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ABSTRACT

This paper analyzes the ways in which national cultural traditions influence the processes of curriculum and pedagogic renewal in three contrasting European countries: England, France, and Germany. The paper is concerned with the ways national school traditions permeate through to systemic features, to the curriculum, and to teachers' pedagogies in their classrooms. Drawing primarily on a recent study of mathematics teachers' work, the research findings in the paper demonstrate that national cultural traditions in England, France, and Germany are a major determinant and influence on the system of schooling in general, on national curricula, and on teachers' principles and classroom practices in schools. The paper argues that an awareness of the socio-cultural and philosophical base upon which systems have developed is a critical element in analyzing and understanding contrasting national models of curricular and pedagogic organization, and that a lack of such understanding is likely to inhibit the process of curriculum change at all levels of the system. (Contains 39 references.) (Author/BT)

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Curriculum, cultural traditions and pedagogy: understanding the work of teachers in England, France and Germany

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Abstract

This paper analyses the ways in which national cultural traditions influence the processes of curriculum and pedagogic renewal in three contrasting European countries: England, France, and Germany. It is concerned with the ways national school traditions permeate through to systemic features, to the curriculum and to teachers' pedagogies in their classrooms. Drawing primarily on a recent study of mathematics teachers' work, the findings of the research demonstrate that national cultural traditions in England, France, and Germany are a major determinant and influence on the system of schooling in general, on national curricula, and on teachers' principles and classroom practices in schools. It is argued that an awareness of the socio-cultural and philosophical base upon which systems have developed is a crucial element in analysing and understanding contrasting national models of curricular and pedagogic organisation, and that a lack of such understanding is likely to inhibit the process of curriculum change at all levels of the system.

Curriculum literature is rich in comparative analysis. The influence of different social, philosophical, even economic traditions on curriculum organisation has attracted the interest of scholars and policy makers alike. Mathew Arnold's sorties into France and Germany in the mid nineteenth century have been well recorded (Rapple, 1989). The interest, particularly from the USA, in the education systems of the Pacific Rim countries represents a more contemporary example of this phenomena (Schoppa, 1991; White, 1987).

In recent years the revolution in communications and the processes of globalisation have created permeable interfaces between systems previously almost wholly separate. In Europe, for example, the Maastricht treaty significantly extended the linkage between education systems. Children and teachers now regularly move between countries. University students increasingly complete parts of their undergraduate or postgraduate qualifications in countries other than their own. Within the employment structures of Europe, teachers, with some caveats, are able to practice their profession across all member countries.

It is within this context that we seek to explore the way in which three European countries (England*, France, and Germany), now economically and politically closely linked, have developed their education system in general and curriculum and pedagogic practices in particular. The paper is divided into five parts. The first part introduces a number of perspectives on curriculum and pedagogic practices in the light of cultural and philosophical developments and traditions. The second outlines the educational philosophies that underpin the English, French and German education systems. The three remaining parts explore the influence of those educational traditions on the curriculum; on systemic features; and on teachers' pedagogies.

1 Setting the scene

The schools that developed the education systems of Europe have much in common. Visitors to Finland or Spain, Ireland or Austria, would see many similarities in the visual appearance of buildings and classrooms. The institutional nature of formal education has a common and enduring quality. The growth of mass education has been extensively debated and argued over (Miller, Ringer and Simon, 1987; Kliebard, 1999). These systems evolved from the more elitist, often class based systems of the nineteenth century which in turn trace their origins back through the mediaeval period to the time of classical antiquity.

The mediaeval curriculum of the *quadrivium*, music, astronomy, geometry, arithmetic and the *trivium*, grammar, rhetoric, philosophy or logic, is seen to have had a fundamental influence on the organisation of schooling in European systems and, therefore, by association, educational systems across much of the world (Moon, 1993). These historical antecedents are now firmly rooted in contemporary understandings and bolstered by the work in historical sociology. Pierre Bourdieu, for example, has shown how academic communities appoint successors who are homogenised into the prevailing traditions (Bourdieu, 1988).

