Making sense through participation: social differences in learning and identity development

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Published in:
Dialogic Learning

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MAKING SENSE THROUGH PARTICIPATION: SOCIAL DIFFERENCES IN LEARNING AND IDENTITY DEVELOPMENT

1. INTRODUCTION

Students have been working in groups on an assignment in a technology lesson. They were supposed to make a bridge construction. Afterwards the fourteen year old students comment on the process:

> Rose: 'Well, the group that did best, were really clever at it. They had chosen their materials really well, their bridge could carry 36 kilos, and that's quite a lot. They did have two girls in that group but they didn't do as much as the boys. The boys were much quicker in seeing what to do. They did it just like that, don't ask me how, but their bridge could really carry a lot, quite smart of them, actually. I couldn't do it.'
>
> Dennis: 'The girls weren't interested at all when we started, but now some are beginning to get interested. They like it when you help them. There are things that they don't know, that you have to explain to them. But the simple things, when they realise that it can be fun, then they find it nice. They are rummaging a bit together, and when it all works more or less, they find it fun. Now they start to apply things that they learned last year, but at the time they didn't want to participate … thought they couldn't do it, and the teacher was busy helping the girls all the time.'

More and more educational theories emphasise that learning is not an individual but a social process, and that explicitly making use of the social dimension of learning processes, for instance by introducing

group work, fosters learning (Van der Linden, Erkens, Schmidt & Renshaw, 2000). In the learning situations sketched above, plenty of social processes are going on: intended and unintended processes, processes that foster learning and processes that hamper learning. Many of the unintended processes have to do with differences between students, gender differences in this case, and the social positions that go with these. Although 'social learning' has become a major theme in educational theory, the implications of the tenet that learning is social for (how to handle) social differences between students have received conspicuously little consideration. We think this is a serious limitation because social differences are an inherent part of all learning processes, and as such should be considered in any instructional design. But as there are different conceptualisations of social learning (see Salomon & Perkins, 1998), there are also different ways of approaching the issue of social differences. In this chapter we, firstly, explore different interpretations of the tenet that learning is a social process. We will show that these differences go together with different interpretations of 'the dialogic character of knowing and learning'. We then reflect upon the implications of the approaches we distinguish for the way 'social differences' are theorised and investigated.

In the first section co-operative learning and collaborative learning research is discussed. We briefly describe how 'the social', 'dialogue' and in particular 'social differences' are conceptualised in this line of research. We will show that social differences are treated as characteristics of individual learners. What light does such a conceptualisation throw on the experiences of Rose and Dennis? In the second section we turn to sociocultural theory. Learning is understood as increasingly competent participation in communities of practice. In general, sociocultural theory shifts the attention to the broader socio-cultural practices within which learning is situated. From this perspective a different picture of what is happening in Rose's and Dennis' technology lessons emerges. In the next section we illustrate the merit of the tenet that social differences are an intrinsic part of learning to participate, using examples from empirical research on learning in the Dutch secondary education subjects Technology, Care, and Information and computer literacy. Our examples show how the social structure of the cultural practices that underpin learning influences what is learned by whom. In the final section we explore the consequences of this perspective for instructional strategies.

2. SOCIAL DIFFERENCES AS CHARACTERISTICS OF INDIVIDUAL LEARNERS

In this section, we will sketch two approaches to 'social learning': co-operative learning and collaborative learning. After briefly describing the differences between both perspectives, we draw some conclusions on the conceptualisation of 'social differences' that emerges.

Co-operative learning

In research on co-operative learning, the issue of social differences is well known. In general, two angles in research on co-operative learning can be distinguished. Firstly, co-operative learning is addressed as an instructional strategy explicitly aimed at reducing social inequality in education. A good example of this line of research may be found in studies on gender differences in maths education. In the late 1980's group work was perceived as an important innovative teaching practice for enhancing the achievements and attitudes of girls in/towards mathematics (see Burton, 1990). The following arguments were used (Busato, Ten Dam, Van den Eeden & Terwel, 1995). Firstly, it was assumed that women - in contrast to men - have little affinity with competitive and individual ways of working. Co-operative styles of working were assumed to be more suitable for women (Fennema & Peterson 1987; Open University 1987). Secondly, since group work offers more possibilities for mutual interaction, it was thought to give women the opportunity to effectively use their verbal qualities (Halpern 1992). Thirdly, since co-operative learning had been shown to improve students' self-confidence, it was thought to be of special importance for women in the context of mathematics education (see Fennema & Leder, 1990). Evaluations of co-operative math programmes designed for women often showed that the target group indeed appreciated the courses (Burton, 1990). But in most cases, no gender effects of co-operative learning on achievement and attitude are found.[1]

Secondly, there is a firm research tradition on explaining the effects of learning in groups where the problem of group composition is central. With regard to this angle, the names of Cohen (e.g. Cohen & Lotan, 1995; Cohen, Lotan & Catanzarite, 1990) and Webb (e.g. Webb, 1991; Webb, Nemer & Chizhik, 1998) figure prominently. The starting point is the finding that students do not profit equally from co-operative learning, because of differences in background. Although 'differences between learners' are often social in character, they are predominantly understood in terms of cognitive abilities and consequently often related to achievement. Students with different abilities seem to benefit differently from working in groups (see Hoek, 1998). Research in the 1980's shows, for example, that high-achieving students have the greatest influence on group interaction. By giving (elaborated) explanations to other students, they themselves learn the most. Building on such research findings, various interventions aimed at improving the quality of the participation of low achieving students in group interaction have been developed and empirically tested. Examples concern types of tasks, composition of the group, the goal that is commonly agreed

[1] For example, in an experimental design (Busato et al, 1995) it was shown that co-operative learning does improve the mathematical achievement of girls compared with more traditional (individual) methods of instruction. However, that same holds true for the boys (no interactions between gender and condition were found)

upon, complementarity of expertise (in tasks and roles), and co-operative climate in schools (see Van der Linden, Erkens, Schmidt & Renshaw, 2000, for an overview). Notwithstanding the difficulties that must be tackled, there seems to be a consensus that heterogeneous ability groups are favourable to learning. This holds true in particular for below-average students. They perform better when working with above-average students. The reverse, however, does not follow: high achievers profit the most from working with other high achievers (Webb et al., 1998)

