The pressure for change and teachers' motivation for PD

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This paper will explore what motivates teachers to participate in development projects, involving experimental teaching, and especially what the nature of pressure for change means for the engagement of the teachers. Thus, it is not dealing with TPD organized as ordinary courses, but digs into the potential of more long lasting development projects – and how different organizations of the projects can lead to different engagement.

The analysis is based on research the author performed on two large TPD initiatives for the upper secondary education (the gymnasium) in Denmark. The first took place in the 90ies as a quite open, self-directed and decentralized initiative. The other was a more central organized initiative taking place in the 00es. They are finally put into perspective with recent experiences with TPD activities in the 10s.

One of the intentions of the paper is to show the importance of the societal and organizational framing of a professional development project, therefore the contexts for the different projects are described quite thoroughly.

Professional development based on an internal pressure

At the beginning of the 90ies the upper secondary education in Denmark was under a strong pressure. It still had the organization and the content demand from earlier decades despite a huge increase in students – and students with a new sociality. The intake rose to 50 % of a cohort – for a system designed to 5-10% - and this caused a huge spread in student background and qualification. Many teachers complained about low motivated students and students with lack of concentration. The teachers felt a need for tools to cope with this situation. The Ministry of Education then launched a development programme about 'differentiated teaching' or 'teaching mixed ability classes' based on some very teacher oriented principles:

- Teachers participated voluntarily
  - they applied themselves for participating
  - they stopped when they wanted
  - they formulated their own development projects and set their own goals

- Teachers worked together in teams with
  - scheduled meeting times
  - a coordinator
- Teachers were supported by a positive climate by the school and some teacher replacement (app. 20 hours a year)
- Teachers were supported by practical and theoretical input
  - literature
  - conferences and seminars
  - consultants
- The experiences were be spread through
  - regional meetings
  - exchange between colleagues
  - reports

The project thus built on teacher initiated, school based activities with a regional and central level of exchange of experiences and a central support in the form of resources and training of consultants. The theme was interpreted in a very broad sense and all teacher group formulations were accepted, so the idea of teaching mixed ability classes was mostly an umbrella term for changing the dominant teaching – with the teacher talking in front of the class. It started very slowly in 1992 with 61 teachers in eight schools and it grew rapidly. It introduced a series of lectures spread around the country by more experienced teachers and researchers and a corps of consultants was formed. After a short time a journal for teachers edited by teachers (called *Pedagogy in Practice*) was established and a series of booklets were published about teaching specific subjects for mixed ability students (eg. *Differentiated teaching in physics*). During 1995 16 of these booklets were published covering all subjects in the gymnasium. The booklets were published by the Ministry of Education in a very large number and they were distributed for free and were widely used for inspiration and for in-service training. After some years, the focus of the development projects gradually shifted from teaching mixed ability classes towards dealing with learning processes and student responsibility, very much inspired by the Australian PEEL project (Project for Enhancing Effective Learning) (Baird & Northfield 1992) based on metacognition and the Norwegian AFEL project (Ansvar For Egen Læring – Responsibility for your Own Learning) (Bjørgen 1994) based a learning oriented and student center approach introducing different teacher roles. The PEEL-book was translated into Danish and re-edited to a Danish context (Dolin & Ingerslev 1995). A number of international educational researchers were invited to Denmark, John Baird from Australia, Philip Adey and Robin Millar from UK, Ivar Bjørgen from Norway, among others, and were travelling around Denmark, lecturing. The organization of the whole initiative also shifted towards local study circles – in 1995 1100 teachers (12 % of all Danish gymnasium teachers) from 83 schools participated in 122 study circles with 50 consultants. The project had many interesting aspects and it was closely evaluated half way through (Baandrup et al 1996). At this time the focus shifted once again towards subject specific didactics (as it is called in Denmark)

