Egalitarianism meets ideologies of mathematical education - instances from Norwegian curricula and classrooms

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Abstract: The article starts focusing egalitarianism in a Norwegian curricular context in general and in mathematics education from primary schools to teacher education in particular. It progresses by locating and problematizing some major ideologies in mathematics education such as rationalism, activism, competitivism and 'autodidactism' on one hand and egalitarianism on the other. Some results from TIMSS, where Norway differs significantly from other countries, are touched upon and contrasted with episodes from qualitative studies. It is asked, from a general didaktic point of view, whether egalitarian values in mathematics education should be seen as strenght or weekness, and the other way round, whether mathematical education contributes to or counterworks egalitarianism in society.

Kurzreferat: Dieser Beitrag beginnt mit Űberlegungen zum Egalitarismus im norwegischen Curriculum im allgemeinen und im Mathematikunterricht von der Primarstufe bis zur Lehrerbildung im speziellen. Danach lokalisiert und problematisiert er einige Hauptideologien im Mathematik-unterricht, wie Rationalismus, Aktivismus, Konkurrenzdenken und 'Autodaktismus' einerseits, sowie Egalitarismus andererseits. Einige Ergebnisse von TIMSS, wobei Norwegen sich signifikant von anderen Ländern unterscheidet, werden betrachtet und mit Ergebnissen anderer qualitativer Studien verglichen. Aus einer allgemein-didaktischen Perspektive wird die Frage gestellt, ob egalitäre Werte im Mathematikunterricht als Stärke oder Schwäche betrachtet werden sollten, und andererseits, ob Mathematikunterricht zum Egaltarismus in der Gesellschaft beiträgt oder ihm entgegenwirkt.

ZDM-Klassifikation: D20; D30; A40

Introduction

The hypothesis of this article is that a strong tendency to value equality in (the Norwegian) society will seep into all cultural sub-elements, included the teaching/learning of mathematics in the educational system. As a central value it will be backed up politically by laws, regulations and other incitaments. On its way from the top curricular domains 'down' to the classroom such a political strive will meet and blur with ideologies of subcultures, such as different kinds of didaktics and pedagogical practices. Thus what becomes the highest meaning or the deepest sense with schooling and mathematics (for society, teachers and students) becomes uncertain, not the least since 'struggle' or 'wrestling' between these values are normally not an explicit issue. The aim of the article is to shed some lights on these encounters, and to demonstrate that the notions of context and genre are crucial in this enterprise.

The unitary school system, the 'enhetsskole', as egalitarianism - a historical outline

Almost all Norwegian students will in principle have the same syllabus in their first ten-eleven (of thirteen compulsary) years at school. Not only do they have the same syllabus, they even are in heterogeneous, mixed ability classes all through the 10 first years, or many places even in the same class for 7 years, where individual differences are handled within the class. Thus Norwegian schools are strongly influenced by ideologies associated with the principles of collective teaching and learning and equal rights for education. This is partly a curricular effect of 50-60 years of social democratic politics and strive for social and economic nivelling that includes the equal right members of society should have to obtain positions in society regardless of their parents socio-economic status (Telhaug 1997). Hence at the start of the new millenium nearly 100% of Norwegian students are in public schools, all written plans (curricula), for all levels and for all subjects all over Norway are given the same form and function, there are no marks given before year 8, permanent and structural streaming based on marks or competance is not allowed, and there is no choice for specialisation in subjects or branches before year 12 (of 13).

Sources of this strong and nationally shared *egalitarianism* can be traced in the political and cultural history of Norway. For hundred of years the bourgeoisie was rather small, there were few major landowners and aristocracy was weak. In 1814 Norway got a democratic constitution, which abollished aristocracy. Compared to most other countries Norwegians originally were and later became more equal and homogenious. During the 19th century a mixture of cultural and political movements became important driving forces in the struggle for educational and equal rights for all and through political pressure, first from radical liberals and later from the labour party educational reforms formalized these rights.

The egalitarian struggle for equal right to education in Norway resulted in what is called 'enhetsskole' , which superficially can be translated as 'unity-school'. The labour movement´s radical claim was that high schools should recruit students from public schools. This principle was approved by the Parliament in 1920 and a new law in 1939 stated that all Norwegian children, irrespective of where they lived and who they were, had the same, or the equal right to (7 years of) education. Thus the political 'sluicing' of allmost all children aged 7 to 14 through public school, was a rather radical decision in Europe at that time. Even the royal family has for two generations had their children in public schools.

Between the late 1930ies and the 1990ies the Norwegian Labour Party dominated Norwegian educational politics, working strategically for social levelling and equalization through a constant claim for equal rights for all, especially when it came to access to

education. Nevertheless when the reforms in the 1960ies and early 1970ies introduced 9 years compulsory schooling, streaming based on homogenous 'ability' groups in central subjects for grade 8 and 9 was allowed.

However from 1978 all kinds of permanent streaming in the sense of permanent homogenous 'ability' groups were explicitly forbidden again.

This decision could be seen in the light of egalitarianism. At this stage a strong political majority across party lines in the Parliament as well as in society in general supported all students' right to get upper secondary education. The streaming policy in the late 1960ies, not the least in mathematics education, actually obstrued this possibility. The 1978 statement was possible partly because 'content differentiation' had become a dominant pedagogical solution and a firm political and educational ideology. It is symptomatic that a leading didaktician in mathematics favoured the following definition: *Differentiation is unequal co-learning* (Solvang 1992). This positioning made explicit a major dilemma that had been historically accumulated and escallated, how can a national enforced will to, make 'class community', in a double sense, be compatible with obvious different learning conditions in mathematics?

