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Trends in Research on Teaching and Learning in Schools: didactics meets classroom studies

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ABSTRACT The relation between teaching, instruction and children's learning arises whenever models of the teaching–learning process are discussed or whenever problems of learning occur. Despite massive research efforts we still know little about how differences in learning activities are related to students' learning. The primacy of teachers and teaching as the primary subjects of research has contributed to a rather limited understanding of what goes on in schools and classrooms. Few studies of teachers and teaching have examined the extent to which differences in teacher effectiveness are related to differences in teachers' subject matter knowledge, and there is still a tendency to discuss issues of teaching and learning in general terms separated from the content that has been taught. In this article the author argues for the need to bridge studies of teaching and learning with studies of the subject involved – to establish a conversation between didactics and classroom studies. An analytical design and framework able to bridge the teaching–learning gap needs to be developed. Emerging technologies in video/audio documentation provide one chain of investigations for bridging how different thematic patterns are linked to instructional activities and interaction formats in classrooms.

Introduction

The didactic triangle as a relation between teachers and learners (the who), subject matter (the what) and instructional methods (the how) points to a long tradition within educational research. Despite the long history of the didactic triad – teaching, learning and content – there is a need for an analytical and methodological framework that integrates the three elements in the triangle and explores the relationship between them. Studies of teachers and teaching have been poorly aligned with studies of students' learning processes and vice versa. We still know little about how differences in teachers' activities are related to students' learning (Anderson & Burns, 1989; Oser & Baeriswyl, 2001; Klette, 2004; Alexander, 2006). Despite a growing stock of studies that disclose how students learn (Leinhardt, 1992; Brown & Palinscar, 1989; Ball et al, 2001), these studies are seldom linked to how learning activities in classrooms reflect and support teachers' activities and instructional repertoires. Moreover, few studies of teachers and teaching have examined the extent to which differences in teacher effectiveness are related to differences in teachers' subject matter knowledge (Shulman, 1986). Two decades after Shulman and his colleagues' prominent research programme on pedagogic content knowledge as a special amalgam of content and pedagogy essential to teachers' professional understanding, we still tend to discuss teaching and learning in general terms separated from the content of what has been taught. Mortimer & Scott (2003), for example, notice how later studies on interaction and learning seldom take content coverage and subject matter issues into account: 'the analyses are carried out, and the findings reported, solely in terms of patterns of interaction, and the actual *content* of what is being taught and learned is not regarded as being a significant feature' (Mortimer & Scott, 2003, p. 101; original emphasis).

Bridging the Old World of Didactics with Classroom Studies?

The aim of this article is to reconceptualise the relationship between teaching, learning and subject matter through a review of research traditions in this field where each of the three elements has its relative strength during different periods. The analyses will use the empirical literature in the Nordic countries and Anglo-American classrooms as a point of reference for discussion. In the case of Norway a mixture of a German-oriented Didaktik (Bildung) tradition parallel with empirically oriented classroom studies has been essential to define research traditions capturing studies of teaching and learning in schools. The Didaktik tradition *as a way of thinking* about *and studying* teaching and learning (Klafki, 1995; Hopmann & Riquarts, 2000; Westbury, 2000) held for a long period a core position in the field with an emphasis on hermeneutics and interpretative stances. In Norway the Didaktik tradition leaned heavily on textual sources (curriculum plans, policy documents, textbooks, etc.) as its primary sources for data and analyses (Gundem, 1992; Karseth et al, 1997). Its analytical framework was often derived from a normative and dichotomised conceptual language (e.g. teacher centred versus student centred, academic knowledge versus vernacular knowledge, etc.), and studies of concrete practices in classrooms and other pedagogical settings were seldom in the forefront. During the 1970s empirically oriented classroom studies become a more frequent setting for studying teaching and learning processes (Klette, 1998) and today studies of pedagogical practices in schools and classrooms together with curriculum (and other textual) analyses constitute teaching and learning as a field of research in Norway and the other Nordic countries.[1] In my overview I will draw on both traditions though with a major focus on recent classroom studies and classroom research.