determined by the teachers' need for implementing the more general learning theories in their subject. Subject specific didactics (Danish: Fagdidaktik) is the didactical oriented version of PCK and it can to a large degree be seen as a counterpart to the Anglo-Saxon curriculum tradition (Westbury 2000). In the project each subject had a group of teachers editing a book with teaching material and ideas for implementing mixed ability teaching in the subject. For example they gathered examples of writing exercises using different genres and the use of role play and ict in the subject. These booklets were often used in study circles by local groups of teachers and especially in the natural sciences they were inspiration for developing the teaching towards more open and investigating approaches among a relatively large group of teachers. This gave cause to an overheated debate among science teachers about what school science should actually be – the classical conflict between 'hard core' science-oriented teachers and the 'soft' science teachers arguing that the subject also had to adapt to the students' need and abilities. Many Danish science teachers in the gymnasium will hold a master in a science subject and they often see themselves more as for instance a physicist than a physics teacher – and pedagogy was not a core competence for these hard core science teachers. Traditional in-service science teacher training was mainly about learning the newest science from university scientists; very few courses with a pedagogical content were offered and they were often not realized due to lack of interest. International projects like the American *Science for All Americans* (ref.) and the British *Beyond 2000* (ref.) had some influence, at least at the policy level, and there came a growing understanding that school science, even at the gymnasium level, could not remain a down sized university subject. It had to be transformed into a subject serving wider goals than feeding the university and industry with small scientists and it had to implement a pedagogy supporting this shift. 'Fagdidaktik' became a core concept in this process and science education researchers were invited to participate in committees for designing new curricula and new ideas for teaching material and teacher training activities. The P in PCK was given more emphasis at the expense of the C.

This growing conflict between different approaches to science teaching developed simultaneously with a new understanding of pedagogical development. Until the mid-90ies pedagogical development in the gymnasium were closely linked to the individual teacher and his or her subject. In-service teacher training were arranged by the teachers' associations (and almost only content oriented) and it was the individual teacher who signed up for the course they found relevant (or interesting) themselves. This understanding of pedagogical development is closely linked to the so-called *didactical tradition* (Westbury 2000). In this tradition the teacher is given a large autonomy to adapt the learning goals to the concrete classroom and the curriculum is mainly some general goals that the teacher interprets and makes his or her own. This is in opposition to the so-called *curriculum tradition* where the teacher is seen as a deliverer of a centrally and politically fixed curriculum.

Towards a school based approach for TPD

At the end of the 'teaching mixed abilities' initiative, with its very broad and heterogeneous approaches, you see the first signs of a shift in the understanding of teacher training and school development. For the first time teachers' professional development was linked to school development and the direction of the development was decided by the ministry of education. This shift was accepted by most teachers because they felt the need for change in the educational system and the launching of the programme was seen as – and in practice was – a helping hand, and it was based on some very teacher oriented principles. The ministry here took on a new role (as a result of the New Public Management wave –ref.) and they defined a project that had a common focus across the subjects and with an organization based on teacher groups on and between schools rather than based on the subject organization (like for instance the physics teacher association).

This trend was increased when the ministry in the late 90ies began sponsoring school based projects with centrally fixed and more specific themes (eg. use of ict, transition from the compulsory school to the gymnasium, cross curricular teaching) and it stopped supporting the study circles in 1999. At that time about one third of all gymnasium teachers (4200) participated in study circles and some thousands participated in the new centrally fixed (and more heavily sponsored) projects, often introduced in the schools by the leadership.

The evaluation in 1996 of the differentiation of teaching project (Baandrup et al) found some common features in the many projects based on the original principles:

- In order to aim the teaching towards the individual student, teachers worked with different methods to know the student's progress (assessments, dialogues, observation).
- The participants introduced new teacher and student roles. Different methods for organizing student group work were invented and teachers learned to form teacher teams.
- Increased consciousness on changing from a transmissive to a more interpretive teaching, and the necessity of enhancing metacognition and the importance of building a class room culture.
- Increased focus on the learning processes and discussions of the concept of 'faglighed' a not translatable Danish expression for the special professionalism attached to the subject.

The interviews with teachers revealed a deep engagement and many expressed a need for combining the everyday practice with theoretical input. Among colleagues to the teachers participating in the projects, the attitudes were more mixed. At some schools the project were well known and had a high status but at other schools the headmaster did not take ownership to the project and it lead an obscure life –was even in some schools thrown suspicion on.

