THE CHILD'S CONSTRUCTION
OF THE CURRICULUM

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Abstract: The curriculum both as a whole and in its parts can be understood as a social representation. Teachers' social representations of the curriculum, instantiated in classroom practice and discourse, provide the resources from which children internalize the curriculum. Children re-construct the curriculum as an active process that depends both on the development of their own socio-cognitive resources and on the structuration provided in specific classrooms.

The paper investigates how children in classrooms with different types of structuration represent the curriculum and how these change over time. Comparable case studies were carried out in schools chosen to reflect three types of curriculum organization. Twelve classrooms took part in the study including two parallel classrooms in each school and at each of two year groups. Ethnographic investigations were employed to compile a typology classroom practices used to map the range and type of curriculum structuration in each classroom. Children's representations of the curriculum were investigated through a sorting task. Analysis focused on both children's performance and their talk about the task.

Findings demonstrate significant differences in the classificatory systems used by children according to year group and type of curriculum. Conclusions suggest: that as children gain experience of schooling they construct more elaborate social representations of the curriculum regardless of curriculum type; that between the two year groups categories undergo qualitative transformations and that curriculum structuration becomes more a feature of the way the older children re-construct the curriculum, specifically the collection type curriculum which facilitated the re-construction of a markedly different curriculum in comparison to the other types.

INTRODUCTION

THE CURRICULUM

Successful learning is not simply a matter of acquiring knowledge, but involves being able to access knowledge in a form that is appropriately framed and organized. The curriculum is an organizing device that determines the way knowledge is framed and classified within the school context. The wider study, from which this work is drawn, investigated how the framing and organization of knowledge is communicated and recognized through everyday classroom activity.

Within any society the structure of the curriculum is highly contested because it influences who has access to, and to what kind of, knowledge. The curriculum both as a whole and in its parts can be understood as a social representation (Moscovici 1976, 1984, 1988). The degree of differentiation within the organisational structure of the curriculum at any time and in any society can be viewed as the outcome of competing interests within different factions of society. In Britain, a deep-rooted Liberal tradition upheld the belief that a structured curriculum based on forms of knowledge would lead the child towards rationality. This began to be questioned by factions within society opposed to the brutal practices found in Victorian elementary schools towards the end of the nineteenth century (cf. Jenkins 1990). A series of experimental schools set up by intellectuals around 1920 demonstrated a spirit of optimism that incorporated ideals of freedom, individuality and independence. Their 'progressive' curricula were unstructured with an emphasis on learning through action and specifically through play. Jenkins (1990) has traced the construction and influence of progressive discourse(s) within education through an analysis of historical texts. Initially, progressive ideas circulated within elite, marginal and middle-class groups. Jenkins argues that it was through these groups' ability to mobilize and developed structures, such as a journal called *The New Era* and a fellowship, the New Education Fellowship, that progressive ideas gained popularity. It has been argued that by 1939 progressive discourse(s) dominated the field of education (See Selleck, 1972; Jenkins, 1990). Later, events of two World Wars induced deep disillusionment in man's capacity to be rational and progressive discourses were reworked for a different purpose. It was not until after the Second World War, and a constellation of changes, including experiences of evacuation (Gardner and Cunningham 1997) that the kinds of pupil-teacher relationship articulated in progressive discourses could be found in classrooms. So called 'child-centred' curricula were organised around superordinate categories known as 'themes' or 'topics'. The *Plowden Report Children and their schools*, published in 1967 has often been said to represent the height of the progressive vision in Britain.

This study was conducted shortly after the introduction, for the first time in Britain, of a mandatory National Curriculum.[2] Official directives were beginning to drive the

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[2] Prior to the Education Reform Act (ERA) of 1988, there was no mandatory official curriculum in England. Government control over educational practice and performance was mediated through Her Majesty's Inspectorate (HMI), a relatively autonomous body, and through Local Educational Authorities (LEAs) which had their own educational advisors recruited from within the teaching body. As a professional group, teachers enjoyed a sense of ownership over the content and structure of the curriculum. ERA defined the mandatory National Curriculum in terms of "core and other foundation subjects". The core was identified as English, mathematics and science and the other

organisation of the primary school curriculum away from topic and thematic structures towards a more classified curriculum. Progressive discourses were being re-appropriated to counteract the bureaucratic moves of the state seen to constitute an attack on teachers' professional identity. Terms such as 'spontaneity', 'creativity' and 'potential' that had been around in the 1890's were this time being used by teachers to bolster an image of the child as 'overburdened' due to the demands of the National Curriculum. In their secondary adjustments (Goffman, 1961), teachers portrayed themselves as protecting the child from the ravages of a classified curriculum. In consequence, a representation of the child as vulnerable, unfinished and endangered had been heightened.

Representations of the child and the curriculum can be seen as two sides of the same coin. Underlying the structure of the curriculum in any society is a culturally specific category of the person or the citizen (c.f. Oyserman and Markus 1998). When considering the primary school curriculum it has to be recalled that childhood represents a particular state, a 'compensatory world' (Chambart de Lauwe 1984 p. 188) into which society projects its fears and hopes for a better future. Contradictory views about man as good/evil, as rational/irrational come to influence the structure of the curriculum in any era. Traditional and child-centred curricula incorporate different conceptions of knowledge and of the knower. In the former, knowledge is external to the child and pedagogic practice emphasizes forms of knowledge. In the later, knowledge is thought to arise from within the child and pedagogic practice emphasizes ways of knowing. As an organising device, the curriculum determines the boundary between what should be imposed on the child and what should not be imposed at any given time. Two opposing representations of the child, the Dionysian and the Apollonian (Jenks 1995) have been associated with two codes that give rise to two opposing types of curriculum in Bernstein's (1971, 1974, 1990, 1996) theory.