In the analyses the following arguments will be put forward:

- The relation between content matter issues (the what), instructional activities (how) and teachers and students involved (who) in studies of teachers and teaching has changed over time. While the Didaktik/Bildung tradition historically had aspects of the *what* (backed up with arguments concerning *why* questions) in the forefront, empirically oriented classroom descriptions have been more occupied with issues of teaching styles and teaching methods (the how) and characteristics and traits of the persons involved, i.e. teachers and students (the who). During recent decade(s) – especially thanks to an increase in subject matter focused investigations – we recognise a renewed interest in the *what* aspect regarding teaching and learning in schools.
- Studies of teachers and teaching hold a strong position within studies of teaching and learning in classrooms and as a consequence the other two angles in the triad are underdeveloped, and may be more important, and the relational dynamics between the elements continue to be vague and obscure. Despite massive research efforts we continue to search for qualities of the individual teacher.
- The role of content is underestimated in studies of teaching and learning. Such neglect is surprising given the need to be specific about issues of knowledge when we address the curriculum of 'knowledge societies': *What should we teach* is as a consequence pushed into the background.
- There is a need for more integrated frameworks that link instructional activities and procedures (the how) with thematic patterns (the what) and mode of interaction (the who) patterns.

Background

The relation between teaching, instruction and children's learning arises whenever models of the teaching–learning process are discussed or whenever problems of learning occur. While studies of teaching for a long period tended to depict learning and knowledge acquisition as a rather unproblematic and linear process of knowledge transmission, these assumptions have been contested during the last three decades, yet never properly disentangled. Early in the 1980s, Reigeluth, for example, wrote:

> Instructional design theory is concerned with what teachers do, whereas learning theories are occupied with what happens to the learner. Like instructional theory, learning theory may be

> descriptive or prescriptive. But prescriptive learning theory is *not* instructional theory. (1983, p. 23)

Later research movements have on the one hand clearly tried to resolve this tension, yet, on the other, never properly disentangled it. Like Reigeluth (1983), later surveys of research of studies in teaching and learning notice a split between research on teaching and research on learning (the 'missing paradigm problem') (Shulman, 1986; Ball et al, 2001). In their research in mathematics education Romberg & Carpenter (1986) are worried about what they see as a weakening connection between research on teaching and research on learning. They noted that despite big gains in understanding students' mathematical conceptions and development, 'findings from research on teaching were unaligned with questions arising from research on learning' (Romberg & Carpenter, 1986, p. 868). During the 1980s researchers in learning produced portraits/envisioned the complexities in students' conceptions of rational numbers, area, functions etc., and researchers within teaching continued to disseminate reports on the consequences of grouping arrangements among pupils, how different teaching styles make an impact on student behaviour and student achievement and the like. As indicated in the introduction to this article, Mortimer & Scott (2003, p. 101) emphasise how content coverage seldom is included in studies of learning. Content matters and disciplinary subjects are mostly seen or treated as vehicles and/or independent variables while teachers and teaching have been the primary concern of research. In their overview of the discrepancy between studies of learning and studies of instruction, Fritz Oser & Franz Baeriswyl (2001) ask: 'What can we say about the relationship between the activities of the teachers and the operations for the learners in a classroom with a high complexity of contexts?' (p. 1031). They claim that the study of education has neglected to make the mental activity of learners the centre of observations and analyses (p. 1041). Their solution is to give primacy to the study of learners – to give priority to studies with a focus on *construction* rather than *instruction* – to paraphrase their vocabulary. We desperately need to know in more detail how visible teaching structures (instruction) influence children's' invisible learning operations (construction), they argue. The pedagogical viewpoint needs to be turned around: 'it needs to emphasise the activation of learners' mental activity and not the teaching methods, social forms and content structure' (Ozer & Baeriswyl, 2001, p. 1041).

To give studies of learning and the operations of the learner an exclusive position will not solve the 'missing paradigm' problem as I see it. Instead we need to elaborate on studies that pay attention to the relational nature between the three elements constitutive of learning situations in school (instructional repertoires, learning activities *and* content coverage). Studies of teachers and teaching detached from both studies of students' operational learning and subject matter involved leave both sides unprobed. We have to move from general to specified context and practice-based studies that take into account how students' (operational) learning interacts with *both* content coverage and specific teaching activities. More complex, complete and detailed studies of instruction and teaching are needed before we are likely to understand and improve life in classrooms.

In my brief presentation I will:

1. Make a short historical review (1929-99) of research traditions that connect to the three corners of the didactic triangle. I will use empirical and descriptive studies of teaching and learning in classrooms as a point of departure of discussion. Anglo-American studies together with examples from Nordic classroom studies will be the empirical floor for this mapping exercise.
2. Show how the teacher and teaching as the primary subject of research has contributed to a limited understanding of what goes on in schools and classrooms.
3. Show how recent technological and methodological developments give opportunities that open up more integrated analyses of life in classrooms.