To get a picture of the teachers' motivation to enter a development project, the author and Gitte Ingerslev in 1999 (Dolin and Ingerslev 2002) carried through a survey with all teachers involved in projects supported by the Ministry of Education, i.e. both the original study circle oriented and the new thematically focused projects. A questionnaire was posted to a representative sample of all teachers involved in these projects in 1997/98 and 1998/99. 321 questionnaires were returned, giving a response rate of 43%. Of the many results the following are interesting for this paper:

- A relatively higher proportion of older and experienced teachers participated in the projects
- Three quarters of the teachers participated in projects initiated by themselves or their colleagues, the rest in projects initiated by the leadership or other.
- The top reason for participation (60 %) was a wish for professional development as a teacher. The next most (50 %) was to increase the students' output of the teaching.
- Most of the projects had general pedagogy content (40 %), half as many (20 %) had a subject specific objective and the rest was a mixture of the two aims.
- Most teachers found the work with the project exciting and rewarding. Half of the app. 10 % feeling frustrations about the project participated in leader initiated projects, although these were only one fourth of all projects.
- Two third of the teachers have changed their pedagogical point of view and half of the teachers have changed their teaching practice. The change in pedagogical point of view is independent of whether the teachers participated in self-initiated or leader-initiated projects. But for teachers participating in teacher-initiated projects it was three times more likely that they changed teaching practice than for teachers in leader initiated projects.
- Projects initiated by the leadership had a greater impact on the whole school than teacher initiated projects.

Summing up, most of the projects were initiated by the teachers themselves with a motivation to develop as a teacher. The projects had a high spill-over effect on the teachers' other teaching. Teachers to a larger degree changed their teaching practice as an outcome of a pedagogical project, if they themselves had taking initiative to the project.

Professional development based on an external pressure

At the beginning of the 00es it became obvious that the gymnasium with its structure and subjects dating 100 years back was outdated. Or at least the policymakers introduced a discourse saying this. The discourse borrowed expressions from industry and private business with emphasis on marketization, competence development and accountability. External agendas such as globalization, knowledge society etc. gave an external pressure to change the gymnasium (and the educational system as such) in a direction towards giving students creative, innovative competences that can be transformed into economic growth – to push it to extremes. As a part of

this movement the subjects were no longer to be seen solely as containers of its own knowledge, but also as contributors to the total competence profile of the individual student. In this context it was no longer possible to maintain a subject identity by referring to the traditional, classical, canonical knowledge. It was necessary to argue for what the subject can give students that they will need in their further life as civil persons, citizens and labour force. And it was necessary to formulate these potentials in competence terms, i.e. what you should be able to do with the subject.

These external pressures were translated into a *Development programme for future youth educations 1999-2003.* The motivation for change was explicitly stated as a reaction to a threat from outside: *The youth educations must develop to consider the needs in a society facing huge technological and global challenges.* It was a general framework for a new gymnasium that passed through a unified parliament with a relatively big funding for experimental projects. These should introduce new ways of teaching that enhance the students' professional and personal competences and also new ways of organizing the school – breaking down the time schedule, organize the teachers in teams, and introduce more cross-curricular teaching, among many possibilities. It was clearly formulated that the results from all the projects would form the basis of a radical reform of the gymnasium.

The results of the programme were evaluated in 2003 (Beck et al 2003) and a series of debate meetings for the subjects took place all over Denmark discussing the purpose of the subject and if and how it should change in order to fit into the coming gymnasium. Many science teachers participated in projects and numerous articles in science teacher journals argued for different points of view. The subjects more or less fought for their positions, more or less re-playing the division between hard core scientist teachers and more pedagogical oriented science teachers. In many ways, this was in itself a large scale teacher training process giving the teachers some concepts about meta-perspectives on their subjects.

Whole school development projects

In the end of 2002 the contours of the principles for reforming the Gymnasium emerged. 10-15 schools applied for whole-school development projects for 2003-04 and the ministry appointed a group of four researchers to follow these whole school development projects. Four schools were selected representing a variation in size, location, leadership style, experience with development projects. A questionnaire was carried out covering all teachers and the management at the four selected schools. Selected teachers (n=18) and leaders (n=12) from the four schools were interviewed and documents analyzed.