Collaborative learning

Recent approaches of co-operative learning have moved away from a narrow cognitivist view of education. Using Salomon and Perkins' mapping of the different meanings of social aspects of learning (1998), it can be argued that nowadays the emphasis is not so much on 'active social mediation of individual learning', but on 'social mediation as participatory knowledge construction' (p.4). In other words, instead of creating a social learning system that enables an individual to acquire knowledge and skills effectively, the emphasis is on the joint construction of knowledge and on fostering mutual understanding. The term collaborative learning seems to mark this shift. Whereas in former days the term 'group' was satisfactory, nowadays modern educationalists' discourse talks about 'communities of learners' (Brown & Campione, 1990; Scardamalia et al. 1994). Researchers have sought ways of organizing the classroom as a 'community of learners' so that reciprocal teaching occurs where students are given the opportunity of shaping or at least partially shaping their own learning process (e.g. Brown & Campione, 1990 and 1994). By encouraging students to discuss the subject matter it becomes more meaningful and makes more sense. Developing a communal way of talking which permits discussion, pointing out evidence, making suggestions and expressing disagreement, enhances the learning process in the classroom (see Bielaczyc & Collins, 1999). The emphasis on interaction, mutual understanding and co-construction of knowledge is one interpretation of 'the dialogic character of learning'.

In the 'communities of learners' approach, the composition of the group has a central place. It is argued that in such an organisation of the teaching-learning process more effective use can be made of the expertise and experiences available in a group. Heterogeneous groups are pleaded for. From the perspective of social differences, it is important how 'diversity' is dealt with in the classroom as a learning community. Again, diversity is predominantly operationalised as 'diversity in cognitive development'. Students can profit most from each other's knowledge and skills when the knowledge and skills of the class are diverse (Brown & Campione, 1994). Ideally, the classroom as a mixed and heterogeneous community stimulates students to learn by reacting to one another, to the teacher and to the teaching materials. Open dialogue is characteristic of such a (imaginary) classroom. Besides diversity in knowledge and skills, however, more factors are important for creating an effective

collaborative learning environment which concern the composition of the group (see Van der Linden et al., 2000). The participants should seek after a common goal, to which everyone (would like to) contribute(s). Moreover, co-responsibility and collaborative engagement are important. In this context the keywords are: open discussion, mutual exchange, active participation. Finally, there should be equality between partners (Damon & Phelps, 1989, cited in Van der Linden et al., 2000). Again and again we see the latter premises in various phrases: collaborative learning not only presupposes, but also contributes to open interaction and shared meanings. Few if any scholars comment on 'equality as the norm' in discourses on collaborative learning. Salomon and Perkins (1998) speak of the differences between learners that can endanger the learning of the collective. 'If all of this seems like a celebration of the potentials of social learning, it is – up to a point. However, the dark side of such interactions also has to be recognized. What is learned by an individual may upset or even subvert rather than abet collective ends, as with the student taking advantage of his or her team members' work or the corporate climber being more interested in personal advancement than in the overall success of the organization.' (p.21). In other words, 'the dark side of collaborative learning' is constituted by differences between learners in effort, motivation, commitment to the needs and goals of the group, and so on. It is predominantly a matter of individual attributes. Unfortunately, the issue of *social* differences as an intrinsic feature of the 'community of learners' as well as of the culture in which students learn, is not taken into account.

To sum up, in the tradition of co-operative learning, (social) differences between learners are acknowledged as an inextricable but unwanted part of learning processes. 'Learning in groups' aims at diminishing these differences. In the more recent approach to collaborative learning, however, the issue of (social) differences between learners is celebrated as a huge learning potential. It gives students more opportunity to learn from each other. In both perspectives 'the dialogic character of learning' is interpreted in terms of the interaction between students in classrooms.

In *both* perspectives (social) differences are treated as characteristics of individual learners. From the first angle of co-operative learning, gender, as exemplary for social differences, has been interpreted as a characteristic of students with the same invariable meaning across different social contexts. Reasoning from that point of view, the main question pertaining to the issue of social differences is how education can be made to fit in with the abilities, attitudes, experiences etc. of particular groups of students. From the second angle of co-operative learning, the emphasis is not only on (social) differences as fixed, unambiguous characteristics of individual learners, but also on the educational context that can influence (the undesirable effects of) differences between students. Differences, however, are still conceptualised as characteristics of individuals, and predominantly elaborated in terms of cognitive abilities. Finally, under the heading of collaborative learning, the process of co-construction of knowledge

and creating mutual understanding is highlighted. In this conceptualisation of the social character of learning, with the emphasis on the potentials of the collective, the issue of social differences tends to quit the scene. ‘Offstage’, however, questions remain like ‘whose voice is privileged in the collective?’ or ‘what are the processes and politics of entry into a specific discourse?’ In order to explore possible answers and think about appropriate teaching strategies, ‘social differences’ in learning must resurface as a theme.

3. SCHOOLS AND SOCIAL PRACTICES

Learning as a quality of participation

A conceptualisation of social differences as characteristics of individual learners does insufficient justice to the cultural context in which learning takes place. In this section we will develop a different interpretation of social differences by shifting the attention to the broader socio-cultural practices within which learning is situated. We will argue that learning should be understood as increasing participation in communities of practice. In such a view, knowledge and the act of knowing themselves are seen as inherently social and dialogical. Classroom procedures do not *establish* the dialogical character of learning, but use and foreground it. From this socio-cultural perspective, the issue of social differences will be looked at again.