Bernstein's theory is based on a distinction between code and its realisations, in which realisations are "a function of the culture acting through social relations in specific contexts" (Bernstein, 1974, pp. 173-4). Codes operate at the level of culture and the theory explains how some codes and not others come to dominate in society. Codes regulate relationships both between and within contexts. As the theory has developed the principles of classification and framing have been used to translate codes between different levels of analysis.

The principles of classification and framing are used to identify different kinds of curriculum structure and pedagogic practice that relate to forms of social organisation. The principles of classification and frame are used to translate between levels of analysis such that is possible to identify different forms of social control in everyday classroom practice. Classification refers to the nature of the differentiation between contents; whether insulation is strong or weak. Framing refers to the degree of control teachers and pupils have over the transmission of knowledge; to the strength of the boundary between what may be transmitted and what may not be transmitted, in the pedagogic relationship. Different types of curriculum entail different forms of control, which facilitate modalities of social interaction and practice. Difference in pedagogic

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foundation subjects were technology, history, geography, modern languages, music, art and physical education.

practices can be located in the "*manner* in which criteria are transmitted" (Bernstein, 1978/1997, p. 59). Pedagogies with explicit instructional criteria are said to be visible, whereas those such as the progressive pedagogies have invisible pedagogies. Visible pedagogies are realised through strong classification and strong framing and invisible pedagogies are realised through weak classification and weak framing. The activities that teachers choose, how they organise these and the ways in which they introduce them to children provide the recognition and realisation rules from which children construct representations of the curriculum.[3] This conceptual framework can be used to model everyday classroom practice and will be considered in more detail in the section on methodology.

THE CHILD'S RE-CONSTRUCTION OF THE CURRICULUM

Classroom cultures are maintained and modified through an active process of construction and teachers' practice and discourss determine what counts as legitimate knowledge in different school contexts. Teachers' everyday activities and practices mediate the school curriculum and in one sense, the lay-out of furniture, choice of text books and styles of interaction can be interpreted as a projection of individual teacher's social representations. The gradual induction into school subjects relies on establishing reciprocity of meaning between the child and the teacher. This is a continuous process of approximation, which requires that children come to recognize and represent school knowledge according to teachers' categories. Teachers rarely explicitly articulate this structure, so the child needs to go beyond the specific content of teachers' discourse to recover the curricular categories implicit within. In order to make sense of classroom life children, like adults, have to order and classify it.

What remains implicit for the teachers becomes a more explicit focus of cognitive elaboration on the part of the children. As Duveen (1997) has suggested, where children are engaged in the acquisition of social knowledge, they will "articulate representations which reflect their cognitive development rather than being the immediate reflection of adult thought" (p. 77). It becomes necessary then to view the constructive efforts of the child as yet another level in the mediation of social structure.

Cognitive structures, understood here as social representations, are not viewed as autonomous developments, but rather as internalized forms of practice related to particular contexts. In this sense, the cognitive structures which children develop serve to locate the child in a social field and they also have symbolic significance, providing an important source for developing social identities (Duveen, 1997; Duveen & Lloyd, 1986). Like all symbolic processes, the values associated with social identities are

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[3] Recognition and realisation rules are concepts from Bernstein's (1981, 1990, 1996) theory. Recognition rules are the 'clues' that children need to determine what counts as a specialist context, in other words, a school subject: "Recognition rules create the means of distinguishing and so recognising the specialist that constitutes a context", (Bernstein, 1990, p. 15). Some of the first recognition rules derive from the ways in which the school day is divided up into periods of time and specialist spaces. Realization rules tell children what constitutes subject competence: "realization rules regulate the creation and production of specialized relationships internal to the context" (Bernstein 1990, p. 15). These rules suggest acceptable forms in which subject principles may be demonstrated, for example, the form that written work may take, acceptable kinds of oral communication, types of movement in PE and the forms of artefact that may be produced in art and technology.

constructed and mediated phenomena open to challenge, dispute and negotiation within the dynamics of social life.

The classroom can be viewed as a semiotic field with a range of linguistic and non-linguistic signifiers. The objects, which comprise the material culture of the classroom, become marked with significance and maintain the boundaries between specialist contexts. Social marking "connects relations of a cognitive order with those of a social order" (Mugny, De Paolis and Carugati, 1984 p. 137). Children comprehend the significance of social marking by developing social representations of the curriculum. Lloyd and Duveen (1990) point out that while it may be assumed that adults have acquired the cognitive instruments required for different kinds of representing, for young children this is a developmental process linked to signification. How children internalise structuration varies between different moments in the formation of curriculum categories.