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* Within the United Kingdom there are the four education 'systems' of England, Wales, Scotland, and Northern Ireland. There are many similarities between these, but also important differences. This paper focuses on the English system.

Differences between systems, despite this common lineage, have emerged. Numerous categorisations exist to describe the contrasting traditions within Europe. Martin McLean has suggested a threefold division of encyclopaedic, humanistic, and naturalistic (McLean, 1990). These concepts, he suggests, evolve through time and place:

> Encyclopaedism has been powerful in France since the 1789 revolution and before. Yet it has been very weakly represented in England in the twentieth century. Naturalist views have been more strongly entrenched in England and Germany than in France. Humanism has retained a powerful place in England. Furthermore interpretation varies from country to country and has changed over time. English and German versions of humanism diverge sharply while the French version of encyclopaedism differs from that of Germany. (p. 15)

McLean argues that these types are cultural and sociological as much as philosophical, a view elaborated by Popkewitz (1997). He points to the problems of privileging, the physical places in which action occurred, the perception of time and space as containing a particular concreteness through a rational ordering of events and people's thoughts. Each event belongs to a unique social context with social reality determined by putting the single events together into an unfolding pattern. Of more interest, for Popkewitz, is the discursive linguistic patterns that focus on how systems of ideas change over time and how that change is related to issues of power. To interpret the schools of the day, he suggests, requires an examination of the continuities and breaks in the classifying principles of knowledge that are embedded in any contemporary structure. The discourses constructed about education in policy-making, reform reports, and so forth, from institutionally legitimate positions of authority, are not merely languages about education, they are part of the productive processes of society by which problems are classified and practices mobilised. There are dangers, therefore, in using categories or traditions. As a preliminary orientation, however, we feel this approach opens up some interesting lines of inquiry.

Some recent work has focussed on the contrasts in pedagogic traditions between the three countries. Moon (1998) has raised the way in which the usage of the words pedagogy and didactics, *pedagogie et didactique*, *Pädagogik und Didaktik*, have evolved over time. The English words didactic or pedagogue are almost wholly used in a negative way. Not so in France and Germany. The two major English language encyclopaedias of teacher education (Anderson, 1995; Houston, 1990) only have one index reference to pedagogy between them. At what point in time did these words with similar roots come to have such varied use and meanings so culturally different?

The comparative study of pedagogic theories and practices has been explored in a number of studies. Broadfoot and Osborn (1993) have suggested that the differing educational values of French and English primary teachers have a significant impact on practice. This was followed up by a further study (Planel, 1997) which further emphasised the way in which national socio-cultural and philosophical ideas influence approaches to teaching and learning. Sharpe (1997), in looking at French and English primary schooling, sees the difference as explained by the structures of consciousness and forums of consciousness which originally developed in an ecclesiastical context for religious purposes and have now been transformed over time into secular equivalents for educational and economical purposes. These, he suggests, have led to societal commitments to two dissimilar sets of moral values that underpin primary

education in the two countries. Kaiser (Kaiser, 1999) has compared English and German mathematics education at lower secondary level and points to pedagogic differences and differences in achievement in the two countries. The research that forms the basis of the empirical work reported in this paper (Pepin, 1997) investigated mathematics teachers' work in great depth in three European countries (England, France, and Germany) in terms of mathematics teachers' classroom practices, their educational backgrounds and beliefs, and the context in which they were working.

Pepin's research (1997) sought to develop an understanding of mathematics teachers' work at secondary level in three European countries: England, France and Germany. The original question underlying the study was whether it would be possible for mathematics teachers at secondary level in England, France and Germany to work in a country other than their own. Twelve mathematics teachers, four in each country, were 'shadowed' for two weeks each, in order to develop an understanding of their beliefs concerning teaching and learning, and their classroom practices. The work was carried out within the framework of an ethnographic approach, in combination with stimulated recall, in order to explore the context in which teachers were working; and how they conceived of and carried out their tasks in schools. A number of theoretical conclusions were drawn, including the nature of commonalities amongst mathematics teachers in the three countries; the influence of cultural educational traditions on teachers' pedagogies (Pepin, 1999a); the influence of varying ranges of teachers' tasks and responsibilities on their beliefs and practices (Pepin, 1998); teachers' beliefs about norms of social interaction between them and other role groups in the wider school community; and the influence of teachers' different beliefs about mathematics on their practices (Pepin, 1999b).