In a sociocultural interpretation of learning, the purpose of what happens in schools ultimately is *not* that students reach stated objectives in terms of knowledge, skills and attitudes. Such objectives have a further goal: enabling students to continue their education, and ultimately, to participate in the practices of society. All practices need to teach 'newcomers' to participate in order to be able to continue; this is the way in which culture 'reproduces' and renews itself. Formal education is a historically grown special way to ensure this process, itself mainly dependent on the spread of literacy. To get a perspective on how special and historically situated this form of reproduction and renewal is, it helps to look at practices that do not depend on formal education for their continued existence. To some extent those exist in our society, but for comparisons it is easier to look at non-Western societies (see for example, De Haan, 1999) or at the history of our own societies, as in the apprenticeship system of the guilds (cf. Lave & Wenger, 1991).

What becomes evident from the study of such examples is that learning is not a separate activity. Rather, it is best described as a mode or quality of participation in a practice. As Lave & Wenger call it, it is 'peripheral participation' with the intention of becoming a more centrally situated participant. In many cases this form of participation is characterised by observation and imitation of the way more central participants (e.g., the master; or in a household, the mother) handle situations and assignments. For all participants, however, the aim is not that something be learned, but that the goals

of the activity be reached. In doing that, other participants will have to make allowances for the fact that not every participant is skilled, and create spaces where peripheral participants can observe, imitate, and practice. Thus, not only the peripheral participants are involved in the learning process, but this process is distributed over many participants. As a consequence, the opportunity to 'learn' is dependent on the qualities of the interaction and of the practice situation. This is especially true of the ways participants adapt to differences in ability and background of the 'newcomers' – and of the way these newcomers adapt to the peculiarities of other participants. Mutual adaptation is an interactive and variable process; learning is a 'dialogue'.

Becoming a more central participant is not just a matter of acquiring knowledge and skills. It also implies becoming a member of the community of practice. Children are motivated to participate in the cultural practices they encounter, as can be seen for example in imitative play: "what motivates the child to master tasks is not the mastery itself but the desire to be the adult or to be the one the adult wants him to be" (Goodnow, 1990). Belonging, however, ultimately cannot be reached by just 'going through the motions'; it requires a person to see herself *as* a member, taking responsibility for her own actions (including the use of knowledge and skills) from that position. The learning process thus implies a change in personal identity, in the way one represents oneself for others and for oneself (cf. Holland, Lachicotte, Skinner & Cain, 1998). Learning to participate is at the same time learning to become a specific person. As a consequence the outcome of the learning process, the way in which one sees oneself as a member, will be different for each participant.

Social differences in informal learning

Within sociocultural theory not much attention has been given until now to the possible backgrounds of differences in learning outcomes, but we can partially construct such a theory. Differences in outcome do not only depend on personal idiosyncrasies in constructing personal identity, but are also connected to the fact that practices do not admit everybody in the same way, and not everybody has the same wish to participate in them. Nearly all practices provide different roles and positions for participants. And most practices restrict admission to certain roles and positions, and/or to central participation in them, to persons with specific qualities, and often also to persons with a certain background or heritage. This was certainly the case for the medieval guilds, which not only carefully selected potential members, but by this means also closely controlled the spread of their esoteric knowledge and skills. Sometimes such restrictions are openly acknowledged and accepted, but in the case of schools, for instance, this is normally not a part of their policy, even though we know from participation statistics that admission is differential. Moreover, the qualities which are required need not be logically connected to the exigencies of positions within a practice (or, in the case of schools, of those practices they are

supposed to 'prepare' for). Often, the reasons for selection are historical or ideological rather than rational, but they have become a matter of course. They are often connected to social differences: race, gender, class, social status. Thus, not only the practices themselves, but also the social distinctions they embody are reproduced (Bourdieu, 1992). And indeed, such distinctions become a part of the taken-for-granted world view of the members of such groups, so that they incorporate the wish to be, or not to be, a member of a specific practice as part of their social status (Holland et al., 1998). Girls, for instance, do not want, in general, to be mathematicians or professional football players, and becoming a professor is not something lower class boys see as a possibility, or even a desirability, for themselves. In other words, they incorporate the discourse of social differences as a part of their own identity (Willis, 1977; Volman & Ten Dam, 1998).

Formal education

In our society, formal education has taken over part of the process of preparing children to participate in social practices. This is not only a change of place; it also entails a change in fundamental qualities of the preparation process. Schooling has separated learning and learners from the cultural practices it is supposed to prepare them for. The historical development of this specific educational process transforms content, motivation, and success criteria, and also has an influence on the way in which social differences are implicated in the process. The problem is that education becomes a practice in itself. Students learn to participate in that practice, and derive their motivation from this participation. But it is much more difficult for them to learn to participate in the practices that schools are supposed to prepare them for. The reason is that education caters mainly to the individualistic and rationalistic elements of preparation for practices, and tends to legitimise this with a rationalistic view of how humans act. It does scarcely help students to effect the changes in personal identity that are required to become participants in those intended practices.

The sociocultural analysis of the context and purpose of education implies that social differences arise as part of the institutional practices of schooling. As education has become a practice in its own right, students develop a relation to that practice itself and to their position within it (a 'school identity') that is socially indexed in terms of sex, class and ethnicity. 'Being a good pupil' is differently valued in, and means different things for, different social groups. In the second place, social differences are also present in the way students develop their relation with school types and curriculum subjects. This not only shows in differential enrolment and success rates (a 'classical' subject of the sociology of education) but also in differential attitudes and relations to school subjects, sometimes culminating in firm resistance to learning some subjects, or even to school learning in general (Kohl, 1994; Willis, 1977; Litowitz, 1993). According to Litowitz, "areas of knowledge and skill are differentially linked to one's social identity, and […] the

linkings can help account for acceptance and resistance to learning" (Litowitz, 1993, p. 282).