Lloyd and Duveen's (1990) developmental semiotics (Lloyd and Duveen, 1990) outlines the processes of signification in which the relation between the signifier and the signified undergoes transformation. Different relations between the signifier and signified characterise the genetic development of social representations (Piaget, 1951; Wallon, 1970). Piaget defined 'representation' as the 'simultaneous differentiation and co-ordination between signifiers and signified'. Piaget viewed the changes in the relation between the signifier and the signified as qualitative changes which in turn laid the foundations for new cognitive resources for understanding the world. The material culture of the classroom acts as scaffolding (Wood, Bruner and Ross, 1976) for the child's entry into school subjects. The code relating signifiers (objects in the material culture) and the signified in sign systems is furnished by social representations. Ideally, everyday classroom practices provide structuration which children use to elaborate curriculum categories and to differentiate activity with increasing complexity.

Initially, differentiated signification remains embedded in the immediate context of activity. The gradual process by which children differentiate functions and contexts relates to what Vygotsky referred to as 'the decontextualisation of semiotic means' (cf. Wertsch, 1985). Lloyd and Duveen have point out that it will be in the contexts where children are offered the greatest amount of scaffolding that they will develop signs.

Children re-construct the curriculum first through developing socio-cognitive resources and second according to how the curriculum is made available to them through classroom practice. The developmental aspect of this study set out to investigate the relationship between curriculum structuration and the development of children's cognitive strategies. Schools with different types of curriculum were chosen to take part in the study. This paper presents empirical findings from one of two psychological instruments specifically designed to investigate children's representations of the curriculum.

METHODOLOGY

RESEARCH DESIGN

Comparable case studies were carried out in schools chosen to reflect three types of curriculum organization according to Bernstein's typology of curriculum types (1971,

1974, 1990). Bernstein characterized two forms of curriculum organization, which capture two opposing forms of power and control: the collection type and the integration type. A collection type curriculum provides a conceptual model for characterising traditional curriculum organized according to subject categories (for example, English, mathematics, science, history and art). Integration type curriculum, models progressive or child-centred curriculum organized according to themes or topics (for example, Health and Fitness, Light and Dark and Explorers). Three types of curriculum were used in this study: a collection type, a mixed type and an integration type. The mixed type refers to a curriculum organized according to both discrete subjects and topic categories. For example, mathematics, language and reading might be studied in the morning while the afternoon would be given over to topic work.

Two year groups were studied; Year 1 (children 5/6 years) and Year 5 (children 9/10 of age) and there were two parallel classrooms in each school and at each year group giving a total of twelve classrooms as illustrated in table 1.

TABLE 1

Classrooms by curriculum type

	Integration	Mixed	Collection
Year 1	Copse School	St Helen's School	Dart Infant School
	Classroom 1	Classroom 3	Classroom 5
	Classroom 2	Classroom 4	Classroom 6
Year 5	Copse School	St Anne's School	Dart Junior School
	Classroom 7	Classroom 9	Classroom 11
	Classroom 8	Classroom 10	Classroom 12

The study comprised ethnographic investigations lasting two years. The ethnography was motivated in that the object of investigation, the curriculum, was pre-selected. The first phase involved extensive classroom observation. In the second phase the sorting tasks were designed and administered to approximately ten boys and ten girls in each classroom.

MODELING CURRICULUM STRUCTURATION

Having chosen schools with different types of curriculum, the first requirement was to model curriculum structuration. The aim was to generate a model, which recognized the dynamic nature of classroom life, yet captured, and 'fixed' practice at a particular moment so that the cultural significance embedded in the practice could be investigated.

The model was constructed after the ethnographic work was completed. It comprised a typology of recognition and realisation rules. Classroom life was described according to eight semiotic systems: place, equipment, curriculum structuration, time intervals, setting and grouping, space and movement, wall displays and teachers' classroom discourse. These systems incorporated two poles around which material culture, practice or discourse revolve, one tending towards openness and the other towards closure. When a practice tended towards closure it was said to be visible and when it tended towards openness it was said to be invisible. One of the subsystems translated curriculum structuration into recognition and realization rules via what I have called a 'cycle', defined as a procedure with an identifiable beginning, middle and end. Table 2

illustrates how this was operationalised for two classroom activities - reading and mathematics - in the junior classrooms.

TABLE 2

Curriculum structuration for 'Reading' and 'Mathematics'

Activity	Beginning	Middle	End
Copse infant classroom 1			
Reading	set time each day reading book, book bag reading log	reading a book reading with a friend	end of period read to teacher comment in log take books home
Mathematics	no set time instruction to a group on carpet at specific table yellow exercise book	worksheets sums using counters games	when sheet finished marked by teacher ticks and crosses
St Helen's infant classroom 3			
Reading	set time each morning reading book, book bag, log reading 'toys' on carpet	read book read with a friend choose books	when teacher says teacher comments reading log take books home
Mathematics	irregular times colour coded exercise book conkers, buttons, cards differentiate worksheets differentiated groups	sums writing came cards work with helper	when finished marked by teacher stickers
Dart infant classroom 5			
Reading	regular, each week go to corridor colour coded scheme book bags, book log	read to helper read to teacher take books home	verbal feedback comment in log star for finishing wear star on uniform
Mathematics	set times worksheets yellow school pencil	worksheets sums	when sheet finished teacher marks work
Copse junior classrooms 7 and 8 (integration curriculum)			
Reading	set time each day choose place to sit choose reading books, reading log, book bag	read pages 30 minute session	comments in log Feedback from teacher, helper & parents take books home
Mathematics	one set time other irregular move to other classroom maths exercise book white board	various worksheets have to calculate write	need to get right answer time not specified verbal feedback hand in exercise books
St Anne's junior classrooms 9 and 10 (mixed curriculum)			
Reading	set time each day choose place to sit reading scheme reading log, book bag	read pages 30 minute session	comments in log feedback from teacher take books home

