SUSTAINABLE SCHOOL DEVELOPMENT: PROFESSIONAL LEARNING COMMUNITIES

E. Verbiest

Fontys University of applied sciences (NL)
Antwerp University (B)

ABSTRACT

In this contribution we report about a project about Professional Learning Communities. This project combines development and research. In this contribution we pay attention to the effect of the organisational capacity of a school on the personal and interpersonal capacity and to the impact of a professional learning community on the self and collective efficacy of teachers and on the innovative attitude in the school? In order to answer these questions, we obtained data from a survey of 67 schools in the Netherlands. On the base of the results we can conclude that a school as a professional learning community influences in a positive way the collective efficacy and the innovative attitude. These attitude and feelings of efficacy can be regarded as a sustainable source for teaching and school improvement.

PROFESSIONAL LEARNING COMMUNITY

A modern version of the moral imperative for schools is in the words of Fullan (2005): *raising the bar and closing the gap.* Aside from the moral reasons one can bring in for this choice, there also economical arguments. The so-called knowledge society demands schools to produce students with complex intellectual skills.

As a consequence, much is asked of our teachers. Improved student learning depends upon teacher learning. At the same time, we experience the limits of formal, externally driven, professional development. Sustained change in the day-to-day practice of schools can not be imposed. Sustained change asks for learning processes of teachers, investigating and improving their own practice. Professional learning communities offer a context for these learning processes because they entail increased levels of a sense of efficacy and orientation on innovation. This in turn, can improve teaching and the achievements of students.

Professional learning community: the concept.

Characteristics of professional learning communities have been described in various ways. Hord (1997), for example, described a *professional* learning community as *a community of permanent research and improvement.* Based on the distinction of three basic capacities (Spillane & Thomson, 1997; Mitchell & Sackney, 2000; Verbiest, 2002), we distinguish:

- *Personal capacity* comprises individuals' ability to construct, reconstruct (revise, adjust) and apply knowledge in an active and reflective manner, making use of up-to-date scholarly and practice-theoretical insights.
- *Collective capacity* comprises the ability of a group or collective to (re)construct and applies knowledge. This presupposes a shared vision of learning and of the role of the teacher. Is also implies shared practices among the teachers.
- *Organisational capacity* consists of cultural and structural conditions supporting the development of the personal and interpersonal capacities. Supportive, stimulating and shared leadership is also an important aspect of this organisational capacity.

Do professional learning communities work?

Pupils' learning results are determined by a complex system of mutually influenced variables in the school and the environment (see e.g. Leithwood, Louis, Anderson & Wahlstrom, 2004).

It would seem that professional learning communities mainly contribute to the improvement of the pupils' results through the creation of a climate conducive to innovations and experiments by teachers. This results in increased professionalism, a stronger focus on the pupils' learning and in innovations in pedagogical actions apparently inducing pupils to better learning (Louis & Marks,1998; Bryk & Schneider, 2002; see also Mulford, Silins & Leithwood, 2004; InPraxis Group, 2006). And although there are some promising results, it is necessary to investigate further the effects of professional learning communities. So an important question is: do professional communities impact on the professionalism of teachers?

About the impact of professional learning communities.

As said before, we suppose that professional learning communities have an indirect effect on student learning. Important in this line of change are so called mental models. The concept *mental model* refers to the idea that people always interpret their environment through a set of "cognitive maps" that summarize ideas, concepts, processes or phenomena" in a coherent way. Mental models are important because people need them in order to simplify the chaotic environments and multiple logical options to act that they face. Reliance on mental models may be particularly prevalent in the case of busy professionals like teachers, whose work require them to make hundreds of rapid decisions each day as they search for the best way of encouraging their students to absorb and interpret the material that they are presenting. Research suggests that a teacher's mental models may hold the key to determining whether or not they make significant changes in their practice (Korthagen & Lagerwerf, 2001; Sheasore, Anderson & Riedel, 2003; Leithwood, Louis, Anderson & Wahlstrom, 2004: 64f.).

According to Kelchtermans (1994), mental models consist of two interwoven parts; professional self-understanding and a subjective teaching theory. Here we restrict ourselves to the aspect of self-understanding.