At the same time, the connection between school (and curriculum subjects) and cultural practices is not totally lost. It is true that schools do not offer much help in building an identity as a participant in such practices, and that for the students, the relation between what they are actually learning and what it is intended for becomes obscured. But still, education is perceived as, if not offering relevant curricular content, then at least providing a necessary formal entry to practices. Thus, social differences act and at the same time are constructed in *a double way*: in relation to attitudes toward school and school subjects, and also to attitudes toward the social practices that schools are supposed to prepare for. These two aspects may reinforce each other, but they may also be in conflict, for instance when a member of a minority group wishes to reach a certain profession but perceives education as an insurmountable obstacle instead of as a necessary preparation – a perception which then acts to fortify the socially constructed difference that gave rise to it: that profession is clearly 'not for our kind of people' anyway.

Schools as secondary apprenticeship systems

There is no *direct* or deterministic link, however, between social differences and school success. Indeed, education *can be* a way for students to transcend the limitations of their social position. This depends on the opportunities schools offer for individual students to construct their view of themselves.

According to a sociocultural perspective as outlined here, many problems in education can be traced back to the absence of visible connections between learning in school and the cultural practices for which it is supposed to prepare. Thus, we consider it desirable to re-instate such connections. The learning of decontextualised knowledge and isolated skills should be replaced by the learning of knowledge, skills and competences in the context of practices re-presented in the school. This would give students the opportunity to obtain first-hand experience of participation, and would thus also provide them with opportunities to build their identity as a participant, to make sense of themselves and their possible positions through a kind of participation (Wardekker & Meijers, in press). Such a proposal does not just try to wield out obsolete knowledge and skills and replace them with those actually required. The aim is to make pupils experience that they could be in certain positions and participate in certain practices, even in such a way that they can contribute to the development of those practices.

This is, of course, not an attempt to reduce education to a narrow vocational training or to revert to the apprenticeship model. The concept of 'practices' should not be narrowly interpreted to mean 'work places'; there is also leisure, sport, art, religion, citizenship, each of which can be considered a practice. Rather, this proposal should be seen as a step toward a 'secondary apprenticeship system' which would combine the advantages of apprenticeship (direct contact with a cultural practice) with those of the school (distance

from societal and commercial requirements, availability of resources, space and intellectual instruments for reflection). In such a system, students do not primarily participate with the goal of becoming 'central' or skilled participants, but as a 'community of inquiry' where participation and critical reflection, both on the nature of the practice and on their own relation to it, are balanced, with the ultimate goal of developing citizens who exercise what Dewey called 'a discriminating heart and mind'. Especially, the critical reflection should extend to those aspects of real practices (as found outside the school) which are boring, oppressive, and supporting inequality.

As an example, Van Aalsvoort (1999) has proposed a chemistry curriculum that is not based on the structure of chemical disciplinary knowledge (e.g. from 'simple' to 'complex' chemical formulas) but on social situations in which chemistry is encountered and on the types of work chemists actually do. It is an attempt to provide students with 'knowledge in action' rather than with 'knowledge out of context' (Applebee, 1996), which means: to show how specific chemical knowledge and skills relate to specific cultural practices. Not just in the sense that they are *in use* in these practices, but also that they were historically *developed* to address the problems of maintaining and renewing them, which shows their dialogical character and puts students in the position of possible (future) contributors to such developments (cf. Wardekker, 1998).

The role of pre-existing social differences

A view of the curriculum as outlined above means that the outcomes of education, seen in these terms, will not be the same for every student, because these outcomes are not to be evaluated in terms of the curriculum content itself, but rather in terms of each student's personal assimilation of curricular contents into the way they personally relate to cultural practices. But it does not, by itself, provide a means to prevent existing social differences of having an impact on these outcomes. On the contrary, there is a distinct danger that such differences in outcome will turn out to be related to pre-existing social differences in a much more complicated way. For if we re-present social practices in the school, we will also provide a point of entry for the way social differences are connected to and actualised in those practices. The influence of social differences cannot be obviated by just restructuring the curriculum in the proposed way. And it is not enough to give all students the opportunity to participate in educational experiences, either of a 'traditional', abstract structure or of a kind designed to make the connections to cultural practices visible, because the students themselves may already have a 'mind set' that reproduces and then reinforces the differences. This may also be true when critical reflection is emphasised: some students may already have 'closed their minds' to such an approach.

This is where the consequences of the difference between a sociocultural view and a more 'traditional' cognitivist view become visible. As pointed out in the preceding section, from a cognitivist point of view social differences are seen as characteristics of

individual students, ascribed on the basis of their class, sex or ethnic background. As a consequence, such differences are accommodated predominantly by taking care that all students get an 'equal' chance to participate and being heard. This is now shown to be too easy, because the important element is not the background of the students in itself. Instead, one side of the problem is in the way they have already used their social background to build their identity or 'mind set'. The other side of the problem is that social differences are already part of the social practices as re-presented in school, even if this happens in an abstract way, and the perception of this relation engages students' mind set. This then becomes part of the 'dark side' of group processes in education. Resistance to learning is not just unwillingness or irrationality; it is part of students' identity, and overcoming such resistance may create identity conflicts (Kohl, 1994).

By 'social learning', we understand a form of learning in which students' co-operative activity is not just directed at carrying out school tasks and mastering relatively abstract knowledge and skills. Instead, learning activity should be directed at constructing identity in relation to specific social practices. What happens in the classroom, however, can work both ways in relation to social differences. Classroom dialogue may either reinforce or tend to eliminate social differences; both are learning processes. The question then is *how* to use and evaluate the contributions of every student and teacher in classroom dialogue and practice in such a way that social differences are not automatically reproduced. We need to reflect on what qualities of the classroom process will permit teachers and students to break through a mind set and will help them to solve identity conflicts in such a way as to form resilient identities coupled with 'a discriminating mind'. We will return to this question of classroom strategies after we give some empirical examples of how such learning processes actually work.