TABLE 2 CONTINUED

Mathematics	set times each week differentiated instruction grey exercise book differentiated text books pencil, ruler, eraser	write calculate have to get right answer	exercises to complete hand in book teacher marks work
Dart junior classrooms 11 and 12 (collection curriculum)			
Reading	not a regular activity		
Mathematics	set lessons minimal instruction maths exercise book own, pencils, rulers etc. maths text book scheme	working from differentiated text called to teacher to have work marked	end of lesson hand in book

TABLE 3

Summary of selected recognition and realisation rules

Class-room	Place[1]	Equpmt 1[2]	Equp mt 2[3]	C S[4]	Time[5]	S&G[6]	Mvmnt[7]	Display s[8]	Discrs[9]
Copse Infant 1	variable	communal tray	4	7	3	3	variable	child	individual
Copse Infant 2	variable	communal tray	4	8	3	2	variable	child	individual
StHelen's Infant 3	variable	communal tray	6	10	4	6	variable	variable	language of emotion
StHelen's Infant 4	variable	communal tray	6	9	6	6	variable	variable	language of emotion
Dart Infant 5	set place	At own table	6	12	4	5	restricted	variable	subject
Dart Infant 6	set place	At own table	6	10	4	1	restricted	variable	subject
Copse Junior 7	no set place	communal tray	4	8	5	1	not restricted	child	individual
Copse Junior 8	no set place	communal tray	4	8	5	1	not restricted	child	individual
St Anne's Junior 9	no set place	communal tray	7	10	5	3	not restricted	variable	individual
St Anne's Junior 10	set place	communal tray	7	10	5	2	variable	variable	individual
Dart Junior 11	set place	At own table	9	12	5	1	variable	curricul um	subject
Dart Junior 12	set place	At own table	9	12	4	1	restricted	curricul um	subject

Notes: 1) Place: Children have a set place to sit
2) Equipment 1: Where personal property is kept
3) Equipment 2: Number of exercise books
4) Curriculum Structuring: Activities with a beginning, middle & end, per week
5) Time Cycles: Number per day
6) Setting & grouping: Number of clues (e.g. differenti-ated worksheet)
7) Movement: Restricted, variable & not restricted
8) Wall displays: Curriculum oriented, variable & child- oriented
9) Discourse: Subject criteria or individual difference made explicit, (other)

Structuration was relatively strong for these activities except for reading in Dart junior classrooms. Mathematics was most visible in Dart classrooms where children had a timetable, regular lessons, an identifiable textbook and lessons that followed a routine. In contrast, children in Copse School had no timetable, unpredictable lesson times, a range of texts and varied forms of instruction. The model allowed different patterns of structuration to be identified and to be related, via visible and invisible pedagogy, to forms of social control. In general, more curriculum structuration was available in the Dart Schools. Table 3 provides a crude summary of a section of recognition rules in order to highlight differences among classrooms. A full account of the model can be found in Ivinson 1998.

In both Dart Schools children had their own desks which they sat at for nearly all their lessons. They had significant quantities of personal belongings, which they stored below their desks. Teachers in Copse School spoke of the lack a rigid timetable as an expression of the values of freedom and choice. Equipment, such as rules and scissors were communal and children kept their personal belongings in centralized trolleys. Teachers often told children that they could choose where to sit.

INVESTIGATING CHILDREN'S REPRESENTATIONS OF THE CURRICULUM

During the ethnographic phase the precise semiotic marking of objects used for different activities was recorded. Twenty objects used regularly for mathematics, language, reading, art and physical education and six other activities were identified for use in the sorting task. Each object was photographed separately against a white background. The task was administered through individual interviews conducted in a quiet place outside the classroom. Children were presented with twenty objects from the material culture of their own classroom and asked to sort them in any way they wanted. After the first sort they were asked to sort the objects a second time using a different method, if possible. After each sort they were asked to justify their groupings. Their talk was audio recorded and later transcribed in full. The sorting task yielded both quantitative and qualitative data. The number and content of groupings produced by children in each classroom was investigated and cluster analysis provided a descriptive analysis of the objects that were grouped together most frequently in each classroom. Talk used to justify groupings was coded using the coding scheme described below. Quantitative data was then subjected to statistical analysis.

CODING CHILDREN'S TALK

The coding scheme was devised after the psychological instruments had been administered and drew upon the full corpus of talk. Talk was coded using four discrete categories - feature, function, structure and other. Lloyd and Duveen's (1990, p. 28) developmental semiotics outlines the importance of distinguishing between different types of signification (signals, symbols and signs). The three principal categories should be viewed as a developmental scale, indicating different forms of signification, running from context embedded to context dis-embedded.

Symbols are signifiers, which are linked to an object through a *personally motivated* relation. Feature and function talk indicate the use of symbols. Feature talk arises when

the child is only able to attend to the surface features of objects and relies on perceptual clues. Social representations are tied to surface features of objects, such as shape, colour and position. Although equipped with resources for interpreting classroom life, use of feature talk implies that these are relatively limited.

Function talk indicates another type of signification characterized by the use of action verbs. Children spoke about functions such as fetching or replacing equipment, understanding where to stand or sit at appropriate times, writing and doing work. Social representations of the curriculum were anchored in the roles and functions of everyday classroom practice. Subject names were used as adjectives such as, 'English book'. Self and objects were not clearly differentiated demonstrating that the relationship between signifier and signified was context-dependent.