What Do We Know about Life in Classrooms? Studies of the Who, the How and the What

In this section I will comment on several decades of empirical studies of the *who*, *how* and *what* in classrooms. The basis for my selection of research is that the studies put forward analytical, conceptual and methodological approaches central for studies of teaching and learning during this

period. Anglo-American and Norwegian studies comprise the ground for this review. By this mapping exercise I seek to roughly outline the purpose of the different studies, conceptual and methodological design, and type of conclusions to be drawn from the different studies.[2]

For the most part and throughout the whole period we are examining, teachers (and teaching) constitute the central subject of investigations. Studies of teaching and learning in classrooms have mostly been occupied with trying to identify and characterise what constitutes good teaching and/or 'the good teacher'. At the beginning of the period (1929-45) good teaching was mostly investigated through the moral characteristics and traits of the individual teacher. After 1950 behavioural characteristics such as observable teacher styles played a more prominent role, while teachers within a contextual framework and environment – the teachers in their classroom context, so to speak – depict dominant perspectives of the investigations of teachers during the 1970s and early 1980s. Teachers' cognition and their personal and practical knowledge represent the foreground of the studies during the late 1980s and early 1990s along with studies of interaction and discursive practices in classrooms.

The learner plays a less prominent part in the studies conducted for most of the period. It was not before the late 1980s that pupils as learners began to take a central position in studies of teaching and learning. We can, for example, identify a shift in research focus of the who – from considering teaching from a functional rather than a behavioural point of view during the late 1960s/early 1970s – but this shift was not followed up by considering functional teacher behaviour from the point of view of students (Anderson & Burns, 1989). As this short historical description will show, it took more than two decades from the recognition of learners as central to studies of teachers and teaching and how this was recognised throughout empirical designs in classrooms. The prevalence of studies of the who (i.e. teachers) is, further, obvious in this rough examination. A primary interest in teaching and teachers reflects teaching and learning as synonymous concepts. One seems to believe that studies of teachers and teaching exhibit studies of learning. The students' learning and knowledge acquisition are seen as a consequence of the teacher's behaviours and aims. Learning is regarded as equal to teaching – instruction the same as construction. This does not mean that the students are regarded as of no interest in the teaching–learning process, but reflects research approaches and research designs where instruction and construction/teaching and learning are considered as more or less identical processes.

Studies of the Who (1929-99)

Teachers' personal traits and characteristics were central during the first part of the period examined. The teacher as a strong moral individual represents a main research focus, and personal and moral characteristics of the individual teacher were the focal point of analyses (see, for example, Charters & Wrappels, 1929; Waller, 1932; Kristvik, 1946; Kleven & Strømnes, 1998).

Charters & Wrapples (1929), for example, aimed at producing 'master's lists' (Anderson & Burns, 1989, p. 243) of teachers' traits, illustrative actions to follow, and activities that teachers performed or were expected to perform in the classrooms. By objective and measurable methods Charters & Wrapples wanted to discharge discrepancies between 'what is' and 'what ought to be' and as such provide a ground floor for a master list for teaching and teacher training curricula.

In the era after the Second World War researchers continued to be interested in traits and characteristics of the individual teachers but now with a focus on external behavioural categories to be measured. This is illustrated in the Teacher Characteristics study of Ryan et al (1960). Ryan and his colleagues wanted to compile information about significant teacher characteristics and to develop objective measures that might be used in evaluating and predicting teacher behaviour (Anderson & Burns, 1989, p. 247). Ryan et al saw teacher behaviour as a function of situational factors *and* characteristics of the individual teacher. In their methodological design they used both direct (observable measures such as teachers' activities and interactions) and indirect measures (self report schemes). All data were gathered within a written and/or text based format.

In 1968 Philip Jackson's book, *Life in Classrooms*, was published. The Jackson study stands out as a classical study of teaching and learning for two reasons. For the first time we got a detailed and elaborated picture of life in classrooms from the point of view of both teachers and pupils. By a mixture of data – reports, interview data, personal observation of classrooms, and opinions about

the schools from both the teachers' and the pupils' perspective – we are introduced to intended *and* experienced aspects of classroom life. His description of the pupil's role organised around three classroom characteristics – crowds, praise and power – has acquired an elevated position in descriptions of students' roles and repertoires. The Jackson study is further interesting because of its mixture of methods combined with an extensive use of ethnographic observation techniques applied to the classroom level. In retrospect, according to Munby et al (2001) and other scholars, the Jackson study marks the end of work on teachers' personality.