General findings from the 4 schools (Dolin et al 2005):

- Teachers often look at the projects as based on external influence and not reflecting their own needs
- The more concrete the projects are, the more they seem to influence practice

- With abstract and structural goals the means often turn into ends
- Management initiated projects have less impact on practice
- Conflicts can be interpreted as an expression of transfer of power between groups of teachers
- All teachers find themselves in a cross pressure between new demands from the project and their own professional pride (and routine!)
- Even if pressure for change is stressing and frustrating, it very often gives an opening for reflection and change of practice

Many teachers expressed a feeling of contradiction between working for the students' deep subject specific professionalism and working more pedagogically and if a change in pedagogy did not directly contribute to the subject knowledge, it was to a large extend considered as a disturbance. These teachers were also less positive towards experimental teaching in general. All the whole school experiments had a strong element of cross-curricular teaching and it was interesting, that what changes the teachers' way of teaching and their conceptions of the subject was

- not changing the distribution of the lessons

- not to work with subject specific development

- but to work with interplay between the subjects (cross curricular activities).

Teaching in one's own subject in a context with other subjects forced the teachers to clarify the characteristic aspects of own subject and how to teach them.

Meaning making

Another important issue that emerged from the interviews was the importance of meaningfulness for the teachers. Two discourses were present: One you could call *instrumental*, where meaning were seen in relation to some external necessity (for instance educational reform, chance in student attitude etc.). This was an openly expressed meaning and the teachers accepted for instance the necessity of interventions motivated in some general societal or economic development out of their reach. The other discourse was expressed indirectly and it was an *internalised* meaning, based on the norms of an underlying culture, mostly a collegial community founded on the subject discourse. It was obvious that teacher practice is not only about effectiveness and obtaining results – it is equally much an expression of moral and value. Among the different groups and persons at the school, most teachers felt most attached to the other teachers in the subject, they felt as participants in a subject founded community of practice. And general changes in teaching conditions, which hindered the free development of their subject, were often commented with metaphors of loss.

A competence formulation of the science subjects

The controversies about formulation of the goals for science education go as a red thread through the 90ies and the 00es. The political level wished to modernise the science subjects in order to increase the students' interests and motivation for working in the science subjects and thus enhancing the up-take to further education in the STEM subjects.

The ministry of education asked a group of science education researchers to formulate a set of competences that could be used to describe the science subjects in a common, general way across the educational levels. Similar groups were appointed for mathematics, Danish literature, and the language subjects. The resulting report (Dolin et al 2003) formulated four science competences:

- A modelling competence (to be able to construct, use, and analyse models)
- An empirical competence (to plan, perform, and describe experimental/practical work)
- A representational competence (to be able to understand and transform between different representations of the same phenomenon)
- A put in perspective competence (put science into cross curricular, historical, philosophical, and personal perspectives)

These four competences were common across educational levels and science subjects, but adapted both subject and level as they were described in the different curriculum documents.

When the reform finally was launched with start in 2005 it represented a dramatic change in structure and content. 20 % of the time in all subjects should be used on cross curricular teaching in modules with societal and epistemological aspects, the teachers were forced to work in teams and the curriculum of all subjects were changed fundamentally, from a fixed syllabus (often as pages in a textbook) to some competences within some broad discipline areas. The demand on content was loosened but restrictions on pedagogy were tightened.

An evaluation of the reform after the first year showed massive resistance from the teachers - 80 % of all teachers were against the reform (Dolin et al 2006).

Professional development in an organizational and pedagogical context

Here at the beginning of the 10s, most teachers have some routine in teaching in line with the intentions of the reform and it is clearer how the reform has changed the teaching in science.

The years after the reform were dedicated surviving in the new structure and the new curricula (called learning plans). An important aspect was the demands for cooperation between subjects from different faculties (for example the natural sciences and the humanities). The subjects shall work together in the teaching of for example climate change, which means that the teachers must be able to give an account of how the subject can contribute to examining the problem. Another important aspect was the demand of teaching for the development of the students' competences.

The science competences are mirroring the practice of science and focussing on science practices and discussing what it actually is to *do* science opens up for a discussion of which processes and procedures are important. This naturally leads into how you implement them in the classroom, i.e. how you teach students to learn them – and thus integrate the pedagogy in the science classroom with the content. The whole point being that content is no longer a fixed amount of knowledge but a set of processes within a knowledge area and the students shall learn to master these processes.

In a TPD perspective this development is seen in new formats for TPD. Groups of teachers, often from the same school, are now participating in long term projects that combine a given area of knowledge, a given content, with a pedagogical approach. A capital P and a capital C at the same time.

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