All levels in the educational system were reformed during the 1990ies. In this periode 'enhetsskolen' and traditional egalitarianism in education came at risk. There was a demand for increased freedom for parents to choose school for their children and traditional ideas of solidarity and equality came under strong pressure. Therefore it is rather thought provoking that Norway, ruled by a minority labour party government, in the postmodern aera, and under pressure from a strong and new-rich populistic right, still has got a fully reformed educational system, seemingly more based on the ideology of 'enhetsskole' and egalitarianism than ever. This becomes especially clear inspecting subject matter plans on all levels - the degree of explicit differentiation in content is extremely low. The strong and reproductive tendencies seem to survive by a massive *tacit* support from an every-day practice where ideologies are constantly transmitted. This means that for instance the many different ideologies of mathematics education should be expected to be confronted with tacit egalitarianisms in classrooms.

Curricular developments and values in mathematics education

Thus in the following we will inspect mathematics as a subfield, tracing possible disciplinary ideological tendencies. The first 'plan' for a new compulsory *nine* year school, *Curriculum for experimenting with a nine year compulsory school* (FR 1959) was implemented progressively from 1959 on and introduced the notion of Mathematics (to replace 'Calculation'). The new plan was common for grade 1 to 6, but was differentiated in three different syllabi levels for grade 7 to 9. Students were supposed to judge their own capacities and aspirations in mathematics and choose an adequate level. However only the most challenging level gave access to further (theoretical) upper secondary education, and accordingly in the next turn to higher education. This was of course not in line with the strong push for equal rights to further education.

A principally new pattern was introduced in M74, the National curriculum for compulsory education from 1974, the idea of curricular framework plan ('rammeplan') in general and for each subject, a means for differentiation within a common, supposedly shared culture. In mathematics the quite open plan gave general guidelines for the teaching which enabled different students to work on different topics and levels, and in different tempi and depths, within the same subject area. At the same time though all students would meet the same final exams at the end of grade 9. A general critique from educators in mathematics of the framework plans from 1974, 1984 and 1987, was that they were too open and unspecific. This criticism probably contributed to the new and current plan's (L97's) more specific guidelines for each school year as well as defined minimum levels of subject matter for the common final exam at the end of grade 10 (the former grade 9) (KUF 1996b).

The international movements within mathematics education influenced the process, on the one hand the "back to basics" movement with its negative reaction to the new math movement, on the other the "minimum competence" movement. The latter wanted to define the minimum competence one could expect from students when they had finished primary school (Fey 1980). All this contributed to the new reform. The overall outcome is a syllabus in mathematics with detailed descriptions and goals for each aspect of the subject for each school year all through the (now) 10 compulsory years. In this respect L97 has become a goal-oriented plan rather than a framework plan. Each subject has some common goals and each aspect and year level have more specific ones, following a rather strict textual formula for all subject matters. For illustration we give examples from mathematics:

Grade 5, Geometri: In their training the students shall
- create figures, forms and patterns, and try to make out some of their properties
- measure and calculate the circumference of among other things quadrangles and triangles

(L97:163, our translation).

Grade 8, Numbers and algebra:In their training the students shall
- work with all algorithms on whole numbers, decimals and rational numbers, and make calculations with percentage

(L97:167; our translation).

Obviously there are still remnants of the framework idea left that may give room for individual differentiation, since all goals are formulated as areas that the students are supposed to work with. Behind the general idea though lies the view that in principle should all students work at the same time with the same topic and that there still would be sufficiant room for individual depth and breath adjustments. Thus the old general dilemma is

transmitted further 'down' to the teacher.

Before we concentrate on the concept of ideology, it seems relevant to present the rather odd historical position mathematics has had in Norwegian teacher education, since this history perhaps partly can explain a tension we may see between a subject and a student oriented didaktic.

Teacher education in mathematics

There are two main different routes of teacher education in Norway. One is through the universities covering secondary and upper secondary education (year 8 to 13). The other is through the Teacher Education Colleges, that primarily educates 1-10 teachers. (Colleges are now called 'University Colleges' since there is a common law for higher education.) We will focus on the latter and consequently the curriculum for teacher education for primary and secondary school, or in Norwegian '*grunnskole*', as this probably is closest connected to 'enhetsskole' ideologies. Through their broad certification the colleges keep up an important pattern connected to 'enhetsskolen', the principle of the class-teacher, one teacher can in principle have the same class through all years, in all subjects, including mathematics. The Norwegian teacher education for grunnskolen accordingly gives the right to teach any subject from grade 1 to 10. However mathematics as a subject in teacher education for primary and secondary school was not compulsory until 1992! In other words mathematics in the Norwegian grunnskole are taught by teachers with relatively low competance in mathematics. Thus official statistics has shown that more than 50% of teachers in primary school who teach mathematics, has no mathematics in their teacher education (KUF 1996a).

The actual situation is probably even worse: In a survey among students at Oslo University College Braathe and Kleve (1995) found that 50% of the students only had the *minimum* of mathematics from upper secondary school before they started their teacher education, and that these same students would not choose more than the minimum of mathematics at the College. This indicates that a great portion of the teachers in primary school who have no mathematics in their teacher education may also have only the minimum of mathematics from high-school. Hence a majority of teachers in Norwegian primary and secondary schools may have just a minimum of interest in mathematics education. There is a significant danger that many of these teachers belong to the teachers who, according to the TIMSS study, organise their mathematics lessons leaning heavily on textbooks and other pre-produced material (Lie et al. 1997, Cogan and Schmidt 1999). Thus student teachers are likely to be led by subject *ideologies* that are in accordance with their restricted background knowledge and low motivation for mathematics.