Self-efficacy
Part of the professional self-understanding is *teacher self efficacy* (or better: teacher' *sense* of efficacy, because teacher efficacy is not the same as teacher effectiveness). Self-efficacy can be defined as a teacher's assessment of his or her competency to perform a specific task (Woolfolk Hoy, 2004; Goddard, Hoy & Woolfolk, 2000). Self-efficacy is multi-dimensional construct and there is no agreement about the dimensions of self-efficacy (Dewinter c.s. , 1997; Goddard, Hoy & Woolfolk, 2000). There is a positive relation between self-efficacy and results of students. Teachers with a higher level of self-efficacy are demanding more of themselves and of students, what can lead to better results. But the relation between self-efficacy and results of students is, at least for a part, reciprocal. Better results of pupils can also contribute to higher levels of self-efficacy (Dewinter c.s., 1997; Goddard & Goddard, 2001; Ross & Gray, 2004; Woolfolk Hoy, 2004). Dewinter c.s. (1997) also pinpoint to the fact that the level of self-efficacy can fluctuate during processes of innovation. High levels of self-efficacy can stimulate innovation. But during the process of implementation one can experience oneself as lesser competent because one do not master the innovation far enough and as a consequence the level of self-efficacy will be lower. Later, when one feels more competent to master the innovation, the level of self-efficacy can be higher again (cf. the so-called *implementation dip* (Fullan, 2001)).

Collective efficacy
More recently, research pay attention to an organizational dimension of efficacy. For schools, this sense of *collective efficacy* represents the judgement of the teachers that the faculty as a whole can organize and execute the courses of action required to have a positive effect on students (Goddard, Hoy & Woolfolk Hoy, 2004). Teacher's collective efficacy has stronger effects on student achievement than student race or SES (Goddard, Hoy & Woolfolk Hoy, 2001).

The power of collective efficacy for pupils learning and results – so is supposed – is indirect. Collective efficacy contributes to the normative context where teachers are working in. The sense of collective efficacy in a school can affect teachers self-efficacy and, indirect, the teacher's performance and student achievement. The experience of high collective efficacy creates an expectation for successful teaching and teachers are likely increasing their efforts to help students learn (Goddard, Hoy & Woolfolk Hoy, 2001, 2004). According to Goddard & Goddard (2001) collective efficacy is a strong predictor of teacher's self-efficacy. Goddard, Hoy & Woolfolk Hoy (2004) stress also the mutual character of this relationship: a school in which most teachers have a high level of self-efficacy will also likely be one in which collective efficacy is high.

However, as Goddard & Goddard (2001) mention, it is a unanswered question whether changes in collective efficacy lead to changes in teacher efficacy. And Cowley & Meehan, (2001) offer some evidence that the characteristics of a professional learning community do not or only in a very weak form, influence teachers self-efficacy. They found that (internal and external) measures of teacher efficacy are not significantly related to perceptions of the school as a professional learning community.

Ross & Gray (2004) stress also the indirect effect of collective efficacy. It contributes to the commitment of teachers to the school mission, to the professional community and to community partnerships.

Based on Bandura who introduced the concept of efficacy, one can distinguishes four sources of self and collective efficacy (Woolfolk Hoy, 2004; Goddard, Hoy & Woolfolk Hoy, 2004). Efficacy beliefs can rise by:
- mastery experience: the experience that a performance has been successfully;
- vicarious experience: seeing a model – which whom the observer identifies – performing well or listen to achievements of colleagues
- social persuasion; encouragement, performance feedback or discussions with colleagues;
- emotional arousal: if performing the task is exciting or at least do not arouse anxiety or worries.

Here the relationship between professional learning community and efficacy become clearer. The individual and collective learning processes in professional learning communities offer ample opportunities for mastery and vicarious experiences and for social persuasion. The tolerant climate for mistakes in professional learning communities can decrease feelings of anxiety while trying to practice new approaches in the class-room. These learning processes and learning context stimulate then higher levels of self and collective efficacy. These senses of efficacy can be regarded as a sustainable source for teaching and school improvement.