A sign is defined when the relation between the signifier and the signified rests on *public* convention. In order to represent the curriculum according to adult conventions children require sign use. Structure talk indicates the use of signs. Talk was characterised by the use of abstract verbs indicating mental states, such as learning, concentrating, practicing. Children would often name a National Curriculum subject and describe aspects of it. Social representations of the curriculum started to encompass notions of the past and the future, of non-school contexts and reflexive understandings of the self as a learner. The relationship between the signifier and the signified was context-independent.

Examples of each category and its subcategories (included to facilitate the identification of three principal categories during the process of coding) are presented in table 4

TABLE 4

Coding scheme for children's talk

	Feature talk		
1	*Context dependent based on visual perception.* Includes naming objects from the photographs, listing objects on the photographs, and classifying them by colour, shape, size or orientation.		
1a	*Non-school objects:*	Red on it, red on it.	year 1
		All paper	year 1
		Made out of mental	year 5
		These are things that are hand held	year 5
1b	*School objects*	Book group	year 1
		That's money and that is the same colour as the pencils	year 1
		Both to do with words	year 5
		Stationery, pens and paints	year 5
	Function talk		
2	*Self referred to as the subject in a general classroom activity or performing a function with objects visible on the photographs.* Descriptions are characterised by action verbs that refer to classroom activities.		
2a	*About the activity.* The classroom activity is the grammatical or implicit subject of the sentence. Subject names are used as adjectives. This section includes 'work' which is an undifferentiated curricular activity.		
		They look the same, they are all work.	year 1
		Cos books, these books can go in that book bag.	year 1
		All art things	year 5
		Because they are all different sorts of books like reading books, writing books, dictionary, spelling and English book.	year 5

TABLE 4 CONTINUED

2b	*About self and others.* Children describe themselves or others performing classroom activities. Subject categories are not referred to by name.	
	We can write in our books.	year 1
	We can use the scissors to cut them out. We've got some right and some left. Normally we can cut the paper out and glue them on to the red and blue books.	year 1
	You can read them all.	year 5
	these are all things that you use for work like pens, and scissors and things.	year 5

Structure talk		
3	*Subject categories.* A subject is referred to by name and described in some way. Abstract verbs are used such as, learn, concentrate, calculate and practice.	
3a	*A subject is named and the self or others are mentioned.*	
	I put these scissors together because the work we done was maths.	year 1
	We're learning about the alphabet. We need to know if it's a capital letter or not.	year 1
	Well I am not sure about the scissors, but the calculator and these are all used for maths, and em that's why I put them together.	
	The scissors I put together because we normally use them in maths.	year 5
	Both like painting, both to do with art.	year 5
3b	*Subject only.* A subject or known topic is used and described. The self or others are not mentioned.	
	To do with history. The history book.	year 5
	This is the English group because you've got dictionary, computer, an English board and an English folder. Now English board has got all types of English on, magic, and the computer is mainly used for English.	year 5

Other talk		
4	Any justification which could not be coded according to the above categories.	
	On its own	year 1
	Forget now	year 1
	I ain't got nothing for them two	year 5
	I couldn't find any other reason	year 5

CHILDREN'S RE-CONSTRUCTION OF THE CURRICULUM

FINDINGS FROM THE SORTING TASK

It was to be expected that the older children with their greater experience of schooling would differentiate a greater number of categories than the younger children. Average numbers of groupings produced by children in each classroom are illustrated in Table 5. Infant classrooms are numbered one to six and junior classrooms from seven to twelve. In each case, integration classrooms are followed by mixed and then collection classrooms .

The younger children tended to group objects in pairs and the older children tended to group them in threes. The content of groupings were analysed using cluster analysis. A cluster was recognized when a high proportion of the children in one classroom regularly grouped objects together. Clusters were identified from the dendograms

produced by the SPSS program. Table 6 illustrates the number of identifiable clusters for each sort by classroom. Those clusters which relied on data aggregated from sort one and two are shown in the lower section of the table and have been used to describe basic level categories.

TABLE 5

Number of Groups produced by classroom and sort

	Classroom											
	1	2	3	4	5	6	7	8	9	10	11	12
Sort 1	9.27	8.82	8.10	9.00	9.35	9.85	6.10	6.35	5.85	4.79	5.42	5.65
Sort 2	9.53	7.94	7.95	8.95	8.95	10.35	5.95	7.05	6.55	6.32	6.32	6.35

TABLE 6

Number of identifiable clusters by classroom

		Copse Infant Integration		St Helen's Mixed		Dart Infant Collection	
		Year 1 classrooms					
Agglomeration Coefficient*		1	2	3	4	5	6
7	sort 1	3	7	4	3	2	4
9	sort 2	2	1	0	0	0	0
16	sorts 1 & 2	2	4	1	1	1	1
		Year 5 classrooms					
Agglomeration Coefficient*		7	8	9	10	11	12
7	sort 1	5	4	5	5	6	7
9	sort 2	4	4	2	4	6	7
16	sorts 1 & 2	3	2	4	5	6	7

Note: Clusters were identified if pairs on the agglomeration schedule had coefficients equal to or less tha the value stated above for each sort. The coefficients for the second sort all tended to be greater tha those in the first sort.