Further teachers who got their pre-service training before 1990 did not have to include mathematics in their education. The only requirement was some short of obligatory courses in teaching methods. This means that nearly half of teachers teaching school below grade 8 only have a short course in teaching methods in mathematics from the college beyond the minimum of mathematics from upper secondary school. Hence teacher education has been heavily criticised for its weak subject matter education, precisely in central subjects such as science, English language and mathematics (Myhre 1998).

In the 1990ies the will to change also was influenced by the liberal right and its focus on quality (rather than equality) in school, especially being worried about Norway's international competitiveness in different subjects. This focus was indeed strengthened by the stress from international comparative studies such as FIMS and SIMS (the first and second international mathematics studies). This political pressure contributed, among other factors, to the new curriculum in 1992 where mathematics became compulsory in pre-service training for primary and secondary school teachers in Norway. Braathe and Kleve (1995) found however that approximately 75% of the students at their college took only the minimum 1/4 year course and only 11% took a 1/2 year course in mathematics.

In line with reforms both in primary and secondary schools the discussion on teacher education continued through the mid 1990ies. The wish to strengthen mathematics and science curricula increased after the results from the TIMSS study were published. Norway's results were rather mediocre, ranked somewhere around number 20 both in mathematics and science in the first two populations of the study (Lie et al. 1997).

The general political push for more quality in the subject matter education in the teacher education contributed to another teacher education reform in 1998 called LU98 (KUF 1998). One important claim was that the LU98-reform should be in line with the L97-reform, that is, a stronger direct link or almost an harmonization between content for primary and teacher education. In some sense this *can* be interpreted as a will to strengthen the enhetsskole. However it can even be seen as a loss in the belief that long-lasting 'basic' knowledge is relevant for being teacher in primary schools. In this current curriculum mathematics is strengthened though to a 1/2 year study. Teacher education is still four years, and gives the right to teach all subjects from grade 1 to 10.

One important change in the new teacher education is that more time is supposed to be spent on training subject matter and less is spent on more general educational matters. Some of the sub-disciplinary 'didaktikk' is supposed to be transferred from pedagogy to the subjects. The curriculum intends at the same time to give the student teachers more depth in the subjects. However the still kept class-teacher ideology means that the subject teachers in teacher education have been given a much broader responsibility when it comes to preparing student teachers for the combination of general education (didaktic) and subject matter knowledge or in other words, or, consequently, seen with the perspective of our article, the responsibility to balance general equality and specific ideologies of mathematics education.

Ideologies in mathematics curricula - focusing utility vs general educational goals

Ernest (1991) presents five different ideologies that historically have been dominating the educational scene in the UK, 'Industrial trainer', 'Technological pragmatist', 'Old humanist', 'Progressive educator' and 'Public educator'. He characterizes these directions in relation to teaching, learning and the nature of mathematics. The 'Industrial trainer' sees mathematics as a distinct body of knowledge of sets of truths and rules. Teaching is seen as authoritarian and as transmission of knowledge. The 'Technological pragmatist' views mathematics as an unquestioned body of useful knowledge. Teaching/ learning is seen as skill acquisition in practical situations with work-relevance. An 'Old humanist' sees the mathematics as a body of structured pure knowledge. The teacher's role is to explain these structures in a meaningful way to the students. Within the ideology of the 'Progressive educator' mathematics is seen as a tool for developing the whole child, a personalised mathematics, the focus is on the child not on mathematics. The 'Public educator' sees mathematics as a social construction. This leads to seeing teaching/learning as an active participating in discussion and questioning the content matter (Ernest 1991:138-139).

In all the (Norwegian) school reforms from the 1950ies on mathematics has been focused in particular. The school subject of mathematics has been influenced from two sides, both as a subject for its 'use' and 'utility' and as a subject for general educational purpose as a means for 'personal growth' and further education. All syllabi referred to above have had both elements as they have been tried integrated as one syllabus for all. Historically the utility aspect has, from the beginning of the 20th century, belonged to syllabi for elementary and more practical oriented schools. The ideology of the new right and the need of the new industries for skilled workers have influenced these. This corresponds to the ideology 'Industrial Trainer' as Ernest (1991) presents it in the UK context. On the other hand the general educational aspects of the mathematics syllabus have their roots in the secondary schools and the preparatory schools for these. This ideology corresponds to the 'Old Humanist' ideology according to Ernest (1991). In the evolution of enhetsskolen these ideologies along with the pedagogical reform movement melted into some ideology that would correspond to the 'Progressive Educator' (Ernest 1991).

Trying to fulfill the idea of enhetsskolen mathematics has been one of the main obstacles when it comes to develop a common syllabus for all children. A central question in this development has been to combine these two ideologies and decide what kind of mathematics the children should learn - was it the public schools utility mathematics or was it the old secondary schools mathematics for general educational purposes that should dominate secondary school (earlier year 7-9, now 8-10)? Besides, since the general principle for differenziation has been based on a flexible choice of content elements, the hierarchical structure of mathematics as a subject has created major problems for this curricular epistomologism.

Where and what are ideologies?