Innovative attitude

Another impact of professional learning communities and of efficacy can be called the innovative attitude of the school. A climate of trust and co-operation, as is presupposed in professional learning communities will reduce the sense of risk associated with change. When school professionals trust each other, they feel safe to experiment with new practices (Bryk & Schneider, 2002). Also, the learning processes in professional learning communities can give rise to new practices in the classroom. Here too, teacher and collective efficacy can mediate this innovative attitude.

We conclude this section by formulating some research questions:
- what is the impact of the organisational capacity of a school on the personal and interpersonal capacity?
- what is the impact of a professional learning community on the self and collective efficacy of teachers and on the innovative attitude in the school?
- what is the impact of collective efficacy of teachers on self efficacy?

-   what is the impact of the self and collective efficacy on the innovative attitude in the school?

METHOD

In this contribution we report about the so-called COPL-project (**C**apaciteits**o**ntwikkeling in **P**rofessionele **L**eergemeenschappen - *Capacity Development in Professional Learning Communities*)[1] of Fontys University of Applied Sciences. This project combines development and research. It contains the
-   support for six elementary schools in their development into professional learning communities;
-   the simultaneous acquisition of knowledge about professional learning communities. Aside from the case-studies of the six schools, quantitative data are obtained of 67 elementary schools.

The project lasts for 2,5 year and will be finished in the beginning of 2008. In this contribution we report about the quantitative data gathered by a questionnaire.

In order to answer the research questions, we obtained data from a survey of 96 schools elementary schools in the Netherlands. All professionals in the schools were asked to fill in a questionnaire. As a decision rule for including the schools in the sample, at least half of the professionals in the school, must filled in the questionnaire. In the final sample 928 professionals of 67 schools were included.
About half of these schools (37) are included in the research because the school leader of the school participates in a training program for school leaders. The questionnaire was a part of the curriculum. The other schools participate in innovation projects and use the questionnaire to gain more information about the school.

The sample is not entirely representative for elementary schools in the Netherlands. The proportion of school leaders with less experience is relative large and there are more older (age>55 year) and more younger (age<31 year) teachers in the sample compared with the total population of teachers.. Furthermore most of the schools are located in the South of the Netherlands.

Measurement of the Variables

Professional learning community
The characteristics of the school as professional learning community are measured by 40 items, divided in 6 Likert-type scales, with a 4 answer category (strongly agree, agree not agree, strongly not agree). The questions were based on different questionnaires (Hord, 1999; Hipp & Huffman, 2003; Sackney, Walker & Mitchell, 2005; Mulford, Silins and Leithwood, 2004; COVB, 19997a,b)

Teacher-efficacy
Teacher efficacy is measured by a translation of the short form of Teacher Efficacy scale (Hoy and Woolfolk, 1993), containing 10 items with a 4 answer category (strongly agree, agree not agree, strongly not agree). This scale consists of two subscales: Teaching efficacy and Personal Efficacy. The authors recommend not to combine the both scores into one total score, because the subscales represent independent factors.

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[1] In Dutch the acronym COPL can be associated with "koppel" meaning "link", a "set of people" but also a mechanism for the conveyance of force.

Collective efficacy
Collective efficacy is measured by a translation of the questionnaire of Ross and Gray (2004), based on a more extended questionnaire (Goddard, Hoy & Woolfolk, 2000), containing 14 items with a 4 answer category (strongly agree, agree not agree, strongly not agree). One item (about drugs and alcohol abuse in the community) is adjusted.

Innovative attitude
Innovative attitude is measured by a translation of the scale *Teacher Orientation of Innovation*, developed by Bryk and Schneider (2002). This scale contains three questions with a 4-point answer category (strongly agree, agree not agree, strongly not agree) and three questions with a 5-point answer category (none, some, about half, most, nearly all). The scores on this scale are recomputed in z-scores.

Personal data
Furthermore some personal data are obtained: gender, age, education, function in the school, class to teach, appointment scope, years of experience as a teacher or school leader in general and in the school.

RESULTS

Psychometric characteristics of the scales.