The literature on teaching and learning has given attention to the conditional or situational factors that shape teachers' (and pupils') educational experience (for example, Cole, 1990). Within any country and educational community, these factors appear in many forms and they are recognised to be influential. Yet, many of the conditions that exert influence on human thought and practice within classrooms are neither visible nor readily identifiable. Rather, these forces are the unseen and often unvoiced principles, philosophies and beliefs that unwittingly penetrate the educational enterprise. As Lortie (1975) asserted, teachers' pedagogical practice, in particular in the early stages of their professional life, is to a large extent influenced by their own schooling years and during thousands of hours of an 'apprenticeship of observation'. It is likely that each country gives its teachers and students a different 'apprenticeship of observation', which is unpinned by the educational trends and traditions of that particular country. There is, therefore, a complex relationship of forces with many sources of influence at work. For example, one of such source is the social context in which teaching takes place. We argue here that embedded in the context are the values, beliefs and traditions of a particular education system which may be manifested in adopted curricula, educational practices such as assessment and pupil grouping, and also in the expectations of students, parents, colleague teachers and administrators.

Whilst recognising the complexity of the forces at work within any education system, in this paper we have attempted to depict some of them. Thus, in order to understand the complexities of the issue, but at the same time not to lose the rich details of the research, we have chosen to look at the ways in which cultural knowledge traditions influence the curriculum, teachers' working environment, and their pedagogy.

The empirical work reported in this paper tentatively begins to explore the possible articulation of curriculum and pedagogy with contrasting socio-cultural and philosophical traditions. The paper raises a number of questions about how systems with such geographical proximity have come to evolve in contrasting ways. Was there ever a common root (the classical world) from which the divergence grew? Are there deeper historical and cultural meanings that need to be explored? And what relevance do these analyses have for contemporary enquiry?

2 Underpinning philosophies

The main underpinning philosophy of the **English** education system is **humanism**, with its associated principles of individualism and morality, amongst others. English education is said to be more child focussed and **individualistic**, and the nature of interaction between teacher and pupil is greatly emphasised. With respect to **morality**, there was (and is) the belief that education (originally only for the elite) should develop qualities such as fairness and integrity, and teachers have traditionally had a pastoral as well as an academic function. The teacher has traditionally been responsible not only for the academic but also for the moral development of the child. Thus, individualism and moral purpose of education are two of the traditional signposts for the philosophical underpinning of the English education system. One of the claims about humanism is that it is anti-rational and that England has in the past given 'little weight in education to rational, methodical and systematic knowledge objectives' (Holmes and McLean, 1989). This can be understood in the light of the philosophy of humanism which assumes that to acquire knowledge is not a logical, sequential and standardised process, as rationalists would claim, but learning is regarded as 'intuitive'. The acquisition of knowledge was the outcome of the interaction between the inherent qualities of the learner and different materials appropriate to the student's development. Therefore, the content of education should be selected in the light of individual differences.

There are two features in the philosophy of **French** education which help initial understanding of the system and the practices of those who work within it. Firstly, France is seen as one of the heartlands of **encyclopaedism**, with its main principles of rationality and universality, and the associated principle of *égalité*, transforming society in the interests of the majority of its members. The principle of rationality encourages the teaching of subjects which are perceived to encourage the development of the rational faculties (for example, mathematics). The principle of universality means that students study broadly the same curriculum (at generally the same time). The associated egalitarian views aspire to remove social inequalities through education and promote equal opportunities for all pupils. Secondly, the principle of ***laïcité*** traditionally leaves the social and moral education for the home environment, whereas intellectual and academic work is expected to be placed in school. Thus, traditionally teachers have been responsible for the academic development of the child, the parents and the church for their moral development. A move towards a more social role for teachers has been advocated for some time (Zay, 1994), not the least in reaction to the problems associated with the deprived educational conditions in the suburbs (*banlieu*) of many big cities.