So far we have presented ideologies as if they are easily labelled in words. The conception of 'ideology' in Ernest's overview, is not directly compatible with the more semiotic, context oriented, and hermeneutic view that we will apply. The difference touches upon a more general debate within modern philosophy, for instance between Habermas and Ricoeur, where Habermas holds the more traditional view that ideologies can be directly pointed to and described, while Ricoeur argue that ideologies should be seen more as contextual dynamics than as textual and object-like, and hence more difficult to grasp in the process of uttering as a phenomenon (Habermas 1984, Ricoeur 1981). Ricoeur has claimed that an ideology should be seen, not as something we think *on*, but *from* (Ricoeur 1981). In a text an ideology is in the co(n)-text, giving value and deeper sense and meaning to the utterance.

Such co(n)-texts can be established by *genres* (Voloshinov 1973, Medvedev 1985 and Bakhtin 1986) or *discourses* (Foucault 1972 and Gee 1991) or any other communicational macro-concept.

If we stick to Bakhtin/Voloshinov, ideologies can be seen as situated in the dynamics between concrete utterances and (immanent) genres (Bakthin 1986). To reproduce or to transmit an ideology, one has to utter (Giddens 1984), although an ideology is never on the surface, but inherent in genre. Genres are developed, negotiated and changed through practical use for collective efficiancy, to save members of a community from having to reconstruct and to repeat all communicational premisses and values for any utterance each time. For instance will an opera audience normally know how to behave, the expectation is set by the inviting genre, or the overall general 'sense' of the opera. Or the genre (that is the 'nature') of 'proof' does not have to be explained to mathematicians *each* time. The genre makes it possible to go straight to the specific issue. Thus the (back-)ground (the genre) helps the figure (the utterance) becoming a figure (to have meaning) by lending its deeper meaning/sense from the ideology or the values of the genre.

Hence an ideology is an unmentioned basic value loaded assumption that functions as a crucial premise for meaning making when uttering. It will in practice work as an unspoken, more or less intended co-message accompanying an utterance, helping the utterance to say more than it really says. Any utterance will in principle have the potential for carrying more than one ideology, the more the richer the text is, and the more the more positionings from which the utterance can be interpreted. Hence a 'rich film' as well as a 'rich classroom incidence' in mathematics (Lerman 1992) can probably be seen through the glasses of more than one genre, because participants have brought different embodied genres to the cinema and to the classroom.

In homogenious groups and societies ideologies will be kept silent because the values are shared or accepted, so that communication can run sufficiantly smoothly. Hence what a specific ideology is or not cannot be judged by formal criteria, but will be a matter of interpretation.

However it has to be partly *shared*; an ideology is a collective phenomenon (Gardiner 1992). It is possible for two persons, for instance couples or twins, to share a 'two-some' ideology. In this paper though we have chosen to focus more broader, basic or crucial values/assumptions that can be traced on a national level, (and, hopefully, transmissable to an international audience) rather than smaller, less important ones.

Curricular ideologies will often just be goals or aims that are too obvious to be mentioned. For instance until recently it has not been seen as necessary in Norway to make explicit that the language of teaching in the educational system should be Norwegian, but now it has become more important to clarify which language will be used. Another example could be that immigrants may have severe problems in a homogenious learning context, to sense the full meaning of activities or utterances that are supposed to lead to a particular goal. Hence a pedagogical curriculum, that is, an outlined didaktic plan in its full procedural length from start to 'fulfillment in reality', may hide its full rationale for persons coming from 'outside'. Even if there are given specific goals at each level, the final consequence or sense may be hidden for students ('the hidden curriculum').

Equality vs ideologies in teaching/learning mathematics

Mathematics education often underlines that its goal is rational and reflexive *understanding*. Since time is scarce though and there are many students, the goal quite often is twisted during a course from understanding to *fast* understanding. By then it may even become clear that the goal is not really understanding for *all*, but just for some, since just a few can understand fast, and this favoured little group will mostly set the pace and conduct the progress. In a society like Norway these ideological twists may easily collide with an egalitarian ideology - is mathematics (collective) understanding for all or (individual) competition in understanding fast? Whether educationalists in mathematics in Norway like it or not, most mathematics classrooms seem to convey these tensions: a Norwegian student in mathematics has to be slow *and* equal or bright *and* equal etc. Even if many teachers of mathematics may try to delimit competition, the tendency to create, to make visible or to evaluate and hence mark student differences seems to be at the heart of mathematics as an educational subject. Are the two ideologies didaktically really compatible?

The evaluative nature of traditional mathematics classroom practice normally reveals most students' level of understanding. Results, and hence implicitly often even students as persons, are explicitly evaluated, making the rank order visible for everyone without really expressing it. This ideological problem has recently been lifted from the level of classroom to the national and even international level by the impact from international comparative studies, often reproduced uncritically by media. A common political and professional reaction is: *let's compete, nationally and internationally*. The counter question though is: *How can we allow competition in the classrooms when school at the end of the day is supposed to decrease social and other differences and to establish community?* In practice this creates an almost inevitable dilemma for any didaktics of mathematics.

Perhaps the strongest ideology of mathematics education simply is to focus the subject, not society, not context. Thus two important tendencies within most directions of the teaching of mathematics are: stress on (mathematical) thinking and stress on individual learning and understanding, in other words, ideologies of rationalism and constructivism/'auto-didaktism', the latter hinting the tendency to overstate of the role of self-learning in institutionalized learning. Students are supposed to accept a silent didaktic contract in which they promise to give priority to explicit thinking and responsible, independant work (Mellin-Olsen 1987). A reflective, communicative and self driven student then is not just a goal, it is even an ideological expectation, a premise for teaching. When this premise does not hold, ideologies will come to surface, and may or may not be negotiated explicitly within the classroom (Lemke 1990).