4. SOCIAL DIFFERENCES AND THE QUALITY OF PARTICIPATION: EXAMPLES FROM RESEARCH

In the last section we saw that a sociocultural perspective on social differences in learning focuses attention on the different ways students relate to learning in school. These different ways are in turn prompted by different mind sets, which are related to social backgrounds, and by the ways social practices – including the social differences that are part of them – are represented at school. An understanding of the dialogical character of both knowledge and learning is crucial in this perspective. In this section we will use the example of the Dutch subjects Care, Technology and Information and computer literacy[2] (ICL) in secondary education to illustrate

[2] The subjects Technology and Information and computer literacy are well known in many countries, Care, however, is less common. The Dutch subject Care is based on the traditional subjects home economics and health education, which are

what this perspective yields in terms of understanding gender differences. Firstly, we give some examples of how girls and boys respond to the subjects Care and Technology as 'gendered' practices; we use the idea of 'peripheral participation' to explain these responses. We then discuss the case of ICL and reflect on how students use classroom dialogue to practice and learn about gender identity.

Care and Technology as gendered practices

When a common curriculum or 'basic education' was introduced in the first stage of Dutch secondary education in 1993, the subjects Care and Technology became compulsory subjects for all students. Before the introduction of the common curriculum these subjects were only included in the lower vocational education curriculum (see also Eijkelhof et al., 1998), where technology-related courses were mainly followed by boys and care-related courses by girls. The arguments for including Care and Technology in the common curriculum mainly referred to the counterbalance these 'practical' subjects would provide to the predominantly cognitive nature of basic secondary education. But arguments were also based on emancipatory considerations (see Ten Dam & Volman, 1998). It was considered important for girls to be introduced to technology in order to develop a more positive technological attitude, and to consider technology as a possible career. The inclusion of the subject Care in basic secondary education was seen as an expression of social recognition of the knowledge and skills that were traditionally associated with women. At an individual level it was expected that boys would learn to appreciate this domain and would become more willing to carry out caring tasks, if they knew more about caring activities. In other words, the differential (class and gender-related) way in which people participate in the cultural practices of 'technology' and 'care' were explicitly addressed by introducing students at school to those practices in which they would not participate as a matter of course.

In a study in which we interviewed 14- and 15-year old girls and boys and their teachers on how they experienced the subjects Care and Technology, we found, however, that the introduction to these subjects had not resulted in the intended identification with and appreciation of these domains.[3]

> This is one of Nathalie's stories about how she loathes the assignments in technology lessons:

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modernized and expanded to include topics such as relationships, the environment, leisure and (un)paid work (see Ten Dam & Volman, 1998 for a detailed description).

[3] This study was part of a larger project focusing on learning processes in the subjects Care and Technology (Volman & Ten Dam, 2000). This part of the study focused on the question how social identities structure the learning processes of students in the subjects Care and Technology. Semi-structured interviews were held with 13 girls and 10 boys, 12 Technology teachers and 10 Care teachers.

> ‘I found that saw really scary. I always had someone else doing it: “Will you do it for me? I have to go for a minute”, or: “I hurt my hand yesterday, I cannot do much with it now”’.

Dennis tells how in Care lessons he often just sits and waits until the lesson is over.

> ‘Just think about something else, then the lesson passes more quickly’.

Kim does not want to work on an assignment with a boy in Care lessons, because

> ‘They usually start throwing the food’.

Of course girls and boys do not respond to Care and Technology in uniform ways. Nevertheless some clear patterns occur in the interviews. Many girls explain in great detail how they hate Technology, and how they get around technical assignments. Many boys talk about hating Care, and about strategies to disrupt or endure the Care lessons. Teachers confirm that girls are less interested in technology and boys in care. Many technology teachers also consider girls less able in their subject. Girls indeed get lower scores on Technology tests (Doornekamp & Streumer, 1994).

Educational theories have tried to explain gender differences in mathematics achievement, for example, in terms of differential capacities (lack of prior knowledge and experience) and in terms of gender-related attitudes. Gender is treated as a characteristic of individual learners, as in the theories discussed in section 2. Such explanations, however, do not explain why and how differential capacities and attitudes themselves come about, nor do they provide directions for an adequate response. Gender-related attitudes are usually seen as irrational, and as such have become the object of government campaigns that try to replace them with more gender-inclusive attitudes (Ten Dam & Volman, 1995). In our example, the introduction of Care and Technology was itself meant as a way to compensate for differential knowledge, experience and attitudes between girls and boys. Much of what is going on in Care and Technology classes, however, remains ‘dark side’ in an analysis in terms of capacities and even attitudes.

The sociocultural perspective turns the attention away from individual knowledge and attitudes and instead focuses on the cultural meaning of areas of knowledge and skills. Care and Technology are subjects in which the connection with the cultural practices from which they are derived is more visible than in most other school subjects. This, formulated in terms of their ‘practicality’, was actually one of the reasons to include them in the common curriculum. From the perspective that learning is more intrinsically motivating when it is given shape as ‘participation’, this may be considered a favourable condition for learning. However, as we also saw in section 3, representing social practices in the school also provides a point of entry for social differences in those cases in which social practices are not equally ‘open’ to everybody. Although the social practices of care and technology do not literally exclude

men or women anymore, they are historically gendered. And barriers for participation still exist in the form of 'mind sets' and 'social identities' that make it difficult for example for girls to see themselves as a potential 'member' of a technical community of practice, and to even develop the wish to participate in such a practice.

Wertsch's (1998) distinction between mastery and appropriation is also useful here. In many school subjects students may simply learn in order to master the subject matter without seeing themselves as committed to the discourse community to which it refers. Knowledge and skills are then kept at a distance from oneself and one's interests. This is much more difficult in learning through participation. This kind of learning invites the student to appropriate the discourse of -in this case - the care or technology community instead of just master it, thus implicating the learner in a process in which identity is at stake.

Peripheral participation in gendered practices

Differences in prior knowledge, skills and experience - featuring in most explanations of gender differences in education - certainly play a role in students' behaviour in the lessons. In the interviews, for example, many boys tell about helping their fathers with technical jobs: woodwork, welding, repairing things. A sociocultural perspective, however, not only looks at the knowledge and skills this has gained them. It also looks at the element of identity formation that is part of the same process. Dennis' father sells engines. Dennis tells:

> 'Sometimes he gives me an outboard motor that is out of order. I find it a challenge to get it started again. I have made a scooter with a small motor. That's when I also learned how to weld. Sometimes when my father had to weld something, he allowed me to watch. Then, at a certain moment you want to try it yourself. First we tried together, but after a while you want to do it on your own, and so on. Then you start and make whole constructions on you own. I think I may be making a cross-country bike soon.'