TABLE 7

Number of objects clustered by classroom

	Copse Infant Integration		St Helen's Mixed		Dart Infant Collection	
	Classroom					
	1	2	3	4	5	6
SORT 1	6	14	8	6	4	9
SORT 2	5	2	0	0	0	0
	Classroom					
	7	8	9	10	11	12
SORT 1	10	8	12	16	19	18
SORT 2	8	8	4	11	14	16

In both year groups, particularly the younger, fewer clusters emerged in the second sort. Children were likely to have called upon their most common sense categories to group the items the first time. The lack of homogeneity within classrooms in the second sort suggests that children had difficulty in finding a second system for classifying objects. Finding a second way to sort the items was clearly beyond the cognitive resources of children in most infant classrooms. Table 7 presents the average numbers of objects clustered by classroom.

A greater number of objects was grouped in the first sort than the second in both year groups. The year 1 children were found to have weaker classification systems than the older children. It might have been predicted that the collection type curriculum in Dart School, which had a greater degree of curricular structuration, would have produced stronger cognitive structuring. Indeed, more clusters emerged in Dart Junior School than in the other two schools (see Table 6). Children in classrooms with integration type curricula drew upon more diverse forms of grouping in both sorts resulting in fewer clusters than in the mixed and collection type classrooms. According to the number of clusters identified, year 5 children in Copse School and St Anne's School had less differentiated ways to classify the curriculum than children in Dart Junior School.

Clusters usually comprised two or three objects. By analysing the content of each cluster it was possible to gain insight into the categories children were appealing to when producing groupings. Two main systems of classification emerged. First, those referred to as 'unambiguous' and which identified a range of curriculum related categories such as reading, mathematics, handwriting, art, spelling, English and topic. Second, those referred to as 'ambiguous' and which identified categories such as, colouring, tools, equipment and exercise books. There was some variation in the way the two classification systems were used in each classroom. Clusters found in the infant classrooms are presented in table 8. Curriculum related categories appear in the upper half of each section in bold.

TABLE 8

Clusters identified in the infant classrooms

Copse School Integration		St Anne's School Mixed		Dart Junior School Collection	
Classroom 1	Classroom 2	Classroom 3	Classroom 4	Classroom 5	Classroom 6
Sort 1					
Ex.Books[+]	Worksheets	Sticking	Books	Books	Pencils
	Colouring Sticking				Books
Reading	*Reading*	*Reading*	*Work*	*Reading*	*Reading*
Painting	*Painting*	*Painting*	*Play*		*Letters*[^]
	Maths	*Play*			
	Play				
Sort 2					
Worksheets					
Reading	*Play*				
Sorts 1 & 2					
Worksheets					
Reading	*Reading*	*Painting*	*Reading*	*Reading*	*Reading*
	Painting				
	Maths				
	Play				

Note: Subject categories are given in italic.

+) 'Ex. Books' refers to exercise books as opposed to 'Book' which refers to text books and reading books.

^) Letters refers to worksheets and a display which had the 'Letterland' style letters on them.

A greater number of clusters was identified in classrooms 2 in Copse School, than in the other infant classrooms. By half way through their second year of schooling,

children had a small number of basic level curriculum categories. 'Reading' emerged as a basis level category in five out of the six infant classrooms and therefore was considered to be the most basic curriculum category regardless of curriculum type. During the ethnography, strong recognition and realization rules were found for reading (see Table 2). In general, reading took place each day and had easily identifiable textbook schemes. Unlike most other classroom activities, children regularly read to an adult on a one-to one basis and received written and spoken feedback. 'Play' and 'painting' also emerged as basic level categories.

TABLE 9

Clusters identified in the junior classrooms

Copse School Integration		St Anne's School Mixed		Dart Junior School Collection	
Classroom 7	Classroom 8	Classroom 9	Classroom 10	Classroom 11	Classroom 12
Sort 1					
Equipment* Ex.Books+	Equipment Ex. Books	Equipment	Equipment	Equipment Electrical	Equipment Electrical
				Displays Paper Books Ex.Books	Displays Paper Books Ex.Books
Reading Art English	*Reading Art*	*Reading Art Handwriting Maths/Topic*	*Reading Art Handwriting Maths*		
Sort 2					
Ex.Books	Ex.Books		Colouring	Equipment Equipment Displays Paper Books Ex.Books	Equipment Equipment Displays Electrical Books Ex.Books
Reading Art English	*Reading Spelling Maths*	*Handwriting Topic Maths*	*Reading Art*		*Geography*
Sorts 1 & 2					
Ex. Books	Ex. Books	Colouring Tools	Equipment Tools	Tools Tools Displays Paper Books Ex. Books	Equipment Equipment Displays Paper Books Ex. Books Electrical
Reading Art	*Reading*	*Reading Handwriting*	*Reading Handwriting Art Maths*		

Note: Subject categories are given in italic.
 *) 'Equipment refers to collections of items such as scissors, rulers, glue and sometimes pencils.
 +) 'Ex. Books' refers to exercise books as opposed to 'Book' which refers to text books and reading books.

In the junior classrooms, children from schools with integration and mixed curriculum types drew upon a mixture of both systems of classification. However,

children from Dart Junior School, which had a collection type curriculum, used a distinctly different classification system for sorting classroom objects. Their categories were both broader and more numerous than in the other classrooms (see tables 6 and 7). They relied, almost exclusively, on non-curriculum categories such as 'equipment', 'exercise books' and 'wall displays'. Indeed, only two curriculum categories emerged and then only in the second sort. If children were drawing on their most familiar categories in the first sort then it becomes even more noteworthy that children from Dart Junior unanimously chose to sort classroom items using non-curriculum categories. Clusters identified in the junior classrooms are illustrated in Table 9.