The next period (1979-86) characterises a shift from research on individual behavioural categories to functional categories regarding studies of the teacher. Galton et al's study, *Inside the Primary Classroom* (1980), could stand out as a prototype example of studies from this period (see also Blichfeldt, 1973; Broch Utne, 1981; Goodlad, 1984). Galton et al's study had primarily a descriptive ambition. Through systematic observation Galton and his colleagues wanted to describe some of the richness and variety of what goes on in a modern primary classroom. The Galton study relied on structured observations combined with qualitative field notes.

In the decades to follow cognitive (Leinhart & Greeno, 1986) and interactional (Palinscar & Brown, 1984; Edwards & Mercer, 1987; Wells, 1999) learning studies together with studies of teachers' tacit (Elbaz, 1983; Carlgren, 1987; Eraut, 1994), personal (Clandinin, 1986) and professional (Clark & Peterson, 1986; Shulman1988) knowledge were conducted. Shulman's study, *Knowledge Growth in Teaching* (1988), has become a classical study in how to describe teachers' practical professional knowledge. The study was designed in response to the 'missing paradigm' problem in education. According to Shulman, few studies of teacher effectiveness had examined the extent to which differences in subject matter knowledge were associated with differences in teacher effectiveness. The Shulman investigation evolved from 'a general examination of how knowledge in teaching develops in general to a more focused study of how teachers learn to transform their own understanding of subject matter into representations and forms of representations and forms of presentations that make sense to students' (p. 1). Although the Shulman study stands out as an almost paradigmatic shift in the studies of the who – linking teachers' classroom activities to specific subject matter knowledge – it is still rare to find educationalists occupied with fine-grained studies of subject matter issues. As we shall see, it is within the subject-specific communities (studies of the what – see next section) that these new approaches for studying life in classrooms were taken up. Studies of interaction (Edwards & Mercer, 1987) and contextual learning studies (Palinscar & Brown, 1984; Brown & Palinscar, 1989) became additionally an expansive field of research during this period. The learners' perspectives are central in these studies; thus aspects of content coverage and thematic patterns involved continued to be pushed into the background.

Three conclusions can be drawn from this rough analysis of studies of the who. First, teachers as the primary subject of investigation in studies of teaching and learning in classrooms have been given and still hold a strong position. For the period up to the beginning of the 1980s, the concern for the general traits of the teacher (behavioural, functional or biographical) has given the way for most of the studies trying to understand teaching and learning processes in schools. After the mid 1980s the learner's perspectives have been taking into account to a certain degree. This is especially true for those studies interested in verbal interaction and communication in classrooms. Second, studies of teachers' style envision that differences in teachers' styles and behaviours are poorly related to differences in classroom performances and achievement. There is little evidence that teachers' attitudes, interests, values and motivation are related to their performances in the classrooms. There is further little evidence that differences in personality characteristics (Getzel & Jackson, 1963) or general teacher knowledge (Shulman, 1986) are associated with differences in student achievement. Third, the period analysed documents an expansion in methodological design and framework used. Although the predominance of quantitative studies is obvious in the first four decades, qualitative and biographical studies become more prevalent during the 1970s and today studies of teachers (and learners) draw on a rich toolkit of methodological instruments available. An increase in technologically supported data-gathering techniques, such as audio taping and videotaping classroom events, is recognised throughout the period. Studies with a prime interest in interaction patterns and discursive practices (Cazden, 1988; Wells, 1999) have strongly contributed to the introduction of new technologies as tools investigating into classrooms.

Studies of the How (1929-99)

Studies of the *how* have mainly been concentrated around consequences of different teaching styles and/or instructional frameworks (Flanders, 1960) and how different educational formats (Bennett, 1976; Dahlöff, 1971; Cuban, 1984) and verbal (Bellack, 1966; Cazden, 1988) transcripts affect students' learning. Taken together and compared with studies of the teachers, few studies have teaching methods and/or instructional format as a point of departure for their research.

Flanders Interaction Analyses (FIAS) (1960) were designed for investigating the effects of teacher directedness relative to different groups of students (gifted, slow and average groups of students). The study was concerned with the differential impact of teachers' directedness towards different types of students and represented a move towards studying new ways of teaching. Flanders et al were, however, not able to identify any strong correlation between teacher style and student achievement (Flanders & Simon, 1969). The FIAS system has, however, had great impact as an observational system for conducting classroom behaviour in Anglo-American and Nordic classrooms (Anderson & Burns, 1989).