Such a story can easily be seen to be an instance of 'peripheral participation'. While helping, boys not only observe and imitate the skills with which their fathers (or brothers or friends) handle technical problems, but also the self-representational aspects of these technical practices. They not only acquire technical knowledge and skills, but also a technical identity. Dennis knows how to talk in a confident way about technical jobs. He also feels that technology suits him. Many boys in lower vocational education want to become technicians. Even a carpentry assignment, which has nothing to do with, for instance, somebody's desire to become an electrician, refers to a cultural practice that is not alien to them. Thus, they are able to experience the technology assignments as peripheral participation.

Most girls, on the contrary, feel that technology is not their thing. The technical assignments at school refer to a cultural practice in which they do not want to participate, to an identity that is not and will not be theirs. They even try to avoid every sign that may suggest technological competence. They just do not want to be such a person. Nathalie and Malu, for example, put a lot of effort in emphasising their clumsiness:

Malu: 'I am not really handy at it. I am all fingers and thumbs. I am really not good at technology.'

Nathalie: 'Technology, I really don't understand anything about it.'

Nathalie illustrates this by telling:

'We had to repair a puncture. I knew how to do it, but I had never actually done it myself. Well, that was obvious, it was really terrible. Couldn't get the inner tube in again, really awful, I am never going to do it again. At home my father does the punctures, I won't do it myself. It was just terrible, I was tinkering about for two hours. My friend is even clumsier than me, and we had to work together. She really demolished everything, took the whole wheel off and broke it into pieces, which made it even worse. It was just really awful, I'm never gonna do it again.'

Again this story is not just an account of knowledge and skills, but also and maybe mainly a matter of presenting an identity. Throughout the whole interview Nathalie keeps telling 'that she is not technical at all, that she cannot do it, and cannot help it'. One could say that instead of participating peripherally in a technical culture, Nathalie practices participation in this culture from a different position, namely an outsider's position. In this way, many girls take the role of 'members' of the community that ask others for help.

Marcella: 'At a certain moment I just go and watch somebody else working. I always ask one of the boys. They usually finish my work piece, I never do it myself. I ask: "can you help me", and they do, and then I say: "I still don't understand" and then they go on.'

Helping the girls in turn contributes to the technical identity of the helpers.

Bernard: 'With really technical things, girls often don't understand. Then the teachers explains it again. Usually we also help the girls. With things they don't dare or don't want.'

In the Care lessons it is the girls who are the ones who refer to experiences at home, who easily participate in classroom discussions, and who seem to feel confident at assignments, whereas

most boys emphasise that they find Care boring and stupid, act deliberately clumsy, and seem embarrassed to talk about for example friendship or their families.

There is, of course, no strict dichotomy between boys and girls; there are individual differences among the girls and among the boys. We interviewed some girls who are really interested in Technology and a single boy who prefers Care above Technology. Vera, for example, likes Technology, because she likes to work with her hands. She does a lot of tinkering at home; she is making a nesting-box at the moment. She also explains enthusiastically and in detail how she managed to combine plastic, wood, lights and a battery in a recent technology assignment. Jasper on the contrary does not like this kind of 'fiddly work' at all. There are more boys who do not particularly like Technology. But Jasper, who wants to become a caretaker in a zoo, is the only boy who talks about the Care lessons without disdain, and who spontaneously talks about his own experiences with caring tasks at home, like looking after his little sister, cleaning, and cooking.

In general the subject Care seems to be less popular than Technology. There are more girls who express some appreciation for Technology than there are boys who appreciate Care. And although many girls prefer Care above Technology, even with them the subject is not particularly popular. We may be seeing here a difference in the social appreciation for the domains of care and technology reflected in students' attitudes.

Another factor that seems to interact with students' gender-related attitudes towards Care and Technology is the type of school students attend. Many boys in general education, for example, have in common with the girls that they are not particularly interested in Technology. Nevertheless, unlike the girls, they usually do not present themselves as a-technical. Something similar holds true for some girls in relation to Care. They are bored, but they seldom resist openly. Ineke explains:

> 'I find it pitiful for the teacher when they make a mess, so I don't do it. She is doing her best.'

A number of boys, again especially in general education classes, just do their Care assignments in a co-operative and unobtrusive way. Carlo for example explains why, unlike some of his friends, he does his best in the Care lessons.

> 'One wants to get good marks'.

One might say that Carlo handles the Care lessons by putting his identity and motives as a student first. He is primarily participating in the social practice of going to school. In Wertsch's terms he probably primarily applies himself to the mastery of the required knowledge and skills. For Ineke it is not the wish to be a successful

student, but empathy with the teacher which makes her comply with the role that is expected of her.

Experimenting with gender identity in Information and Computer Literacy lessons

In the Dutch common curriculum, in addition to Care and Technology, a third new subject was introduced in 1993: Information and computer literacy (ICL). It was new for all students and was not meant as a computer course but as a subject that also treated general principles of data collection, interpretation and presentation, and social consequences of automation. Despite the intention to overcome the already established cultural link between the computer and masculinity by focussing on general aspects of information and computer literacy, interviews with students and teachers, and classroom observations revealed that computers play a central role in the lessons and that girls and boys appreciate the lessons differently and also behave differently.[4] In the interviews boys talk more and with more enthusiasm and imagination about ICL than girls. They boast about their knowledge of computers and technological developments, using a lot of computer jargon, and portraying themselves as experts. Mastering technical jargon, however, does not necessarily imply mastering the skills and knowledge presupposed in the discourses they use. But talking about their computer knowledge seems to make them feel good.

> 'You can do complicated mathematical calculations much faster, like involution of roots from back to front. I think computers are interesting. There's fantastic technology inside them.'

