependence of teacher interpretations within schools. This research could contribute to the testing of more complex multilevel models in which both organizational and individual con-

cepts are integrated. These complex models are needed to develop theory that can yield information about the complex interplay between change mechanisms operating at different levels (individual, group, organization) in schools (House, Rousseau, & Thomas-Hunt, 1995).

A second limitation of our study is that our model of factors affecting teachers' professional learning activities explains only a small to moderate percentage of the variance in learning activities. The variance of keeping up to date and experimentation/reflective practice was explained for about 30%; the variance of changed practice for about 16%. Thus, it is likely that other factors not included in our model may also affect teacher learning. Future research should explore the influence of other leadership and organizational factors often considered as crucial for the capacity of schools to enhance professional learning, including "distributed" forms of leadership, organizational conditions such as school climate and culture, and teamwork processes such as consensus, conflict management, and collective efficacy. More recently, scholars have stressed the need to include system-level variables such as the support schools receive from parents, districts, and the Ministry of Education (Leithwood & Jantzi, 2006; Spillane et al., 2002). In addition, the inclusion of classroom conditions in the model (class size, population, academic heterogeneity) may help researchers to understand the influence of school factors on individual teacher learning and improvement (Smylie, 1988).

Finally, in our study we focused on collaborative working relationships and opportunities for teacher participation in decision making. Although these activities support teacher learning and educational change as long as they are related to the classroom, we did not examine one of the most enduring features of teachers' work, namely, autonomy. Although autonomy is often considered a problematic by-product



of the work of teachers, it can also be viewed as a condition teachers need in order to adapt and update their practice to cope effectively with rapid changes in education. Schools may create an optimal learning environment when they stimulate teacher collaboration without diminishing respect and appreciation of teachers' autonomy and expertise (Clement & Vandenberghe, 2000).

Future studies should examine how autonomy, collaborative working relationships, and participative decision making provide enough and rich variation and challenge in teachers' work and promote teacher learning in the workplace. The model tested in our study might function as a useful framework for follow-up research in which the relative importance of the suggested additional factors in explaining a variety of teachers' professional learning activities is examined.

Like other organizations, schools are experiencing the pressure and demands of an information society, leading to national reform movements. To cope with these complex demands and enormous pressures, schools have to increase their capacity to enhance teachers' professional learning and transform large-scale reform into accountable, learner-oriented teaching practice. By focusing on the interplay between psychological and organizational factors affecting teacher professional learning in the workplace, we have tried to make a significant contribution to the existing knowledge base. Building on our findings, future research should use complex multilevel models in which the effects of psychological, organizational, and leadership factors on professional learning in schools are tested. In our view, this is imperative to theory building regarding school improvement and educational change.

## Appendix A

### Operational Definitions, Item Parameters, and Scale Descriptions for Variables in the Dutch School Improvement Questionnaire

#### *Item Representation*

The final Dutch items were translated to English by a native speaker and then to Dutch by another person with both persons having no preliminary knowledge of this study. There were no misunderstood item translations. Thus, these English items represent the Dutch items to a reasonable extent. For use in countries other than The Netherlands, cultural differences should nevertheless be taken into account.

#### *Transformational Leadership: Initiating and Identifying a Vision*

The extent to which the school leader initiates and identifies a vision for the school (see Geijsel et al., 2001; Leithwood et al., 1993; Silins, 1994).

<i>The school leader . . .</i>	Factor Loading	Residual
1. Makes use of all possible opportunities to communicate the school's vision to the team, the pupils, parents, and others	.73	.38
2. Refers explicitly to the school's objectives during the decision-making process	.53	.60
3. Explains to the team the relationship between the school's vision and initiatives taken by the school board, consortiums of schools, or the national government	.67	.46
4. Clearly defines current problems from the perspective of a vision of the future of the school	.73	.36
5. Outlines during meetings how the vision of the future of the school affects school life at the present time	.68	.36

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree; mean score (valid  $N$ ) = 2.78 (307); standard deviation = .71; alpha = .87; intraclass correlation = .38.