After the data were gathered, the Cronbach's alpha of the different scales was computed. The subscale Personal efficacy of the Teacher Efficacy scale shows a rather low alpha (0,641). Therefore we decide to remove two items of this subscale and combine the two subscales of personal efficacy. As said before, the authors do not recommend this combination. But one can argue that teachers judge Teacher efficacy also in relation to their own experiences as a teacher.

In table 1 on can find the different scales, the number of items and the alpha.

Table 1: **Scales in the COPL-questionnaire, number of items and Cronbach's alpha**

Scales and subscales	number of items	Cronbach's alpha
Professional learning community		
1. Personal capacity	7	.804
2. Collective capacity: shared values and a common vision of learning and of the teacher's role	4	.745
3. Collective capacity: collective learning and shared practices	8	.805
4. Organisational capacity: resources, structures and systems	5	.722
5. Organisational capacity: culture	4	.700
6. Organisational capacity: transformational and shared leadership	14	.893
Effects of professional learning community		
7. Personal efficacy	8	.707
8. Collective efficacy	14	.765
9. Innovative attitude	6	.803

RESULTS OF THE MULTILEVEL ANALYSES

In order to estimate the relative impact of the different variables we conduct multiple regression analyses. First, we carried out three regression analysis with the sub dimensions of a professional learning community as the dependent variable and the sub dimensions of the organizational capacity as independent variables. Table 2 shows the results of these analyses (in all tables, only effects that are significant at a 0,05 reliability level are shown).

The results show that quite a large part of the variance in the total score on the sub dimensions of a professional learning community is explained by the independent variables (the organisational capacity variables). The independent variables explain a large part of the variance of the two variables of collective capacity (*Collective capacity: collective learning and shared practices* and *Collective capacity: shared values and a common vision of learning and of the teacher's role*). Lesser but still more than 35%, of the variance in the total score on *Personal capacity* is explained by the independent variables.
The most important predictor for all the sub dimensions of a professional learning community is the independent variable *culture*. The more there is trust and respect between the teachers, the more they act as critical friends, the more they see professional development as a norm, the more the personal and collective capacity is enhanced. But also leadership and a resources, structures and systems for individual and collective learning are important.

***Table 2*: Regression analysis with the sub dimensions of a professional learning community as the dependent variable and the sub dimensions of the organizational capacity as independent variables.**

dependent variable	adjusted R square	Predictor	Beta
Personal capacity	0,352	Organisational capacity: resources, structures and systems	0,138
		Organisational capacity: culture	0,446
		Organisational capacity: transformational and shared leadership	0,130
Collective capacity: shared values and a common vision of learning and of the teacher's role	0,426	Organisational capacity: resources, structures and systems	0,166
		Organisational capacity: culture	0,434
		Organisational capacity: transformational and shared leadership	0,201
Collective capacity: collective learning and shared practices	0,502	Organisational capacity: resources, structures and systems	0,242
		Organisational capacity: culture	0,505
		Organisational capacity: transformational and shared leadership	0,114

Second, we carried out three regression analysis with the supposed effects of a professional learning community as the dependent variable (personal efficacy, collective efficacy and innovative attitude) and the sub dimensions of the personal, collective and organizational capacity as independent variables. Table 3 shows the results of these analyses.

***Table 3*: Regression analysis with the supposed effects of a professional learning community as the dependent variable (personal efficacy, collective efficacy and innovative attitude) and the sub dimensions of the personal and collective capacity as independent variables.**

dependent variable	adjusted R square	Predictor	Beta
Collective efficacy	0,253	Personal capacity	0,245
		Collective capacity: shared values and a common vision of learning and of the teacher's role	0,169
		Collective capacity: collective learning and shared practices	0,162
Personal efficacy	0,022	Personal capacity	-
		Collective capacity: shared values and a common vision of learning and of the teacher's role	0,148
		Collective capacity: collective learning and shared practices	-
Innovative attitude	0,487	Personal capacity	0,288
		Collective capacity: shared values and a common vision of learning and of the teacher's role	0,244
		Collective capacity: collective learning and shared practices	0,270

The results show that quite a large part of the variance in the total score on the dimension *Innovative attitude* is explained by the independent variables (the personal and collective capacity variables). The independent variables explain a moderate part of the variance in the score on the variable: *Collective efficacy*. And almost none of the of the variance in the total score on *Personal efficacy* is explained by the independent variables. For two dimensions (*Innovative attitude* and *Collective efficacy*) the most important predictor is *personal capacity.* In the case of *innovative attitude* the other independent variables have almost the same predictive power. In the case of *personal efficacy* nor *Personal capacity* nor *Collective capacity: collective learning and shared practices* have a significant effect.