Most boys are convinced of their competence in using computers, which is quite the reverse for girls. They often present themselves as less expert than they are. And they attribute problems with the computer to their own failure and certainly avoid showing any signs of expertise about computers. Just as in the Technology case they rather seem to enjoy 'acts of helplessness'. Here again girls seem to 'practice' participation in a culture of technical outsiders.

> 'When it suddenly went off, I thought: I did that because I don't know very much about it. I thought: "that's me again, pressing the wrong key".

Or:

[4] The interviews and observations were carried out as part of a study into the effects of ICL curriculum materials and teaching behaviour in ICL classes on changes in girls' and boys' attitudes, knowledge and future plans, and into the gender-linked ideas about the subject and about themselves developed by students during ICL lessons. Three classroom observations were carried out in each of 19 classes. Interviews were held with 10 girls and 10 boys from 5 classes (Volman, 1997).

> ‘Then it suddenly starts beeping and I think: “Oh help, the thing’ll blow up in a minute”’.

Whereas in the example of Care and Technology students took up the gender-linked positions that these practices traditionally offer, in the example of ICL they create such positions for themselves. A gender difference emerged quite soon in the subject ICL. It is not so much a difference in computer skills, but in skills for and willingness to participate in a computer culture. We interpreted the emergence of these differences in terms of processes in which students are engaged in experimenting with masculine and feminine identities, at the same time as they are (more or less) building knowledge and skills (Volman, 1997).

According to Penuel and Wertsch (1995) identity should ‘be conceived as a form of action that is first and foremost rhetorical, concerned with persuading others (and oneself) about who one is and what one values’ (p.91). In this sense, in secondary school classrooms students are actively engaged in forming their identities. This includes, among other things, persuading themselves and others of their masculinity or femininity. The subjects Technology, Care and ICL, with their gender-linked connotations, appear to be ideal settings for trying out stereotyped masculine and feminine identities.

However, masculinity and femininity are not unitary concepts, as has been pointed out and illustrated by many feminist poststructuralist scholars (e.g. Scott, 1986). What is considered masculine and feminine is a historical and cultural product, a ‘social construction’, and is subject to changes and internal contradictions. The socially constructed categories of femininity and masculinity interact in complex ways with other categories, such as ethnicity, class and age. At the level of individual identities, this implies that girls and boys develop and present their sense of self in relation to different discursive practices. They develop gender identities by participating in the existing discursive practices and negotiating their own place within these. How they do this is not necessarily compatible with the way in which parents and teachers expect them to participate (Volman & ten Dam, 1998). In our examples it is mainly a traditional gender discourse that students appear to take up. Nevertheless, alternative discourses are available around technology, care and computers. Overcoming the traditional dichotomy in gender identities was an explicit aim of policy makers, when these subjects were introduced in the common curriculum. Although such an emancipatory discourse seems to have little appeal for most of the students, some of them find their own alternatives, for example the girl who is interested in Technology because she likes tinkering, and the boy who, as a future zoo caretaker, finds Care a useful subject.

Our examples make clear that being part of a ‘learning community’ or participating in classroom dialogue, as advocated in theories on co-operative learning (see section 2), does not help to overcome social differences as a matter of course. In our examples it

rather invited students to emphasise a stereotypical social identity. In their conversations and interactions, students joined in with discourses that reinforce, or even construct, their outsider position with regard to the social practices at stake. This was possible and enticing because the conversations in the classroom concerned knowledge and skills with a history in which access to the position of contributor to the development of such knowledge and skills was organised along gender lines.

In the ICL lessons we observed, we also saw instances where teachers did not find adequate ways to invite all students to participate in the classroom dialogue. Girls were often not addressed by their teachers as potential members of the 'community of computer users', whereas boys on the contrary were often addressed on the basis of an assumed mutual interest in computers. Teachers often accepted discourse in which girls positioned themselves and each other as outsiders, and similarly accepted that boys positioned themselves as insiders without this implying real skills and knowledge. This also implied that boys did not always gain as much skill in the lessons as was possible; their competence was already assumed. Finally, classroom discussions were often dominated by students who knew much about computers (usually boys), while the rest of the group was just listening, or not even that.

On the other hand, classroom dialogue does not necessarily work in this way. Typical of the idea of 'secondary apprenticeship' in schools, as explained in section 3, however, is that social practices are represented in a way that calls for discussion and critical reflection on the practice itself and on the students' own relation to the practice. Classroom dialogue can then be used to reflect on and challenge social differences. The different discourses that are available around such a practice and the different ways individual students relate to these discourses are resources for such discussions in the classroom.

The interviews show that it is not easy to give a new meaning to school subjects, and that students cannot be motivated to participate in certain practices just by being introduced to them. The subjects in our example refer to cultural practices to which students relate in different, socially structured ways, and in which they often already participate in different ways outside the school. The cultural practices that are brought into the school are 'gendered' and 'classed'. This element does not remain at the school gate, but enters the classroom. The way in which it is taken up in classroom dialogue partly determines what meaning students give to what they learn.

5. SCHOOL, IDENTITY, AND SOCIAL DIFFERENCES

To conclude this chapter we will first briefly summarise our argument, and then discuss how classroom dialogue can contribute to breaking through the connectedness of knowledge and skills to social positions and social identities.

Conclusions

In this chapter we discussed the implications of different approaches of 'social learning' for the way 'social differences' are conceptualised. We first discussed co-operative learning theory, mainly developed from a cognitivist view. From this perspective justice is done to the social character of learning when students learn and work in groups, where they can benefit from participation in the social interaction around school tasks, either by helping other students or by being helped. More recent approaches, which try to organise learning in 'communities of learners', highlight the joint construction of knowledge. In both interpretations social differences are treated as characteristics of individual learners, and such differences are taken account of predominantly by ensuring that all students get an 'equal' chance to participate and to be heard. The unintended and unwanted effects of co-operative or collaborative learning are referred to as the dark side of social interactions.