The students, on their hand, may have created silent alliances since they are captives of a logic that forces them to stay in the system on a 'pseudo-volontary' basis (Mellin-Olsen 1987). This alliance works as a *power basis* for negotiating values such as 'freedom' and 'entertainment'. Any 'imposed' teaching will have to, in some way or other, to wrestle with student ideologies of liberalism and info-tainment (Postman 1985). Thus there will be a tug of war between teachers and students about how to melt social genres with genres of mathematics. Ideologies are resting in the contextual meeting places between mathematics (the subject), teaching (the teacher) and learning (the student). What is said directly (utterances) and what is said indirectly (genres and ideologies) have to be sufficiantly 'fun', 'entertaining', and 'free' to engage and stimulate the students and solid enough to build up a progressive understanding of mathematics. Thus gate-keeping over teaching and learning genres functions as a contextual power basis for specific ideologies.

Summing up so far - a tentative overview

Ideologies are anchored in, or simply *are* central values, which, when they are not threatened, tend to be tacit. They are normally rooted in specific communicational communities and are conveyed through a system of genres or discourses. They may have a formal powerbasis, to a certain degree controlled by particular communities.

Some suggested ideologies, their values, roots, carriers, genres and power basis

Ideology	Central value	Expressed by	Genres, example	Power basis
A. Egalitarianism	equality, lack of difference	society, nation	whole-class	laws, guidelines, tradition
B. Rationalism	reflexivity, thinking	teachers, didaktic	logs, explanation	marks, future outcome
C. Autodidaktism	responsibility, independence	teachers, didaktic	studying	plan, marks
D. Performativism	doing, acting, working	students, society	plans, tasks	plan, evaluation
E. Competitionism	winning, ranking, quality	society, students	calculation race	future outcome
F. Liberalism	freedom, independence	students	free tasks, chat	the collective
G. Entertainism	fun, engagement	students	breaks/info-tainm.	the collective
(-)	(-)	(-)	(-)	(-)

Fig.1

In this rather tentative, almost speculative, overview the simplifying two main ideas are: 1) to make aware the *horizontal* connection, the relationship between ideology, genre/context and power, and 2) that there is a possible tension, inconsistence, blurring *between* ideologies (the *vertical* connection). We will underline that we see ideologies primarily as values that act as given matters of facts and thus as presuppositions for participants of a discourse community through which the values will have strong impact on the final implication of utterances within that community. However ideologies are not just passive values, they have functions or effects, and these functions cannot be easily controlled. Hence they can develop both in a functional and a disfunctional direction. In this particular article we focus on a possible interference between egalitarianism on one hand and some ideologies in mathematics education on the other. (The vertical connection)

Further an ideology is neither positive nor negative per se. If we are positive or negative towards an ideology, it is rather our own implicit *positioning*, our (own) ideology that evaluates (Ongstad 1999). However even claiming that *An ideology is neither positive nor negative,* as we just have done, hides an ideology. It implies a will to force the receiver (our audience and our readers) to accept ideology as a neutral, 'descriptive' phenomenon. This is neutralism, which is a 'nice' and conflict-free positioning in a world of tensions, battles and wars. It represents a 'scientification' of the concept, bended by the genres of 'definition' and 'argument', a will to change a concept value loaded among others by Marxism. Or in other words, the more *explicit*, the less ideological.

Ideologies then in our context is not an explicit belief system that has status as traditional world views, such as buddism, nazism or communism, nor the classical Marxist, critical concept, meaning something like a false consciousness, nor the Ernestian (1991) coming close to kinds of didaktics. They are rather systems of tacit conceptions within a semiotic community of sign users (Kragh and Pedersen 1999 and Knain 1999). In our view definitions and conceptualizations of ideologies should work towards a neutrality it never will succeed reaching though.

Instances of egalitarianism and 'isms' in classrooms

In the following we will present some instances of conflicts of hidden expectations or values in math classrooms. The ideology of egalitarism has a tendency to favour the use of homogenous undifferenciated classes, to hesitate to use comparable mark system and to avoid being specific about performances. Since it is a strong national ideology, it has support on the highest political level, where there are produced top-down designed documents to keep the values intact during all steps in the process of implementing and fulfilling the curriculum. However it even has support in the classroom where there are tendencies of 'bullying' or teasing if someone does it too well, and at the same time tendencies to inclusion of all, not making a difference to 'protect' 'low-achievers'. On the other hand there is a tendency to admiration of smartness, as we will see from the first episode, from a class of student teachers in mathematics education. Reflexivity and reasoning, for instance through problem solving, are advocated, and expected, by and large by all mathematics educators. When it is expected, but not mentioned, smartness easily becomes an ideology.

Smartness: Problem solving in math - a class episode in teacher education

The topic is problem solving, using logic and creative strategies. The teacher is giving different challenges, called 'nuts'. One of them is a classical problem: A man wants to row a sack of grain, a hen, and a fox over a river, but it is not space for them all in the little boat, so the man can only bring two things at the most. So what

will he do, when on the other hand the grain and the hen, and the hen and the fox cannot be left alone together?