The **German** tradition espouses more **humanistic views**, combined with naturalistic tendencies. Humboldt's concept of *Bildung*, the searches for 'rational understanding' of the order of the natural world represents a pivotal influence. It incorporates

encyclopaedic rationalism as well as humanist moralism, and attempts to express the unity of academic knowledge and moral education. Teachers, therefore, have traditionally held the two functions, that of academic specialist and, to a lesser extent, that of moral educator. However, the humanist rationale existed alongside a high respect for the study of mathematics and science subjects. The naturalistic view, in the German sense, combines the child-focussed approaches with the work-orientated. The 'wholeness' of education emphasised the belief that educative experiences are not necessarily intellectual. In Germany there is the cultural view that every occupation has dignity and that work of every occupation should be carried out with maximum commitment and thoroughness.

3 Curricular traditions

The contrasting curricular traditions in England, France, and Germany have been analysed in a number of studies (Holmes and McLean, 1989; McLean, 1990). The idea of a common curriculum for schools has come only recently to the **English** system and still retains no statutory authority over the powerful private school sector. The 1988 Education Reform Act which introduced a national curriculum has been scrutinised extensively (Moon, 1990; Whitty, 1990). It defined 'core' subjects, such as mathematics, English and science, and 'foundation' subjects, such as history, for example. The National Curriculum was therefore subject-based, and schools and teachers were obliged to follow programmes of study and attainment targets established centrally. In addition, national testing of pupils at ages 7, 11, 14 and 16 was introduced. In addition to the introduction of a national curriculum, the 1980s also saw the introduction of a common secondary school examination at 16+, the General Certificate of Secondary Education. Both emphasised the concept of 'differentiation' of focussing on where the child was, as opposed to where the whole class might be; an approach that had earlier been advocated in a major national report on mathematics education (Cockcroft, 1982). The National Curriculum only gives general guidance about the relationship between stages and levels of the curriculum and age. Pupils, it is argued, should work their way up through the levels at a pace to 'suit their abilities', a stance we argue that can be associated with the humanistic, individualistic tradition. The National Curriculum thus has a more individualistic than collective orientation.

Regarding the National Curriculum and its historical development, it can be argued that the way the National Curriculum was set up was influenced by the philosophy of individualism. Until the 1988 Education Act and the introduction of the National Curriculum, the curriculum or the syllabuses had been 'top-down'. This meant that low attainers had received a 'watered-down' version of the grammar school syllabus. It was assumed that a common curriculum for all students at secondary level based on formerly grammar school syllabuses would genuinely offer equal opportunity to all pupils. The Cockcroft Report (1982) and the subsequent HMI document (1985) suggest that the content should be differentiated (to match pupils' abilities) via extensions rather than deletions. This should allow pupils to progress as 'far and rapidly as their abilities will allow', and, it was hoped, to experience success rather than failure (HMI 1985). The National Curriculum involves a 'bottom-up' approach and individual pupils, so it was argued, could work their way up the levels in their own time – all approaches which reflect the humanist perspective with its principle of individualism.

There has long been acceptance of a centrally regulated curriculum in **France**. The form that this curriculum might take has often been a source of significant controversy (Moon, 1986), but public and professional acceptance of the desirability of a specified *programmes scholaires* receives little challenge. The underpinning encyclopaedic philosophy tradition encouraged the view that the majority of the children follow a common curriculum without greater variations at least up to the end of compulsory schooling. The encyclopaedic curriculum also allowed for a degree of equality of treatment of students (every pupil to have access to the same valued body of knowledge). However, within those traditions French education has been uneasy to accommodate individualistic and subcultural aspirations.