We then formulated a sociocultural perspective in which a plea is made for understanding learning as participating. From this perspective learning as well as knowledge and knowing are inherently social and dialogical. Teachers can make use of interaction/dialogue between students, but classroom procedures do not constitute the dialogical character of learning. Here lies the main difference with co-operative and collaborative learning theories. This perspective focuses attention on the fact that every learning content refers to social positions and has particular cultural meanings, and that acquiring knowledge and skills always implies identity building. This holds true for both learning through participation in social practices and for learning abstract - 'decontextualised' - knowledge and skills. Social differences between students can then be analysed in terms of how the knowledge, skills and identities that students are supposed to acquire at school fit in or conflict with the identities they have already developed, and in which their social positions are reflected.

Our research examples showed how gender differences in learning processes and learning results in the subjects Technology, Care and Information and Computer Literacy lessons can be understood from this perspective. Students appeared to feel attracted to these subjects or alienated by them as a function of how the ongoing discursive reconstruction of their identities could accommodate their view of their proficiency in the subject. Just being introduced to a subject appeared not to be sufficient to develop the wish to participate in the community of practice represented in that subject. For Marcella, Nathalie and Malu technology remains a cultural practice with which they feel no affinity, and in which they would not participate if a compulsory subject Technology did not exist. Rose and Dennis who figured in the introduction of this chapter have no doubt learned some technical knowledge and skills in the technology lessons. But they have also learned that the fact that men are technically more competent than women also applies to them and their fellow students.

Discussion: the pedagogical space

Our analysis of social differences in learning at school is at first sight not a very optimistic one. Should our conclusion be for instance that education is not capable of contributing to breaking through the connectedness of knowledge and skills with social positions and social identities? Or that re-establishing a link between education and social practices, as is pleaded for from a sociocultural perspective, only makes the problem of social differences worse? In the rest of this section we will explain why we think that on the contrary 'learning through participation' is a powerful way for students to develop motives to participate in social practices.

For many students the fact that they are introduced to subjects as Technology, Care or Information and Computer Literacy ensures that they have a possibility to get interested at all. However, the way in which the practices at stake are represented in school is crucial. One of the problems of the subjects Care and Technology is that they are not part of a 'secondary apprenticeship system', as we discussed in section 3. They are instead part of a curriculum in which subjects that are derived from the academic disciplines are considered the more serious and important ones. In many schools students' achievements in Care and Technology are not given as much weight in their final evaluation. For some students the 'practical' subjects, therefore, just make a more or less welcome change. Another problem is that Care and Technology in themselves are not 'ideal' participatory subjects. The social practices at stake are hardly represented in a way that provides for engaged participation. The practical work often consists of isolated assignments, aimed at practising skills by copying an already decided-upon object in Technology or carrying out domestic tasks in Care. In the Technology lessons students are often required to make the same wooden or metal object all at the same time, resulting for many of them in making things that they are not interested in and that do not make sense to them. Students have no responsibility for the choice of practical assignments, and only seldom are asked to design an object with a certain function, or organise a situation in which care is required. Their own initiative is not often valued. Technology teachers told us that many girls like to adorn their assignments – they put a lot of effort in painting the objects they make, for example - but of course, this is not what they are supposed to do.

Students' resistance leads teachers to assume that some students are just not motivated for their subjects. We think, however, that students develop motives to participate in classroom processes and ultimately in social practices by experiencing their social and personal meaning. It is possible to enhance this by a careful choice of assignments and by involving students in this choice. Girls appear to be interested in all kinds of technical work when this results in products that they find beautiful, useful or exciting. This does not even need to be something 'girlish' (Van Eck & Volman, 1999).

But emphasising the inherent social and dialogical character of knowledge, knowing and learning gives direction to teaching

strategies that go beyond the choice of assignments. When social differences are part of the practices that are represented in school, the issue of inequality should be addressed and reflected on explicitly. The school, in its function of a 'secondary apprenticeship system' provides a suitable context for doing this, as it can offer both an introduction to cultural practices and opportunities for taking distance and reflection. Participation and critical reflection together mark the pedagogical space of the school and teachers in it. This way of representing social practices in school implies making visible and reflexive the obstacles to participation in a given social practice and the possible identity conflicts resulting from it. For instance, by pointing out the way in which such a practice now handles social differences, how this has changed in history and how this could be changed in future. In classroom dialogue teachers can also reflect with students on their own behaviour. They can help students to reflect on their motives for participating or not participating in particular social practices. Classroom situations in which identity conflicts arise, or in which disruptions of traditional discourses or taken-for-granted identities become visible, may be seized upon for such reflection.

Such experiences can make students feel that they can be somebody who participates in care, technology, or information technology, even when they had never imagined it before. At the moment this is sometimes aimed at by presenting students with examples of women who work in technology and IT. There are even a few examples of programmes in which men talk to students about care and caring jobs. But such projects are usually rather the frills of the curriculum than an integrated part of the regular school subjects, and many teachers would probably say that this is not really about technology or about care, but about their 'social context'. A sociocultural perspective on learning, however, considers such frills, which are aimed at reflection on social practices and the students' own position in them, as essential elements of the introduction of students to social practices.

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ABSTRACT

In this chapter we discuss the issue of social differences in relation to learning. In theories on co-operative learning or collaborative learning social differences are treated as characteristics of individual learners. The focus on learning as a *social* process is primarily elaborated in terms of interaction between pupils and the combined construction of knowledge. Sociocultural theory (Vygotskij, Lave & Wenger), however, understands 'social' not only in terms of knowledge/meaning being constructed in interaction with others, but also in terms of the cultural practices/activities informing these interaction processes. Learning can be understood as increasing participating in communities of practice. As social differences are an intrinsic part of the culture in which students are learning to participate, these are also an inherent aspect of learning processes in schools. Students learn to participate in practices in different ways, depending on their social position, and thus develop distinguished cultural identities. In this chapter we elaborate on this tenet, using examples from various empirical research projects on learning in secondary education. We not only show how social differences in the cultural practices that underpin learning influence what is learned by whom, but also explore the consequences of this perspective for the pedagogical space of the school..