Some of the year 5 clusters corresponded to adult conventional categories such as 'English' and 'mathematics' defined as subjects according to the National Curriculum. Other clusters identified sub-categories such as 'spelling', 'handwriting' and 'reading' which reflect more closely the activities associated with primary schools. In the junior classrooms, basic level curriculum categories included 'reading', 'mathematics', 'handwriting', 'art', 'spelling', 'English' and 'topic'.

It was in the junior classrooms with less visible curriculum structuration that more subject clusters emerged. The differences between clusters in Dart Junior School and those of the other two junior schools suggest that the structure of the curriculum has had a strong influence on the way children sorted classroom objects. Even although their clusters rarely identified specific curricular categories, it was found that they often used subject names when justifying their groupings. Indeed, the range of subjects named, particularly in the second sort, was noticeably wider in the Dart Junior classrooms than in the others and included English, mathematics, science, art, geography, history and technology. This finding suggested that children in the Dart Junior classrooms had two classification systems available to them and that they had unanimously chosen to use a non-curriculum in the interview context. Social representations of the curriculum were investigated further by analyzing talk about the task. The following section presents this analysis.

ANALYSIS OF TALK

The quantity of each type of talk was calculated by counting the number of utterances[4] in each category for one classroom. Table 10 illustrates mean number of utterances for each type of talk by classroom. Infant classrooms are numbered one to six and junior classrooms from seven to twelve. In each case, integration classrooms are followed by mixed and then collection classrooms .

It can be seen at a glance that the amount of feature and function talk decreases between years 1 and 5 for both sorts. As might have been predicted, the older children produced more structure talk than the younger children.

Separate repeated analyses of variance were undertaken for each type of talk. Within subject variables were amount of talk produced in sort 1 and sort 2 and between subject

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[4] An utterance refers to a complete description given by a child to justify one grouping, whether as short as one word or consisting of a lengthy paragraph. Each utterance was coded according to one of the discrete categories 'feature', 'function', 'structure' and 'other'. Utterances were transcribe and entered into the NUD-IST program. A code was assigned for each utterance. A colleague coded approximately one quarter of the utterances. Inter-rater agreement of 87% was reached. Disagreements were resolved through discussion until all utterances were coded.

variables were curriculum, year group amd sex group. Significant effects are reported in Table 11.

TABLE 10

Mean number of utterances produced by kinds of talk, sort and classroom

	Infant classroom						Junior classroom					
	1	2	3	4	5	6	7	8	9	10	11	12
	Feature talk											
Sort 1	3.20	2.12	1.65	3.20	2.20	4.05	0.85	1.15	0.45	0.68	1.37	2.10
Sort 2	2.40	1.65	1.05	1.95	2.60	2.80	0.65	0.95	1.10	0.37	0.79	1.65
	Function talk											
Sort 1	4.13	4.88	5.00	4.90	4.05	3.90	3.30	3.75	3.25	2.42	2.63	2.90
Sort 2	5.27	5.29	5.85	6.45	3.40	4.80	3.70	4.10	3.05	3.37	3.05	3.30
	Structure talk											
Sort 1	0.27	0.47	0.05	0.10	0.70	0.15	1.45	1.10	1.35	1.16	1.16	0.30
Sort 2	0.07	0.41	0.00	0.00	0.85	0.10	1.10	1.10	1.30	1.74	1.84	0.60
	Other talk											
Sort 1	1.67	1.35	1.40	0.80	2.40	1.75	0.50	0.35	0.80	0.53	0.26	0.35
Sort 2	1.80	0.59	1.05	0.55	2.10	2.65	0.50	0.90	1.10	0.84	0.63	0.80

TABLE 11

Significant effects found in the repeated measure analysis of talk by curriculum, year group and sex group

	Within subject variables		Between subjects variables	
	Main effects	Interactions	Main effects	Interactions
Feature	Quantity of talk sort 1,2 $F(1,218)=9.37*$		Curriculum $F(2,218)=5.93*$	
			Year group $F(1,218)=39.74**$	
Function	Quantity of talk sort 1,2 $F(1,218)=691.54**$	Quantity of talk s.1,2 by curriculum by Year grp. $F(2,218)=4.14*$	Year group $F(1,218)=29.98*$	
Structure			Year group $F(1,218)=56.07**$	Curriculum by Year gr. by sex gr. $F(2,218)=3.29*$
Other			Year group $F(1,218)=19.17**$	Curriculum by Year gr. $F(2,218)=5.35*$

Note: * $p<0.05$, ** $p<0.001$

There was a main effect for year group for each type of talk. Post hoc analysis using Tukey's b was used to compare means. Year 1 children produced more 'feature', 'function' and 'other' and less 'structure' talk than Year 5 children in both sort 1 and sort 2. Means for each type of talk by year group and sort are illustrated in Figure 1.