In France, traditionally the function of the school has been intellectual and academic, where social and moral education was left to the family (the principle of *laïcité*). Therefore, the concept of individualism which stresses the development of the whole person and physical, aesthetic, emotional and social elements of the human personality has not received the attention many now argue it should.

The key point to make is that the curriculum, formulated in terms of years, is built around an egalitarian expectation of collective rather than individualistic progress (compared to an 'individual' approach in England). These egalitarian views (to move everybody together) is also manifested in the practice of *redoublement* where pupils who fall behind expected levels of achievement have to repeat the whole academic year. Despite recent ministerial moves to abolish this practice the concept of *redoublement* exists in professional and parental cultures.

Germany has never, except during the Third Reich, had a centralised and uniform education system (Mitter, 1981), although in some senses the level of prescription within some of the regional *Länder* governments represents a structure very similar to the system of prescribed national curriculum binding on English and French teachers. In the Federal Republic of Germany the *Kulturhoheit* lies with the 16 *Länder* and each has absolute autonomy in matters of school education. The *Länder* have on a voluntary basis set up the *KultusMinisterKonferenz* (KMK) as a forum where they seek to co-ordinate the structures, institutions, curricula and leaving certificates of their school and higher educational systems.

Traditionally, the two knowledge traditions, humanism and the naturalistic view, set up the basis for the structural organisation of the education system in Germany, the establishment of the originally divided secondary system (*Hauptschule* and *Gymnasium*) which later developed into a tri-partite system. The *Hauptschule* tends to reflect the naturalistic stance where teachers are expected to adopt child-focussed approaches and to prepare students for later vocational training; whereas the *Gymnasium* represents the humanistic ideal of *Bildung*. In 1964 the middle school structure (*Realschule*) was introduced with an encyclopaedic curriculum. At the same time a core curriculum for secondary education (all school types) was introduced – an encyclopaedic idea. However, encyclopaedism never became the dominant epistemology in Germany. McLean (1990) asserts that rationalism is not so central to German conceptions of ultimate knowledge as it is to the French and that at the highest level reason is subordinate to intelligent insight into the nature of humanity.

Mitter (1981) has pointed to the distinction in German educational theory and practice between the two 'core' terms, *Lehrplan* (syllabus) and *Didaktik* (didactics), which relate to the term 'curriculum', a distinction also found in the French system.

Kansanen (1995) suggests that didactics in Germany has always been a form of philosophical thinking, theorising and construction of theoretical models, although contemporary approaches are informed by learning theory. The syllabus is the 'normative framework for what has to be taught and learnt in schools' (Mitter, 1981). It is usually restricted to the definition of aims and the specification of subject matter. According to Keitel (1992) the syllabi are a mixture of prescriptions (of certain topics) and recommendations (of methodological approaches, for example), and that commercially produced text books have to be closely related to the syllabi. On the other hand the Anglo-American term 'curriculum' refers to an integrated model including several or all of the following: the definition of aims and objectives; the selection of subject matter; the choice of adequate organisational forms, media and methods; the implementation of the materials; and the evaluation of the implementation process (Mitter, 1981).

In 1967 Robinsohn introduced the term 'curriculum' into the 'didactic' debate and since then the terms 'curriculum' and 'curriculum theory' have been competing with the traditional German terms in educational discussions, with the result that sometimes the term 'curriculum' is used for 'syllabus' and 'curriculum theory' for 'didactics' (Mitter, 1981).

The key point to make is that there is no all-German National curriculum; and that the German secondary curriculum is divided into years and school forms. The curricula and syllabi may be different in each *Land*, although the establishment of the federal KMK has influenced the curricula in such a way that there has been a co-ordination and harmonisation between the different *Länder*. More recently there have been curricula for a whole age range (for example, years 6 and 7) and with guidelines for the different school types to enhance or reduce the syllabi. The *Länder* also provide a list of approved school books from which teachers (within their schools) can choose. Thus, for German teachers, textbooks reflect official (and binding) syllabi and supporting pedagogical guidelines.