*Transformational Leadership: Providing for Individualized Support*

The extent to which the school leader—acknowledging teachers' efforts—provides individualized support for teachers (see Geijsel et al., 2001; Leithwood et al., 1993; Silins, 1994).

<i>The school leader . . .</i>	Factor Loading	Residual
1. Takes the beliefs of individual teachers seriously	.77	.34
2. Shows appreciation when a teacher takes the initiative to improve teaching in the school or to engage in other forms of professional development	.82	.30
3. Listens carefully to the ideas of members of the team	.83	.22
4. Helps teachers to put their emotions into words	.62	.56

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree; mean score (valid  $N$ ) = 2.93 (310); standard deviation = .81; alpha = .87; intraclass correlation = .50.

*Transformational Leadership: Providing for Intellectual Stimulation*

The extent to which the school leader provides teachers with intellectual stimulation (see Geijsel et al., 2001; Leithwood et al., 1993; Silins, 1994).

<i>The school leader . . .</i>	Factor Loading	Residual
1. Encourages teachers to try new things in line with their own interests	.79	.29
2. Helps teachers to reflect on new experiences that they have gained on the job	.74	.34
3. Encourages teachers to seek and discuss new information and ideas that are relevant to the direction in which the school is developing	.63	.47
4. Engages individual teachers in ongoing discussion about their personal professional goals	.67	.35
5. Encourages teachers to experiment with new teaching methods	.68	.46
6. Creates sufficient opportunities for teachers to work on their professional development	.50	.63

Scaling = (1) (almost) never, (2) sometimes, (3) often, (4) (almost) always; mean score (valid  $N$ ) = 2.55 (292); standard deviation = .71; alpha = .88; intraclass correlation = .45.

*Participative Decision Making*

The extent to which teachers experience that they participate in processes and outcomes of the school's decision making regarding issues of education, innovation, and school improvement (see Geijsel et al., 2001; Jongmans et al., 2004).

<i>The school leader . . .</i>	Factor Loading	Residual
1. Teachers at our school are involved in decisions about using new teaching methods	.41	.60
2. Teachers at our school take decisions about coordinating the curriculum over the different school years together	.49	.58
3. At our school we take decisions about new educational objectives for the school together	.52	.48
4. At our school teachers have a say in the purchase of new teaching materials and resources	.37	.64
5. At our school changes to classroom teaching are a matter for shared decision making	.48	.47

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree; mean score (valid  $N$ ) = 3.28 (315); standard deviation = .51; alpha = .80; intraclass correlation = .10.

*Collaboration among Teachers*

The extent to which teachers experience professional collaboration that extends the level of exchanging information and offers opportunities to learn from each other (see Geijsel, 2001; Little, 1990).

	Factor Loading	Residual
1. My colleagues discuss new teaching methods with me	.56	.49
2. My colleagues give me positive feedback about my teaching	.51	.56
3. The conversations I have with colleagues about my work are superficial (negatively formulated item)	-.40	.68
4. My colleagues give me support when I try out new teaching methods	.62	.37
5. My colleagues tell me what problems they have come across and how they solve them	.49	.54
6. My colleagues are only interested in their own lessons (negatively formulated item)	-.42	.65
7. My colleagues pass on to me things they have learned from further training	.44	.67
8. My colleagues let me observe their lessons	.43	.70

Scaling = (1) (almost) none, (2) the minority, (3) the majority, (4) (almost) everyone; mean score (valid N) = 2.80 (321); standard deviation = .54; alpha = .85 (negatively formulated items were recoded); intraclass correlation = .15.

*Internalization of School Goals into Personal Goals*

The extent to which teachers have internalized the goals and vision of the school (see Leithwood et al., 1993).

	Factor Loading	Residual
1. I make an effort to put the school's vision of education into practice	.41	.57
2. I have noticed that I am expanding my own repertoire as a teacher in order to put the school's vision into practice	.44	.66
3. I do my best to understand what implications the school's vision has for the way I teach	.43	.55
4. I assume that I will be given the opportunity acquire concrete knowledge about what the school's vision means for my class and the school as a whole	.49	.52
5. I know what the next steps are that I should take in order to be able to put the school's vision into practice	.45	.68

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree; mean score (valid N) = 3.25 (318); standard deviation = .51; alpha = .78; intraclass correlation = .14.