The student teachers do not seem to know this classic nut. It looks as if they are sucked into it, discussing it in groups of 3-5. The activity is characterized by involvement. At least it is hard to find groups or students not trying. The problem is complicated enough to prevent a majority to find the solution immediately. On some of the students´ faces one can see frustration. They run into the traps, before they think of the thought of bringing one of the items over and back again.

One of the students who has been 'leading' and active in his group is asked to come to the black-board to share his thinking/solution with others. His presentation is filled with engagement: *Yes, now you take the grain...*(= *Joda, nå tar du kornet*), using a 'collective you'. As the solution is developed, there is some kind of fascination, since some students are on the edge of giving up, almost believing that there is no solution to the problem at all. One of the boys listening to the explanation suddenly exclaimes in admiration: *Damn smart !* (= Jævla smart!). (From Hudson et al. 1999.)

This admiration of smartness and alternative thinking is a main part of the aura in most mathematics classrooms, disregarding level of teaching and learning. In a community like Norway, with its stress on egalitarian values, this admiration is quite often tacit though, since Norway also is '*Jante*'. The 'Jante Law' was 'invented' by the Danish-Norwegian novel writer Aksel Sandemose in the 1930ies, who immigrated to Norway. It was formulated in the genre of ironic commendment as a critic of the strong Norwegian norm of treating people as (too) equal, with small margains for difference. Two of the first commendments in the 'fictive' land of Jante are: *Don´t think that you are something* (= du må ikke tro du er noe) and *Don´t think that you are better than us* (= du må ikke tro du er bedre enn oss).

This ideology is not mentioned in the class in this situation. However even if it is 'legal' to be bright or smart, there is a significant will in this student teacher group to avoid brilliance and intelligence to dominate the teaching and the learning. Still the problem is there. One of the characteristics of the group is not to show off if you have found the solution before the others, but rather to hide it by proceeding to the next problem. And if you have solved the problem, you do not volunteer on the teacher's first request. Thus for an observer the group is not easy to 'read', because its hesitance cannot always be interpreted as shyness or lack of confidence.

On the other hand there is quite an open minded and empathetic space for making mistakes during the process or for not understanding, even if it is rare that someone admits it. The student teachers are conscious that not understanding basic principle in mathematics is a threat to them as future teachers. When the same students teachers were working with the principle of Oware, a calculation game for children, one of them exclaimed: *Scary that 6 year old kids understand this!* In yet another situation the question is whether the mathematics teacher should proceed with explaining new content. Student A: *No, I think it is difficult to hang on now.* Student B: *No, progress!*

Egalitarianism and competitiveness

Egalitarianism may, from an evaluative perspective, be seen as 'positive' in the sense that it *includes*, but since (forced) inclusion can be a hinderence for personal freedom and independence, this ideology may create tension in any community. The very notion of 'community' again is ideological because it implicitly claims, that togetherness should be seen as an unquestionable positive value. Hence ideologies can easily become two-edged swords. Teaching of mathematics cannot take place in a vacuum. Teachers and students will bring different ideologies to classrooms. In the following we will try to exemplify the encounter of some ideological values. Ongstad (1997) followed a class in mathematics, grade 7, students (then) aged 14, over 6 months. From the study some short incidents can be contrasted.

On the 18th of April [1994] the always very visible and hearable student Tom is roaring to his friend Einar (just 2 rows away) *How far?* Einar answers: *17.* Tom: *Welcome after then!* Some 15 minutes later Tom now turns to Erik, placed at the other end of the classroom: *Were are you?* Erik: *4b*. Tom, laughing out loud: *Ha, ha.* (Erik is considered to be the math star in the class. Tom is triumphant, being ahead of Erik. (Ongstad 1997:360-361. Our translation.)

The 4th of May. Tom is absent. After a slow and a bit noicy start the class is working well, significantly better than usually. Consentrated activity and small relevant discussions dominate the atmosphere. Even the uneven Einar and Tonje are 'negotiating' a certain methodological 'grip'. Einar is the tall, strong, self confident, clever, outspoken. Takes the lead. Tonje is the fatish, the slow learner. Lacks belief in that she can learn math, but is socially fearless and tough. For once she does not give in and sticks to her own mathematical argument. Things are finally sorted out between them and again there is a deep positive silence.

Einar, suddenly, half shouting out to the class: *Check, we are calculating fast!* By asking others around him he finds that he is right. Many others are inspired by the 'speed'. Even Iris is positively stressed by the fast progress, and tries short-cuts to hang on: She even turns to the observer. *What´s 51 divided with 17?* Later on she asks Hedvig, the teacher: *Is it all right if I just take every second problem?*

Later. For the second time someone comments on the class. This time it is Tonje, who without knowing it, lets the verdict fall: *It's quite quiet when Tom is absent!* (Hinting that there are now good conditions for working and learning.) It hits like a bomb. Einar tries to protest on behalf of his absent friend, but the class will not let this topic go, and it ends, for the first and the last time in this class, in an advanced (self-) critical discussion about themselves and the class as an environment for learning (Ongstad 1997:Attachm.12:5-6).

Egalitarianism in mathematics classes seems more at risk than in most other subjects, especially in this class,

dominated by the two very tall, strong, noicy, active, self confident, competitive mates, usually having most of the arena for themselves. Normally there are not strong enough powers to neutralize or counterbalance them. One reason is probably that the class consists of many girls with a cultural background other than just a mono-cultural Norwegian one. During the half year of observation these female students hardly express any explicit opinion or take any collective initiative in the class.