The link, therefore, between the broader education traditions of the three countries and curriculum is an important one. In the following sections we ground the general analysis in an investigation of the work of secondary teachers of mathematics.

4 Cultural traditions and systemic features

Tasks and responsibilities

Teachers in the three countries had a wide range of responsibilities. Beside the task of form tutor, teachers held positions of responsibility within mathematics, general school administration, or staff councils. In **France**, the emphasis was on the teaching of the subject (mathematics) with little or no responsibilities for the pastoral care of pupils or for the wider school community. The expectation for French teachers' role in the classroom was concerned with academic learning of mathematics and children's academic performance in school. Amongst **German** teachers, it is necessary to differentiate between the *Hauptschul* and the *Gymnasium* teachers because of their different role as form tutor in terms of pastoral care. Whilst *Hauptschul* teachers' responsibilities tended to move towards more pastoral care duties, the *Gymnasium* teachers were centrally subject specialists with some pastoral

care duties. In general teachers were responsible for the academic side of teaching with some defined tasks in terms of pastoral care. **English** teachers had many more responsibilities than their French and German colleagues. English teachers' tasks encompassed the whole child (academically as well as morally) and they were responsible for the academic as well as the pastoral side of schooling. It appeared that a climate was created where the pastoral care and other non-teaching responsibilities became at least as important as the preparation and teaching of the subject. This in turn gave teachers less time to reflect on the processes involved in mathematics teaching and learning; there were simply too many other things to think about.

These differences can be understood in the light of the national cultural tradition discussed above. In England the individualistic view encouraged teachers to attend to the needs of every individual child, and the moral dimension of the work implied that teachers should spend a considerable amount of time on pastoral responsibilities – all approaches that could be said to derive from (English) humanistic principles. French teachers, reflecting the encyclopaedic view of rationality, were expected to prepare their lessons in such a way that learning experiences were seen as mind-training for pupils. The principle of *laïcité* freed teachers from major pastoral duties, and they could concentrate on the preparation and teaching of their lessons. In Germany, (Humboldt's) humanistic views encouraged teachers to combine academic teaching and the moral side of education. Depending in which school form of the tri-partite system teachers were working, their responsibilities in terms of pastoral care were greater (*Hauptschule*) or lesser (*Gymnasium*).

Institutional features

Compared to the French and English **system of schooling** which is predominantly comprehensive, the German schooling system is predominantly tripartite. The three school forms of the tripartite system were originally associated with German knowledge traditions: the *Gymnasium* with the humanist tradition according to Humboldt; the *Hauptschule* with naturalistic traditions; and the 'newly' established *Realschule* with 'newly' adopted neo-encyclopaedic traditions.

In terms of **organisation in groups**, to take another example, it can be argued that the practices of streaming and setting pupils were influenced by the schooling system (which, in turn, was underpinned by cultural traditions). In Germany the schooling system was tripartite and therefore a selection had already taken place. This in turn had an effect on the ways schools chose to group pupils. For example, in the German *Gymnasium* students were taught in form groups, and these form groups were put together on the basis of catchment area; pupils who came from the same primary school or village were grouped together. The only exception to this grouping was in the options that pupils chose, in the sense that those pupils who chose Latin as a foreign language were grouped together in one form group, and those groups were generally regarded as academically high achieving groups. In the *Hauptschule*, pupils were also taught in form groups, with the only exception of some 'A-courses' which had all the high attainers (in one particular subject) of that year grouped together. In France, in general all pupils were mixed together in form groups, with the same consideration of catchment areas. Here the Latin classes were also regarded as the academically high achieving groups. Further up the school (from year 9 onwards) pupils chose their options (which then determined a form group for all subjects) and were taught in those opted form groups.

In England, different schools used different systems, and within many schools the departments could choose what they thought was the best way of organising the different teaching groups. In mathematics most students were set according to their achievement in any particular subject. Students were divided into different achievement sets and teachers provided a different mathematical diet for each one – a strategy that derives from an individualistic approach. As pupils were generally grouped in achievement sets, lower achievement set pupils worked through the National Curriculum at a slower pace than the higher achievement sets. This led to the situation that each pupil's mathematical experience was determined by the level they reached in the National Curriculum, whether or not this led to a coherence of mathematical experience or not.