During the 1960s Bellack (1966) and his colleagues started to examine the verbal interaction taking place in classrooms and how this interaction was related to students' achievement. Their study did not set out to identify the good teacher or the best teaching method. They were interested in how differences in verbal communication may be related to differences in teachers' classroom control and students' achievement. Since the teacher controls the communication in classrooms, they saw insight into verbal communication as a central tool for exercising classroom control. They sought to identify the various types of verbal moves teachers and students make 'and the rule they implicitly follow in making these moves' (Bellack, 1966 p. v). Bellack et al developed an elaborated coding scheme for identifying verbal moves and rules in the classroom. It was also one of the first studies using audio as a tool for gathering data in classrooms. Coding categories and methodological design inspired by the Bellack study had a strong impact on empirical classroom studies in the Nordic countries in the years to come (see Lundgren, 1979; Haug, 1994).

Inspired by the Flanders study, Urban Dahløff (1971) conducted on observation study on the relation between grouping, curriculum, teaching processes and student achievement in Swedish classrooms. He found that grouping practices affect the ability distribution of a class of students and especially the ability level of the steering group (that is, the group of students teachers use to pace their instruction). Seen as a frame factor, grouping indirectly sets standards for the pacing of the instruction, which again ultimately affects students' achievement. Dahløff's frame factor model has been used to show how the environmental characteristics frame the conditions under which teaching and learning take place. In Sweden and Norway this model for observing life in classrooms played an influential role for the next decade (Lundgren, 1979; Bernstein & Lundgren, 1983).

Larry Cuban's study, *How Teachers Taught* (1984), aimed at understanding the high degree of stability in certain teaching behaviours despite mighty efforts to try to move teachers towards what he describes as 'student centred' instruction. Cuban discusses the stability in teacher–student behaviour within a period of 90 years. He selects five criteria as indicators for the degree of change with the dimension of student-centred instruction versus teacher-centred instruction;: class arrangements, group instruction, classroom talk, class activities and student movement. In his study Cuban draws on multiple sources of data: historical sources, biographical sources, journals, newspapers, interviews, survey studies, etc.

During the 1980s several studies on verbal interaction and discursive practices in classrooms were conducted. Morine Dershimer (1985) was interested in the relation between classroom talk and students' misconceptions. Edwards & Mercer's study, *Common Knowledge* (1987), focused on teacher-initiated versus student-initiated questions and responses, while Cortny Cazden's study, *Classroom Discourse* (1988), used language patterns to discharge participation structures in classrooms. During the late 1980s and the following decade numerous constructivist/social constructivist and sociocultural studies aimed at discharging how verbal interaction and discursive practices (here framed as an aspects of the *how)* facilitate and support students' learning (see Wertsch, 1998; Wells, 1999).

The following conclusions can be drawn from the studies of the how in classrooms. The prevalence of lecturing, plenary discussion and seat work in classrooms has been well documented

(Bellack, Flanders, Goodlad, Cuban). For several reasons (tradition, disciplinary order, effectiveness) classroom life is structured around some rather stable features known as lecturing, seat work, classroom discussion, plenary discussion, demonstration, etc. Analyses of research on the how aspect further suggest that there is little if any evidence that changes in format (for example, giving priority to seat work, plenary discussion, subject integration) result in a higher level of student achievement. From more recent studies we know, however, that the teacher's deliberate and systematic use of grouping arrangements together with sufficient scaffolding structures (especially regarding classroom talk) within the classroom is beneficial for student learning (Meichenbaum & Biemuller, 1998; Klette, 2003; Alexander, 2006). Instruction time, pacing and high academic expectations and – as we shall see – content coverage are further associated with high levels of students' achievement.

Methodologically, studies of the how in classrooms draw on a rich toolkit. Observational systems for the registration of classroom behaviour across contexts and settings have been one pertinent outcome. New data-gathering tools such as audio taping classroom conversations represent another.

Studies of the What – studies of content coverage (1929-99)

Within the Didaktik tradition studies of the what have been in the forefront (Gundem, 1992; Klafki, 1995), either related to the 'Bildungs potential' (Klafki, 1995) and democratic values embedded in the different epistemic content areas (Englund, 1997) or how these content areas could be reduced down to teachable sequences throughout a teaching session, a school year and/or within a lifelong perspective. The Didactik tradition in the Nordic countries has mainly used curricular plans, textbooks and other textual documents (the intended and/or written curriculum) as the point of departure for analyses and with a little and minor interest in learning and teaching practices at the classroom level. Within a didactic/curricular vocabulary my analyses will then consequently have studies with an interest in the implemented and experienced curriculum (Goodlad, 1984) as their primary focus of investigation.