Year 1 children were more likely to represent the curriculum through feature and function talk partly because the linguistic capacities of children under the age of seven are usually more limited (Donaldson, 1978) and because they have less experience of schooling than the older children. It would therefore be expected that structuration afforded by different types of curriculum in infant classrooms might have had less influence on production of talk than in junior classrooms. The following sections investigate relationship between type of curriculum and children's reconstruction of the curriculum, as reflected in different types of talk, in more depth.
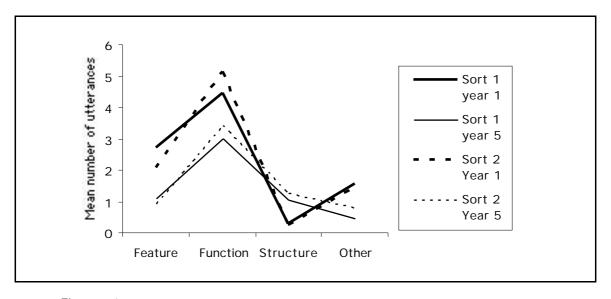

Figure 1
Types of talk by year group and sort.

FEATURE TALK

More feature talk was produced in the first sort (mean 1.90) in comparison to the second sort (mean 1.48). Significantly more feature talk was produced in classrooms with a collection type curriculum (mean 2.20) in comparison to the integration and mixed type classrooms (mean 1.42, $p<0.05$). It was Year 5 children in collection type classrooms in Dart Junior School who were responsible for the curriculum effect, particularly in sort one where they produced significantly more feature talk (mean 1.74) than other Year 5 children (mean 0.78, $p<0.05$).

FUNCTION TALK

Children in mixed classrooms produced more function talk (mean 4.70) in comparison to the other curricular types (4.08, $p<0.05$) and this reached significance in the second sort. The effect was largely due to Year 1 children in the mixed type curriculum, who produced significantly more function talk in sort 2 (mean 6.15) than other Year 1 children (mean 4.69, $p<0.05$).

STRUCTURE TALK

There was no significant difference in the quantity of structure talk produced between the first and second sorts. The patterns for the production of structure talk in each type of curriculum varied according to year group and sex group. A three way interaction for curriculum by year group and sex group was found.

Year 1 classrooms will be considered first. Significantly more structure talk was produced in Year 1 classrooms with a collection type curriculum (mean 0.45) in comparison to the others (mean 0.17, $p<0.05$) for both sorts. Children in classroom 5 produced more structure talk than children in classroom 6 in the same school, and significantly more (mean 0.85) than their peers in the same school (0.10, $p<0.05$) in the second sort. There was no significant difference in the quantity of structure talk produced by the boys and girls in Year 1 collection classrooms.

Overall, more structure talk was produced in Year 5 collection type classrooms although the result did not reach significance. Year 5 girls in the collection type classrooms produced more structure talk (mean 1.25) than boys in the collection type classrooms (mean 0.66), and once again the difference did not reach significance. In the mixed type classrooms, Year 5 boys produced significantly more structure talk (mean 1.76) than Year 5 girls (mean 1.02, $p<0.05$) in each sort. In Year 5 integration type classrooms, girls produced more structure talk than boys and this reached significance for sort 1 (mean for girls 1.76, mean for boys 0.80, $p<0.05$). There was no significant difference between the quantities of 'other' talk produced in the first and second sorts.

DISCUSSION

Findings from the cluster solutions suggest that all children, irrespective of curriculum, had social representations of the curriculum. The form of representations change as categories become differentiated. By looking at the basic level categories it can be seen that the first distinct category to emerge was 'reading' followed by, 'painting' and 'play'.

Curriculum structuration became a more noticeable feature of the way the older children re-constructed the curriculum. Year 5 children from Dart Junior School which had a collection type curriculum were found to have a strongly classified system that was not based on the curriculum, and indeed they demonstrated considerable resistance to applying curriculum categories in the sorting task. Extensive probing revealed that they had no problem in recovering symbolic marking relating to the curriculum from classroom objects and this suggested that these children had two classification systems available to them.

In Year 5 in the mixed and integration classrooms, basic level categories included mathematics, handwriting, English art, reading and spelling, demonstrating that children were starting to use adult-conventional categories to talk about the curriculum. From a developmental perspective it is important to register that basic level categories do not remain static, they undergo transformation as representations become more elaborate.

Differences between findings from cluster analysis and analysis of talk demonstrate the gap between children's practical knowledge and their powers to communicate what they know. Although Year 1 children used representations which were tied to functional

activities and surface features of objects, nevertheless this furnished them with useful ways to make sense of classroom life. Their *performance* in the sorting task showed that they had a more sophisticated grasp of the curriculum than their talk would suggest. Children have representations of the curriculum that work at a non-verbal level.

The sorting task has demonstrated that classrooms are local cultures that make the curriculum available to children in different ways. Differences betwen classrooms in the same school point to the influence of teachers' individual styles and structuring of classroom practice. As children gain experience of schooling their social representations undergo transformation and become more differentiated. The nature of the structuration made available to them through everyday classroom practice becomes an increasingly important source for the development of social representation.

The shift away from feature talk and towards structure talk indicates a qualitative transformation in the process of signification between Year 1 and Year 5. When curriculum structuration is particularly strong, as in Dart School, children may well reserve their curriculum categories for tasks that they recognize as part of school culture. As children develop elaborate cognitive resources, context-specific items may lose their scaffolding properties and, like transitional objects (Winnicott, 1971/91), become 'decathected'. Thus objects are released back into the everyday realm. This finding points to the transitional role of material culture in the development of cognitive resources.

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