Although a certain competitiveness seems acceptable in this class, it is not a dominating ideology, not being supported by the teacher nor by a majority of students. This, together with the noice from the two boys, Einar and Tom, creates a somewhat uneven and sometimes partly a dull atmosphere and a quite slow progress, except from the 4th of May, when Tom is not there. So fragile can the balance of egalitarianism and competetivism in a class community be.

Rationalism - for the few or for all?

Of the 'isms' we mentioned in the frame above, rationalism is probably one of the strongest and most significant in mathematics classroom in Norway. The textbook discourse is stressing explanation and clarity, the written plans underlines reflexivity and there is in general an unspoken admiration for smart, fast and rational solutions among teacher educators, student teachers, teacher trainers, students and society in general. All these aspects make ideological values such as 'sense', 'intelligence', 'reason' and 'smartness' to strong, tacit, classroom forces even if activity, drive and process can dominate the immediate impression one gets of a classroom.

In fact, if there is no dynamics, values will wither (Giddens 1984). The ideology of rationality will therefore quite often have to ally with performativism (or activism); who can *do* most and *do* it fastest? Even if speed and competition can obstruct critical thinking, most teachers like the air of activity and 'drive' in many mathematical classrooms (Mellin-Olsen 1991). This is supported by the rhetoric in all new curricula, (all plans in primary, secondary, upper secondary and teacher education), that the learning goals are desribed (in fact pre-scribed) as students *activities* (to facilitate external evaluation, Barnett 1997).

An implication of this goal oriented regime is an extreme focus on students' performance (Barnett 1997). Teachers are supposed to 'cover' all or most of the cues in the written plans. In mathematics there are appr. 62 cues for year 1 to 4 in the national curriculum L97, which gives an average of 15 cues or main 'doings' per year. All are formulated as an activity (an active verb) related to a disciplinary aspect or subfield. It is nothing wrong per se with this way of writing goals. The problem is that the control regime is supposed to use these concrete formulations as specific points of departures for marking, inspection and evaluation (Barnett 1997). Many uncertain teachers teaching mathematics will probably try to 'cover' these activities as best they can (Koritzinsky 2000).

The ideology of doing stems partly from functionalism, captured by NIKE in the dense slogan *Just do it!* In a deeper sense the attitude is related to modernism and practicality - feelings and thinking may be useful, but are just tools for results and effects. In schools it quite often takes the disfunctional character of performativism and instrumentalism, for instance when students utter: *How much shall I do?*, *Can I just write the answer*, *I have done the task!* etc. Iris in the above episode embodies this attitude:

Many others are inspired by the 'speed'. Even Iris is positively stressed by the fast progress, and tries short-cuts to hang on: She even turns to the observer. *What´s 51 divided with 17?* Later on she asks Hedvig, the teacher: *Is it all right if I just take every second problem?*

Thus in the following episode the teacher in this class wants to make a conscious break with some students' tendency to performativism and competitivism:

Hedvig, a teacher for a math class in grade 7 (age 13-14) works with 'substitution' (Norw. 'innsetting') and parentheses, according to her sub-genres in algebra. She starts with a concrete example on the blackboard to demonstrate *substitution*. This takes seemingly the form of a 'task'. Hardly with any hesitation the leading boy in the class, Einar immediately exclaims: *I know the answer!* However Hedvig stops his rush by saying: *Just a moment*, *Einar. It is the procedure that is important, how we do it.* (From Ongstad 1997:359.)

Hence Hedvig deliberately brakes the routine of a well known schoolish ideological pattern, the who-is-going-to-find-the-answer-first-game, a genre suitable for smart, competitive boys, making the classrooms into arenas for praise and admiration from teachers and co-students. This time however the black board presentation was for the collective, for the whole class, and not for individual competition in fast reasoning.

Responsibility for own learning of mathematics and Norwegian egalitarianism

Responsibility for own learning is a relatively new pattern or slogan in Norwegian mathematics classrooms. Searching its historical roots brings us back to the differentiation debate in the 1970ies when Norwegian teachers of mathematics were forced to teach heterogenous classes as if they were homegenous. The dilemma urged teachers to give priority to groupwork and individualization that did not split the class too much (according to the ideology of the egalitarian enhetsskole). In the mid 1980ies there was a growing awareness of the obvious insight that teaching was not learning. This recognition went parallelly with an overall national tendency, that schools got less economical support from the State, along with a relatively strong inflation rate, which caused 'cuts' in budgets. A third possible factor was an extreme and sudden success of process writing across the curriculum starting in 1985. This American imported movement put the writer as learner in focus not only in writing, but across disciplines. Along with other causes the result was that a 'new' strong pedagogical slogan was born: *Responsibility for own learning*.

This cost-reductive pedagogy was immediately supported by Norwegian school authorities and it soon became a significant and much used slogan, as it was cheap and made sense. Some teachers took up this approach, and it became progressively an expectation in many classrooms that students were supposed to start working without waiting for the teacher's explicit orders to do so. Thus it seems fair to claim that already in the mid 1990ies the new ideology of progressive classrooms would be individual 'independence'. The supposed autodidaktic student had become both a presupposition and a condition for the functionality of responsibility for own learning. Observation data from Ongstad (1997) collected in 1994 can illustrate the tension between a teaching oriented pedagogy and a learning oriented one:

Hedvig, the teacher, is back at Begim's desk after a 'helping' round. He has not progressed much, as he mostly has been chatting with Rebaj. Hedvig is explaining whereafter she asks: *Did you understand more now?* His lack of answer (together with his body language) seems to signify confirmation. However he hesitates a bit. Then Hedvig says: *But then you go on!* She says this mildly, but it is no doubt that there is a clear expectation of progression in her intonation. Later on she is back at his place a couple of times. He has given in though (Ongstad 1997:360).