As remarked at the beginning of this section, studies of the *what* played a rather peripheral role in empirical studies of learning in classrooms at the beginning of the period examined. Watson (1963) drew on the field of science education as an example and used the 1963 edition of the *Handbook on Teachers and Teaching* to search for research publications that paid attention to aspects of content coverage (i.e. science teaching). Watson found 69 publications which discussed aspects of science teaching, all of them stemming from research groups within the US research community. Thirty-five years later – in 1998 – it was enough research to issue the first American handbook on science teaching of 600 pages.

This historical development illustrates the role of content coverage within the studies of teaching and learning on a general level. Studies of the *what* in terms of content coverage and subject matter areas were during the first part of this period of investigation treated either as (i) unquestioned or (ii) as a background variable and/or a vehicle for other and primary research concerns. White (2001, p. 466) makes this point for science education when he states that for most of the studies in science up to 1975, the content the students were asked to learn was treated mainly as a background variable and the teaching method was the primary interest for the researcher.

If we look at issues of knowledge domains and subject matter in more detail the following picture emerges. For a long period (1929-60) issues of content coverage and subject matter were hardly analysed as empirical practices at classroom level. During this period subject areas and knowledge domains were treated as rather unproblematic within empirical studies of teaching and learning. Within the didactic tradition content coverage and knowledge areas were discussed in terms of 'Bildungs potential', issues of inclusion and exclusion, and to what degree the different epistemic areas contributed to integrate larger groups and cohorts into the educational enlightenment project. Contestation between academic disciplines, such as the contest between humanities and sciences (Høigaard & Ruge, 1963) and the role of vocational knowledge versus theoretical knowledge (Goodson, 1987), played further a certain role in the discussion on teaching and learning (but with minimal influence on the research going on during this period).

In the first part of the post world war period (1945-69), subject matter issues and knowledge domains continued to play a rather invisible part in studies of teachers, teaching and learning. If content areas happened to occur in studies of teaching and learning at that time, the content coverage the students were supposed to acquire was treated as means and background variables rather than playing a distinct position in the foreground (see, for example, the Bellack study [1966]).

During the first part of the 1970s content coverage and knowledge domains were playing a certain role as themes of investigations for studies of teaching and learning. This was not in terms of subject matter and content coverage as academic disciplines embedded with certain qualities of knowing but rather how academic subjects and their disciplinary boundaries reflect and support mechanisms of social control in the society. The new sociology of education with its emphasis on knowledge areas and knowledge domains as tools of social reproduction was taking a leading role in this discussion. Following the new sociology of education, realms of knowledge were merely a mechanism of social control (Young, 1971; Bourdieu & Passeron, 1975), a device for securing capitalist hegemony (Bowles & Gintis, 1976) or a means of enforcing the power of the 'ideological state apparatus' (Althusser, 1972). Although few of these references had studies of teaching and learning as their primary focus, they played an influential role for the studies which were about to be conducted in the following period.

Studies interested in language games in classrooms and how they reflect hegemony and hierarchical positions were produced during the following decade (see, for example, Bernstein, 1975; Project Skolesprog in Denmark, 1979). Studies of schools and school disciplines as reservoirs for knowledge hegemony (Høgmo et al, 1981), class control (Freire, 1972; Willis, 1977) and gender interests (Spender & Sarah, 1980; Bjerrum Nielsen, 1981) were performed. Cross-disciplinary working, such as project work (Project Skolesprog, 1979), and ways of working that linked school knowledge and school disciplines to forms of everyday knowledge were examined (Negt, 1971; Ziehe, 1980; Høgmo et al, 1981). The evidence from these studies – all inspired/labelled under the umbrella of new sociology of knowledge – is not consistent, or convincing. Few of the studies came up with warrants such as cross-disciplinary work was positively linked to student achievement, or documented the benefits of horizontal knowledge organisation. There was little evidence that supported the thesis that learning from everyday experience (and inductive ways of working) was more likely to produce learning compared to disciplinary-based learning. Willis's classical study on how schools contribute to and actively reproduce how 'working class kids get working class jobs' presented few possible and preferable alternatives. The teaching–learning experiments of the 1970s, investigating the benefits from different forms of inductive, cross-disciplinary and inquiry-based learning programmes, were naïve and based on too simple models of learning (Borgnakke, 1996; Klette, 1998). A lot of the studies referred to above were designed within a methodological model of action research and where researchers and practitioners worked together collaboratively (Negt, 1971; Freire, 1972; Høgmo et al, 1981).