Another example concerns **pupils who fell behind expected levels of learning.** In France and Germany pupils were expected to reach a certain target at the end of every academic year. For example, in France there were national targets, 'required skills' , in every year. Yet, there were differences of opinion amongst teachers about the benefit of *redoublement* and there seemed to be a general lack of consensus about the whole issue. Teachers were unanimous that it did not make sense to let pupils repeat a year, if they seemed to be failing repeatedly, in which case they were passed through the school as soon as possible. In Germany there were different targets for different school types (for every year). Only in the *Gymnasium* was it apparent that it would be used to determine whether a pupil could stay in the school or move to another school type (*Realschule* or *Hauptschule*). Teachers could advise and ask pupils to repeat the year, if they had fallen behind expected levels of learning. In England pupils reached levels of the National Curriculum and some progressed further than others within the same year. The focus was on the individual, on how the individual pupil advanced within their capabilities. Pupils who did not achieve expected levels (of a set) were put into sets where the targets were lower. This led to a particularity which was not evident in France or Germany, that English pupils could leave school after year 11 whichever level they had reached.

In France, almost all pupils were expected to reach the same level in mathematics each year. Moreover, the mathematics in France was at a fairly abstract level. In England, lower sets meant pupils were set less ambitious targets. In Germany, different school types meant that low attainers were working with a different curriculum, but within one school type they were expected to reach the same level of mathematics each year. Overall, therefore, different traditions did appear to influence the way teachers' roles have evolved in distinct ways in the three countries. The traditions, evolving from a philosophical basis, are now manifest in structural forms that define and constrain pedagogic practice.

5 Cultural traditions and pedagogy

In this final section, the findings on teachers' classroom principles and practices of mathematics teaching are discussed in the light of underpinning national cultural traditions of the three countries.

Principles of teaching

In **England**, situations where pupils discovered multiple solutions or investigated new solutions which required reasoning were rare and usually reserved for 'investigation' lessons. In English classrooms the major aim was to convey a mathematical concept and let pupils receive as much practice as possible. The emphasis was on the skill side of mathematics and results – all approaches that can be traced back to (English) humanistic philosophies which give less emphasis on the idea of training the mind.

French teachers focused on developing mathematical thinking which included exploring, developing and understanding concepts, and mathematical reasoning. They tried to forge links between skills and cognitive activities (small investigations) on the one hand, and concepts on the other. Relatively little time was spent on routine procedures. Pupils had to reason (sometimes with rigorous proof) their results and they were given cognitive activities to discover notions of mathematics for themselves. The emphasis was on process and not the result. These approaches reflect the ideal of rationality (in encyclopaedism) embodied in the French phrase *formation d'esprit.*

In order to find out what pupils had understood, French teachers analysed the whole class, in addition to giving regular tests and some marked homework (in class or otherwise). In their view, this was giving them a good overview of what pupils had understood (or not), in order to be ready to prepare for the next lesson. In addition, they seemed to feel that the preparation of the lesson was more important than marking and would potentially provide for a stimulating lesson. French teachers spent considerable time on selecting 'suitable' approaches for introducing a notion and 'appropriate' exercises for classwork.

In **Germany**, the view of mathematics which teachers revealed was relatively formal and included logic and proof. The teacher's role was that of the explainer who taught the structure of mathematics through an 'exciting' delivery and by adapting the structured textbook approach meaningfully. In particular in the *Gymnasium* (grammar school) where expectations were higher, topics were discussed in great depth. Logical thinking, the core of German humanist tradition, was regarded as important. The invention of new solutions or procedures was not encouraged, and lessons appeared relatively formal and traditional in terms of their mathematical content.