*Sense of Self-Efficacy*

The extent to which teachers experience a sense of self-efficacy with regard to their own professionalism (original Dutch items stem from: van Woerkom, 2003).

	Factor Loading	Residual
1. Do you feel that you are able to work effectively?	.35	.70
2. Are you satisfied with the quality of your work?	.41	.44
3. Do you feel that you are being successful in your work?	.50	.23
4. Do you have sufficient self-confidence to defend your own points of view about the work?	.36	.73

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree; mean score (valid N) = 2.93 (326); standard deviation = .47; alpha = .74; intraclass correlation = .08.

*Professional Learning Activities: Keeping Up to Date*

The extent to which teachers keep up with developments in the field of education by reading professional literature and undertake other activities (see Geijsel et al., 2001; Kwakman, 2003).

	Factor Loading	Residual
1. I take the initiative to work on my own professional development	.49	.56
2. I take part in further training and in-service training even if it is not compulsory	.50	.65
3. I read professional literature	.49	.64
4. I study textbooks and lesson material thoroughly and on a regular basis	.33	.79

Scaling = (1) (almost) never, (2) sometimes, (3) often, (4) (almost) always; mean score (valid  $N$ ) = 2.78 (326); standard deviation = .55; alpha = .66; intraclass correlation = .11.

*Professional Learning Activities: Experimentation and Reflective Practice*

The extent to which teachers try out new things and/or undertake action explicitly meant to improve their practices and/or enable reflection on their practices (see Geijsel et al., 2001; Kwakman, 2003).

	Factor Loading	Residual
1. I observe colleagues' lessons to learn from them	.44	.71
2. I try out new knowledge and skills in my lessons	.47	.55
3. I make my own teaching materials	.36	.79
4. I use pupils' reactions to improve my classroom teaching	.39	.68
5. I discuss problems in my classroom teaching with others in order to learn from them	.44	.64

Scaling = (1) (almost) never, (2) sometimes, (3) often, (4) (almost) always; mean score (valid  $N$ ) = 2.60 (328); standard deviation = .50; alpha = .70; intraclass correlation = .16.

*Professional Learning Activities: Changed Practice*

The extent to which teachers change their practice during the last years toward promoting process-oriented student learning, focusing on strategic, meaningful, and social learning as well as on pupils' motivation for learning.

<i>Compared with three to five years ago . . .*</i>	Factor Loading	Residual
1. I focus more on increasing pupils' motivation	.69	.42
2. I have expanded my repertoire of teaching strategies	.43	.62
3. My interaction with pupils has become richer	.69	.34
4. I vary the pace of the work more to suit the needs of different groups and individual pupils	.60	.45
5. I use a greater variety of teaching methods	.49	.63
6. I pay more attention to the emotional perception of pupils	.73	.41
7. I leave pupils to work together more often	.52	.66
8. I pay more attention to different cultures	.52	.70

\*Teachers with less than 3 years' teaching experience should read this as: since the beginning of my teaching career . . .

Scaling = (1) disagree, (2) disagree more than agree, (3) agree more than disagree, (4) agree; mean score (valid  $N$ ) = 3.03 (322); standard deviation = .63; alpha = .88; intraclass correlation = .06.

## Appendix B

TABLE B1. Correlations among Factors in the Final Measurement Model

	1	2	3	4	5	6	7	8	9
Transformational leadership practices:									
1. Vision	1								
2. Support	.73	1							
3. Stimulation	.79	.77	1						
School organizational conditions:									
4. Participative decision making	.41	.44	.40	1					
5. Collaboration	.31	.28	.44	.33	1				
Teachers' psychological states:									
6. Personal goals	.39	.37	.35	.45	.21	1			
7. Efficacy	.10	.09	.15	.26	.18	.35	1		
Professional learning activities:									
8. Keeping up to date	.17	.09	.22	.19	.27	.45	.43	1	
9. Experimentation/reflective	.09	.08	.24	.16	.47	.33	.39	.69	1
10. Changed practice	.29	.18	.26	.25	.17	.26	.28	.26	.34

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