The year 1986 indicates a shift regarding studies of the *what* in learning and teaching processes in classrooms. After the mid 1980s we recognise a huge number of studies with a primary interest in content coverage, subject matter issues and/or pedagogical content knowledge (see Shulman, 1986; Wilson et al, 1987; Grossman et al, 1989; Ball, 1991). Studies focusing on content coverage were explicitly highlighted within studies of subject matter theory such as within the fields of science, mathematics, reading and writing. But also educationalists (Shulmann, 1986; Cohen, 1990) started to discuss learning and teaching within a subject-specific framework. And this time content coverage was not merely a vehicle for discharging related variables but took centre stage as focus, topic and departure of research.

The Shulman study, *Knowledge Growth in Teaching* (1988), holds a classical position in this shift. As indicated above, the Shulman study was designed in response to what has been referred to as the 'missing paradigm' problem in studies of teaching and learning. With the introduction of *pedagogical content knowledge* to the lexicon of research on teaching and learning, Shulman and his co workers called attention to a special kind of teachers' knowledge that linked content and pedagogy. Pedagogical content knowledge is a unique kind of knowledge that intertwines content with aspects of teaching and learning (i.e. the missing paradigm). Shulman's perspective was highly recognised and appreciated within research of subject matter theory. Within studies of mathematics education, for example, Begle (1979) and Monk (1994) found that courses in mathematics methods had more effect on student performance than typical mathematics courses,

because the curriculum of methods course often focuses on pedagogical content knowledge. In studies from science classrooms, White (2001, p. 468) comes up with a similar conclusions.

Not surprisingly, the field of subject matter theory was a central driving force for a renewed interest in the *what to teach* aspects in classrooms. Although Nuthall & Church already in 1973 indicated that subject matter being taught made an impact on some, if not all, aspects of teaching and instruction, it was to take more that a decade before this insight were followed up with subject-specific in-depth analyses at the classroom level. Especially we can see a growing interest in studies of subject matter in science, mathematics and reading/writing classrooms. In the following I will use studies of science education and writing skills as illustrations for an enhanced interest in how content coverage influences teaching and learning processes in schools.

Science Education

Studies of science education expanded dramatically during the late 1980s and cover today a widespread field of research. White describes the expansion in studies of science classrooms as 'a revolution' (2001, p. 457). He shows how this shift has influenced the *focus* of research (questions and topics of research), studies of investigations, *methodological design* (methods of data collection and analyses) *researchers involved* and how the studies are to be *represented*. He documents how, for example, studies paying attention to conceptions and misconceptions, learning strategies and sociocultural studies in science have expanded. In 1971 White registers 14 articles that have misconceptions in classrooms as their research focus while this number has increased to 226 in 1986 and 285 in 1991 (White, 2001, p. 459). Constructivist studies of science classrooms were none in 1971, 3 in 1981 and 233 in 1991 (White, 2001, p. 459). In his overview White claims that students' learning holds a core position in studies of science education (2001, p. 465).

Writing Studies

Like studies of science classrooms, studies of writing were relatively newly recognised as a serious area of study in education (see Dyson & Freedman, 1991; Nystrand et al, 1993). And like White, in science education, Nystrand et al (1993) point to an expansion and intellectual movement in writing research equal to that described in science education. Hairston (1982) links this shift – what he labels a 'paradigmatic shift' –especially to the fact that research on *writing processes* has taken a primary conceptual model for studies of writing. Hairston uses the field of native writing (L1) for his reference to paradigmatic sequencing, but as Sperling & Freedman recognise (2001, pp. 382-383), this shift in conceptual framework was soon picked up by research within second language studies (L2) as well.

During the 1980s studies of writing processes understood as a process of planning, translating and evaluating became frequent (Flower & Hayes, 1981) in combination with an interest in examining how expert writers compose. During a few years process writing had become *the* dominant perspective and conceptual framework for studies of writing processes in schools. Appelbee interprets this 'paradigmatic shift' in studies of writing in schools as an example of how 'new research findings fit with old paradigms of writing' (Sperling & Freeman, 2001, p. 373). The writing process performed at classroom level included the following stages: first plan, then write, then revise. Brainstorming activities and whole class conversations seemed to be rather frequent in most classrooms while problem-solving focus had a tendency to get lost in the translating process (Sperling & Freeman, 2001, p. 373). Appelbee (1984), Gutierrez (1992) and others indicate that what went under the label of 'writing process pedagogy' could be vastly divergent from one classroom to another. Hillock's meta-analyses (1986) of the effectiveness of various kinds of writing instruction and writing improvement supported the primacy of the environmental model of process writing. During the 1990s studies of the writing process model become the dominant model (Hillock, 1986; Nystrand et al, 1993; Evensen & Wagle, 2004) and it is only recently that fears regarding the quality of students' written products have been uttered. In Norway Evensen & Wagle (2004) use text production at the classroom level to examine writing qualities and writing profiles among secondary students of today.