In the humanist spirit, academic knowledge is transmitted in a structured and logical way, and the emphasis was on understanding. This, it was assumed, could be done with a class taught approach, where the interactive element involved pupil understanding. There was a tradition of high academic standards (*Bildung* and *Allgemeinbildung*), in particular in the *Gymnasium*. But there was also a recognition of the value of practical work, particularly in the *Hauptschule*.

There was also a certain 'thoroughness' and a sense of 'quality' which teachers were trying to achieve. It seemed to be more important that pupils understood than to rush through the syllabus. The literature parallels this goal of thoroughness with the French goal of 'rational intelligence', for example.

Classroom practices

Teachers in all three countries used whole-class teaching to some extent, but there were also important differences. When **English** teachers used whole-class teaching, they explained a concept from the front in a relatively didactic way. Unless the lesson took the form of an 'investigation', most English teachers introduced and explained a concept or skill to students, gave examples on the board and then expected pupils to practice on their own in small groups while they saw their duty to attend to individual pupils. In England there was a clear view that teachers had to attend to the need of the individual child. **French** teachers expected the whole class to move forward together, reflecting egalitarian views. They tried to pose thought-provoking problems, expected students to struggle with them, and then drew together ideas from the class and the whole class discussed solutions. **German** teachers used a more conversational style where they tried to involve the whole class in a discussion. The emphasis was on understanding, part of Humboldt's humanistic ideals, and often pupils' mistakes in homework or class exercises were used to check and deepen pupil understanding. Typically, a teacher brought pupils to the board and discussed their mistakes and understanding with the whole class. The tradition of the country encouraged teachers to teach the class as a whole, and they were expected to move pupils (possibly the whole class) to a different level of cognition.

There were also teachers' **routines** which were culturally determined. **English** teachers marked every pupil's book about once a week. This was a routine which could be understood by teachers' concern for analysing individual pupils' difficulties. They felt that it helped them to analyse diagnostically pupil understanding, and, as a result, to identify any problem areas that individual pupils might have. They also wanted to give pupils individual feedback. This was expected of teachers by their heads of department, by heads of school and by parents, for example. **French** teachers traditionally asked pupils (and teachers are also expected by head teachers) to keep a '*cahier de cours*' (lesson book) and a '*cahier d'exercices*' (exercise book). This tradition involved certain routines. The *cahiers de cours* were used to write down the main concept of the lesson in a summarised form and possibly a worked example during or towards the end of the lesson. Teachers commented that with the *cahier de cours* those pupils who did not understand during the lesson had the chance to learn at home with the help of the things recorded in the *cahier de cours*. French teachers were trying to teach pupils as a whole class and, although they were aware that not everybody might have understood at the end of the lesson, they knew that at least pupils recorded the main points of the lesson in their *cahier de cours*. Pupils might have got to different stages in the lesson, but at the end of it, everybody was writing the statement and an example in their *cahier de cours*, so that they could learn and revise the lesson at home if necessary. **German** teachers started nearly every lesson with the correction of homework, with the whole class. It was a tradition in Germany to go over the homework, because it was considered to be the way in which teachers assessed in a diagnostic way whether understanding (of what had been done previously) had taken place. This was done with the whole class and regarded by teachers as a manageable activity which helped them to assess pupil understanding as

well as pupils to gain an understanding together. At the same time this routine was used for revision purposes, providing an introduction for what was to come.

Conclusion

The findings of the research demonstrate that national cultural traditions are a major determinant and influence on education systems in general, on national curricula, and on teachers' pedagogies in schools. The differences between systems do, therefore, reach down into the pedagogic practices of teachers. Looking at the literature there is a powerful argument that systems are the main determinant for differences between countries. What is often neglected is that national cultural traditions are the philosophical base on which the systems are built. These traditions depend on philosophical beliefs about education, but once in place they become part of the structure of the system and teachers have to work within them. These findings suggest that curricula and pedagogies need to be analysed and understood in terms of the larger cultural context, if any lessons are to be derived that can be generalised across systems. Implicit in these varied perceptions are contrasting ideas about the forms of human learning. How such located perceptions relate to the increasingly global debate about the nature of learning is a further question worthy of exploration.

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