Hedvigs teaching can ideologically be placed between the two cultures described in Boaler (1999:263). Her study contrasts Amber Hill School and Phoenix Park School. The former is stressing textbooks, short, closed questions, teacher exposition every day, individual work, discipline, high work rate and homogenous ability groups. The latter's approach is characterized by projects, open problems, less frequent teacher exposition, group discussions, relaxed atmosphere, low work rate and 'heterogenous' mixed-ability groups.

Hedvig's teaching is mostly based on textbooks, but she quite often stops and creates own examples, ment for reflexion as we saw an example of above. She defends collectivity, as she strongly wants *all* students to understand the main points, and she downsizes competition by not giving praise for progress without reflexion. Students can move around if its clear that they work as well. There is little use of authority. Her teaching is egalitarian, oriented towards reasoning rather than competition, and she intends to counterwork performativism and downplay the value of marks.

If we focus on Begim again, he has been enculturated to schooling in an Asian country, and is appearently not familiar with the kind of freedom Hedvig's teaching represents. His lack of drive may have many sources, but it seems, at least in one sense, as if he falls victim to two clashing ideologies, a structured, teacher lead teaching he has been used to, and a more independant, less structured, autodidaktic approach.

An other expectation is that each student or a group of students are supposed to think, to reflect and to solve problemes, which means that they are supposed to *study*. However it does not happen in this class. They seem to be able to work on their own just as long as they can repeat patterns. One reason may be that half of the class originates from other school cultures than 'Norwegian', and where egalitarianism of the Norwegian kind is not at stake, at least not in the school system.

Traces of ideologies in the TIMSS results for Norway?

So far we have used examples to illustrate egalitarianism in interplay with some other ideologies. The significance of 'enhetsskolen' seems even possible to demonstrate through the TIMMS study, as there is no difference between Norwegian schools, as is the case in most other countries, when it comes to scores in the tests. The differences are *within* schools, not *among* schools. Where a school is located, in cities, in rural areas, north or south, does not influence the results significantly. The same tendency is seen in the fact that Norway is the country where there is the weekest connection between students' socio-economic background and test-score. Thus these results may indicate that the intentions of the democratic school policy supporting 'enhetsskolen' at least in this respect have been successfully implemented.

Cogan and Schmidt (1999) have characterised the Norwegian mathematics classroom as organised around students' activities, both when they work individually and in small groups. There is an emphasis on students' responsibility for their own learning. There is an extended use of work plans developed by the teacher for the students to follow or to use over a period of one or two weeks. Students are expected to work on their own and to develop an understanding of mathematics through specifically prepared learning activities. This is evident in the relatively large amount of time students spend working on worksheets or problem sets from the textbook, and the rather brief periods where teachers address comments to the entire class. During lessons students work independently or in small groups much of the time with teachers available as needed. Such independent practice and exploration time tend to be longer, fewer and less integrated into the teacher’s explanation of the lesson than in most other countries in the study. Such periods contributed to a low content visibility in some lessons such as those in which the teacher had students work on problems in their textbooks or on worksheets without any substantive discussion.

A contrast and its dilemma

The ideologies pointed to, and ideologies in general, will rest in a specific mixture of classroom genres and the genre regime of the subject matter. A teacher dominant approach consists of a quite significant and familiar regime of doings: Teacher controls homeworks, students wait for teacher's initiative, teacher explains new content from the textbook on the blackboard and gives examples, students get related tasks, long period of individual calculation, students get homework at the end of the lesson, next day control of homework etc week by week until the national syllabus is 'covered'.

The ideology of the liberal-autodidaktic genre regime,

and hence the whole learning context, is different: teachers differentiate the mathematical content in what they believe students can manage, make planes, students may choose elements and/or progression, individually or in groups, they give self reports on what they have managed, they choose how much they want to do for the next period, teachers look after where collective explanation might be needed, students work mostly on their own, teacher creates regular 'meeting points' during the process to progress collectively.

Values of the former are: competitiveness within collectivity and commitment to teacher's initiated activities. Values of the latter are: respect for students rights, belief in their will and ability to think for themselves, expectations of studying and progress. The problem with both ideologies in relation to egalitarianism is that quality as a value and as an outcome is at risk. In the first case competition makes differences visible. Hence teachers are forced to choose speed in relation to a range of different progresses, in which togetherness and quality is threaten. In the second case the feeling of whole class togetherness may get lost, and the wide range of preferances, strategies, understandings, and progresses splits the class in fragments.

Even if a teacher tries to balance these two approaches, there is a fair chance of pedagogical or societal 'defeat' in the sense that the class runs the risk of not achieving either. Or, within the Norwegian context, egalitarianism has to give in, since mathematics as a subject individualizes students and makes collectivity secondary to personal understanding, success and progress. An other scenario is that goals for mathematics education will not be achieved because the gravity of egalitarianism is too strong in Norway.

Although it is not the goal of the TIMSS, the above overall picture, reveals a major question in any general education, are national curricular goals for school subjects at the end of the day just for the subject as such or is there any realism in that, subjects, and especially mathematics is for the formation of future society?

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