The following conclusions can be drawn from the studies of content coverage in classrooms. The old didactic tradition had knowledge areas and epistemic content at the centre of its research. However, few of these studies used classroom level and concrete pedagogical practices as their point of reference and analyses. As a consequence there is a split between general didactics and studies of concrete (and subject-specific) didactics at the classroom level. While the first tradition tends to discuss the what aspect of education in terms of general aims and devices – often held in dichotomised and normative language and where pedagogic practices are treated as a consequence of the general aims – the latter position has neglected the subject matter involved and tended to study life in classrooms without paying attention to how instructional activities and interaction patterns are linked to content coverage involved. Subject-specific analyses – especially within the field of mathematics, science and writing education – have contributed to a renewed interest in knowledge areas of and within schooling. The use of new technologies – especially video studies as a way to document teaching and learning processes in classrooms – have developed strongly during this period, closely linked to an increase in subject-specific studies.

Discussion

Taken together studies of '*the who, how, what to teach*' point to the following development trends:

- A shift from considering teaching from a functional rather than behavioural point of view during the late 1960s/early 1970s – but this shift was not followed up by considering functional teacher behaviour from the students' point of view.
- A move from psychology and behaviourism in studies of education. This is a move from behaviourism to cognition as the dominant model for understanding learning. Knowledge of information processing and constructivist theories of learning spread through the 1970s and 1980s. These theories provided a more useful basis for instructional design than behaviourism since they could encompass the complexities of learning in schools. However, knowledge processing theories did not illuminate the social context, or the content coverage involved.
- The new sociology of education reframed studies of knowledge acquisition and its epistemic basis in subject content but was stuck in a restricted perspective when knowledge issues were conceived as primarily mechanisms of power relations and devices for capitalist hegemony.
- Subject and content specific investigations of teaching and learning in classrooms have contributed to produce more nuanced and complex portraits of classroom learning.
- Methodologically we recognise the following trends:
- A shift from evaluative and predetermined methods developed and controlled by the researchers to interviews and observations (and quantitative data) aiming at discharging individual differences among the stakeholders in the classroom.
- The value of lengthy, context-rich observations of the interpersonal dynamics occurring in classrooms has been asserted throughout the last two decades (1986-2006). Throughout the 1980s there was a growing interest in individual understanding of contexts. Researchers started to appreciate the active role learners' play in forming the situation. They therefore turned to interviews, narratives, mental protocols and different types of collaborative research to discover/discharge participants' beliefs, feelings and purposes.
- The shift from experimental or descriptive design, where one compared two or more teaching models or styles in order to estimate how they contributed to students' achievement and pupils' progress, to in-depth descriptions (through quotations, lesson scripts or narratives) of natural classroom events have extensively increased over the period analysed. Today qualitative studies hold central positions in studies of teaching, learning and subject matter issues in classrooms.
- A shift from pen, pencils, notebooks and questionnaires as the primary technologies for gathering data to audio, video and other technologically supported data-gathering techniques. Today video/audio documentation (and quantitative and qualitative data) supported with existing software tools for analyses are one of the driving forces for methodologically and conceptually designing studies of teaching and learning.

Conclusion

Didactic framework and research design able to bridge the teaching–learning gap struggle with institutional and disciplinary boundaries and fragmentation, policy initiatives and power relations among the different stakeholders. Recent developments within the research field of didactics/subject-specific didactics *and* classroom studies combined with emergences in technologies able to document teaching–learning processes at micro and meso level provide for opportunities to study how different thematic patterns are linked to instructional activities and interaction formats in classrooms. Funding structures in research together with policy initiatives such as the creation of networks across research communities, disciplines, and national contexts (e.g. EERA) support this research ambition even further.

Notes

[1] This rather rough examination does not take into account specifics between the Nordic countries There are some significant differences which place Denmark at one position of the axis (where the German Didaktik/Bildung tradition held (and still holds?) a strong position) and Finland on the other (where cognition empirically measured at a classroom level holds a strong position in the field of studies of teaching and learning) and with Sweden and Norway in a more mixed position drawing on both textual curriculum studies *and* empirical classroom investigations as a framework for analysing teachers and teaching.

[2] In drawing conclusions I will especially pay attention to how the different approaches and studies shed light on aspects favourable for students' learning.

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