Thirdly, we carried out a regression analysis with the personal efficacy as the dependent variable and the collective efficacy as the independent variable. Table 4 shows the results of this analysis.

***Table 4*: Regression analysis with the personal efficacy as the dependent variable and the collective efficacy as the independent variable**

dependent variable	adjusted R square	Predictor	Beta
Personal efficacy	0,098	Collective capacity	0,314

The results show that almost none of the variance in the total score on *Personal efficacy* is explained by the independent *collective efficacy*.

To end, we carried out a regression analysis with the *innovative attitude* as the dependent variable and the collective efficacy and personal efficacy as the independent variables. Table 5 shows the results of this analysis.

Table 5: Regression analysis with innovative attitude as the dependent variable and collective efficacy and personal efficacy as the independent variables

dependent variable	adjusted R square	Predictor	Beta
Innovative attitude	0,245	Collective capacity	0,466
		Personal efficacy	0,080

The results show that a moderate part of the variance in the total score on *innovative attitude* is explained by the independent variables *collective efficacy* and *personal efficacy*. But at the same time we can notice that the predictive power of personal efficacy is very weak.

CONCLUSIONS AND DISCUSSION

Based on the Cronbach alpha reliability, we can conclude that that all scales have satisfactory reliability.

The organisational characteristics explain a moderate to large part of the variance in the total score on the sub dimensions of a professional learning community. Especially a culture of mutual trust and respect between the teachers, of professional critique and of professional development is a strong predictor for individual and collective learning processes in the school.

A school as a professional learning community contributes to the *innovative attitude* in the school and to the *collective efficacy* of the teachers. For this *innovative attitude* and *collective efficacy*, the strongest predictor is *personal capacity.*
At the other hand, the *personal efficacy* of teachers is almost not influenced by the characteristics of a professional community. As said before, this is in line with evidence that the characteristics of a professional learning community do not or only in a very weak form, influence teachers self-efficacy (although in this research teacher efficacy was measured in a different way) (Cowley & Meehan, 2001).

Collective efficacy is a predictor for self efficacy but the amount of variance in the total score on *Personal efficacy* explained by *collective efficacy* is very low.

A moderate part of the variance in the total score on *innovative attitude* is explained by the independent variables *collective efficacy* and *personal efficacy*. But at the same time we can notice that the predictive power of personal efficacy is very weak.

So it seems that personal efficacy plays not a very significant role. Nor as a consequence of the school as a professional learning community, neither as a consequence of collective efficacy. And also not as a predictor for the innovative attitude.
One possible explanation for this had to do with the way teacher or personal efficacy is measured. As said before, the *Teacher Efficacy* scale consists of two subscales: *Teaching efficacy* and *Personal Efficacy.* But due to the reliability of the subscale *Personal efficacy* we decide to remove two items of this subscale and combine the two subscales of personal efficacy. Therefore most of the items in the Teacher Efficacy scale have now more to do with the subscale *Teaching efficacy*: remarks about the efficacy of teaching in general. Perhaps these ideas of teaching in general are lesser influenced by feelings of collective efficacy or by the characteristics of the school.

Do professional learning community contribute to sustainable school development?

On the base of the results we can conclude that a school as a professional learning community influences in a positive way the collective efficacy and the innovative attitude. It seems that the individual and collective learning processes in professional learning communities offer ample opportunities for mastery and vicarious experiences and for social persuasion. The tolerant climate for mistakes in professional learning communities can decrease feelings of anxiety while trying to practice new approaches in the class-room. These learning processes and learning context stimulate then higher levels of collective efficacy and of innovative attitude. These attitude and feelings of efficacy can be regarded as a sustainable source for teaching and school improvement.

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