



## **Building municipal support structures in science education**

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### **Background, framework and purpose**

Mounting research shows us that long-term improvement to the quality of teaching often hinges on the school's capacity to function as a coherent, focussed unit aimed at promoting learning and development throughout the organisation (e.g. McLaughlin and Talbert, 2006). One strand of research focuses on the formation of professional learning communities (PLCs) (Stoll and Louis, 2007). These are characterised by a number of factors that have been shown to be necessary for continued development within schools including 1) shared and supportive leadership, 2) shared values and vision, 3) collective learning and application, 4) shared personal practice, 5) supportive conditions in the form of relationships and structures and 6) external factors (Hipp et al., 2008).

Although our knowledge of what PLCs look like, how they function and even how we can facilitate their development is growing, much of the research has focused on the organisational unit of individual schools. Few researchers have attempted to characterise how the aforementioned external factors can influence PLCs, or more to the point, how the notion of PLCs might be expanded beyond institutional boundaries so that not only schools but other community stakeholders can be included in continued efforts to develop science education. This study therefore examines *how local continued development in science education can be facilitated through municipal coordination and support*.

In 2008, a privately initiated project named "Science Municipalities"(SM) was launched with funding from the Danish Ministry of Education. The project built on a model derived from research in connection with a successful development project aimed at promoting science in a small region, which demonstrated the importance of political support for local development (Author, 2007). The SM project's purpose was to coordinate and support improvement of science education at the municipal level in concordance with current national policy and the national science education action plan (Undervisningsministeriet, 2008). The project attempted to achieve this through the appointment of municipal coordinators who were assigned to secure the following supportive structures:

1. Political support through local legislation and by engaging key political figures in the effort to promote science education initiatives and secure funding.
2. Establishing and developing networks between science teachers at all levels of education.
3. Establishing and developing partnerships with private enterprises and other stakeholders that could contribute to improve the quality of science teaching and benefit from closer relationships with teaching institutions.
4. Coordinate and facilitate the numerous science initiatives already in play throughout the country in order to improve coherency and utilization of existing resources.
5. Establish a Science Board consisting of key stakeholders of influence across a broad spectrum of interests to ensure widespread acceptance and coherency of the municipal science strategy.

These support structures involved the engagement numerous stakeholders (such as local enterprises, government officials, politicians, science centres and museums) in a consorted effort to promote science education within each municipality. In spite of the complexity involved, the project quickly drew the interest of more than half of the 98 Danish municipalities and to date 25 municipalities have committed to the project on a political level.

## Method

Participating SM have been monitored through bi-yearly micro-surveys and yearly in-depth interviews with the appointed SM Coordinators. In total, 46 in-depth interviews of approximately one hour in length were conducted (22 in 2009 and 24 in 2010). The micro-surveys were mainly used by the project leader to make strategic decisions but they also provided background information for the in-depth interviews. The interviews were conducted using a thematic questionnaire designed to function as the interview guide. The questionnaire included items regarding project goals as well as questions derived from micro-survey data. In the interview, respondents were primarily asked to respond to key items on a five-point Lickert type scale and allowed ample opportunity to discuss the reasoning behind each answer. The answers were then noted in the questionnaire by the interviewer and supplemental notes were added immediately after each interview. This was done to help reduce the complexity of the information gathered through the interviews while retaining detail and ensuring high respondent validity. The resulting data was analysed to see whether supportive structures seemed to have become institutionalised (Fullan, 1991).

## Results

Data from the first two years of the SM project revealed an enormous diversity within the 25 involved SM with regards to whether or not supportive structures were established and institutionalised through the project. In this regard, the SMs fell into four categories based on pre-existing conditions in the municipality. A short summary of the overall results is shown here:

<i>Category</i>	<i>Description</i>	<i>n=</i>
Established	Political focus and municipal support structures already existed before 2008. The project became a continuation of existing efforts to improve science education and few new support elements were introduced. Existing structures were not based on SM project goals.	2
Overlapping	Plans (if not actual initiatives) to improve science education were in place before 2008. Project elements became an overlapping addition to existing initiatives and many support structures were established although they were not necessarily in line with SM project goals.	9
Serendipitous	Widespread interest in improving science education existed, but no concerted efforts were planned in 2008. The SMs project became the catalyst for efforts to improve science education. This generated a high level of new initiatives and many support structures were established, though not necessarily institutionalised.	6
Starting	There were no pre-existing support structures or political efforts to promoting science education. Few support structure were established and little coordination achieved.	7

The study showed that most of the SM successfully established (some) support structures, but with varying degrees of coordination with pre-existing conditions. The greatest potential for change was found in the Serendipitous category, where pre-existing conditions allowed for a concerted effort to be made. However, many of the established support structures were not yet institutionalised. Both Established and Overlapping SMs also showed many promising initiatives, but in many cases existing structures were not necessarily part of a coordinated effort. Starting

municipalities where characterised by few development initiatives and little success in establishing support structures. Where the SM project had had significant impact, support structures enabled teachers and many other stakeholders to build productive relationships that could be sustained with minimal effort and/or resources. This seems to support the notion that there is good reason to expand PLCs to include stakeholders from outside schools to enable continued development.

### **Conclusions and implications**

The SM project has demonstrated the potential of municipally anchored supportive structures and coordination to develop continued development in science education that engage a broader part of the community. Various project elements described in the SM model may contribute to make this possible, but the composition of individual municipalities is very diverse and pre-existing conditions need to be addressed in order to achieve significant success in the short time span of two years.

The SM model could be adapted to fit other educational systems. The principles behind the model are not restricted to national policies or cultural conditions. Nor are the underlying needs for coordination of efforts to improve science education unique to Denmark, and there are still many aspects of the SM model to explore.

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