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## Designerly play

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# **DESIGNERLY PLAY**

Design: Occasional Paper No 2  
Ken Baynes

Department of Design and Technology  
Loughborough University of Technology

## **Design: Occasional Papers**

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DESIGN: Occasional Papers uses DESIGN as its encompassing category. In this usage, Design is to be construed as a broad field of human endeavour and enterprise, analogous in its generality and complexity to Science and the Humanities. Still at the level of generality, but now related to professional-vocational activities, Design is also to be construed as a field that includes a diverse range of distinguishable areas of professional activity (which would include architecture, communication and graphic design, industrial design, information design, interior design, aspects of engineering design, textiles/fashion, environmental design). At this level, Design must accommodate pluralistic conceptions: there is no single Design culture.

But 'design' is also commonly used as a verb. Again at the high level of generality, designing may be characterised as an intentional activity: to do with bringing about change. More specifically - and as with Design when used as a tag for a field - what 'designing' is intended to mean relates also to the specific area in which it is used, and by whom. The field has many specialist communities, many languages of discourse and, within and around those, different persuasions and differing voices.

DESIGN: Occasional Papers is therefore concerned with the relations between the generic and the particular. The essential reason for publishing the Series is to provide a means whereby the differing conversational communities that are related to design may become, at the least, more accessible to each other and thereby enable the reader to take part in the running argument by which knowledge and understanding develop.

Loughborough University of Technology  
Department of Design and Technology

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**KEN BAYNES** is a visiting professor in the Department of Design and Technology at Loughborough University and a partner in Brochocka Baynes, educational design consultants.

Ken Baynes was trained as a painter and craftsman in stained glass but has spent the whole of his professional life working as a designer, educator and writer. At the centre of his work have been two main themes: the use of exhibitions as a medium for entertainment and education; and the attempt to develop better strategies for teaching and learning about art and design in Primary and Secondary schools. He was head of the Design Education Unit at the Royal College of Art and his most recent exhibitions include the ART of LEGO and The Art Machine. During its tour of the UK the ART of LEGO was seen by 1.4 million people. In addition to his work for Brochocka Baynes and Loughborough University, he is Education Consultant to the Design Dimension Project and is on the Advisory Board of design education bodies in Illinois and New York. He has been the scriptwriter and presenter for the Design Matters television series on Channel 4 where he was involved in creating 27 programmes dealing with every aspect of design. With Krysia Brochocka he is joint editor of the Nelson Design and Technology Resource.

Current work includes the *DESIGN WORKS* exhibition for Birmingham Museums and Art Gallery and *The Shakespeare Show* for the Barbican Centre. He has recently completed a study of *Children and Art Galleries* at Loughborough with funding from the Gulbenkian Foundation.



## INTRODUCTION

One of the largest claims made by protagonists of design is that it is a universal attribute of human communities. The claim is presented from two rather different points of view. The first recognises that material culture is a characteristic of all societies. The second attempts to identify 'designing' as something which everybody does, or is capable of doing.

It has always seemed to me that it would be enlightening to study the emergence of design behaviour in childhood. In recent years, my conviction has grown that the best way to do this is to analyse play. In play, children are engaging with people and things on their own terms. Play draws from the surrounding adult world, of course, but unless it is fully translated into the child's world it does not become play.

Are there design elements in play? To my mind the answer is undoubtedly: yes.

The aim of the present study is to try to identify the designerly elements in play and to show that they are fundamental.

I have approached this task in three different but complementary ways. In Chapter One I record some of my own experiences of designerly play and outline the beginnings of an explanatory scheme based on the work of students at the Royal College of Art. In the second chapter, I attempt to expand this personal experience into a broader framework using models developed by Jean Piaget, John Gabriel, David Cohen and Stephen A MacKeith. Finally I use the framework to analyse and identify the designerly elements in play.

Children's playing should be recognised as their most serious actions  
**Michel de Montaigne**

Play teaches children to master the world  
**Jean Piaget**

Play is children's way of perceiving the world they have been called upon to change  
**Maxim Gorki**

## 1 Personal Experience

When we were eleven, my father introduced us to a game that took a whole weekend to play. It owed something, I believe, to H G Wells. The first prerequisite was a sheet of paper as large as the whole of our big dining room table. On a Friday evening I and my three special friends would meet for tea. Our first job was to join together the sheets from a drawing pad until the whole table was covered. Then we assembled the tools that we would need - pens, paints, rulers, inks, big rubbers, scissors. We covered the area round the table with newspapers because the game could get messy at times. All we had to do then was to hope that he wouldn't be late home.

The game always started in the same way. To begin with it was a monologue. My father told us the story of the creation of the earth. He told us how it had spun out of the sun in a molten state and, like the other planets, had settled down to cool in an endless and unchanging orbit round the sun.

He showed us how the moon came off, ready one day to provide the motive power for the tides. He told us how, to begin with, the earth was fire, a perpetual furnace gobbling matter to burn into energy. As it cooled, he described the successive worlds that emerged; burning red deserts empty of life; hot tropical forests where the rain never stopped and plants were as big as skyscrapers; then steely cold grinding even the mountains under its ice. Gradually there was life. Sea-things first. Then earth-things and even air-things. As he told it, they seemed to change in a whirling kaleidoscope of competing species from the most huge tyrannosaurus to the smallest and most delicate moth blowing through history like a leaf. The evolutionary picture show detained us for fifteen minutes of ferocious drama.

Finally - and in a moment we could join in - animals came on the scene who could think and plan and walk upright. The game we were to play could not really begin until that moment because, for all their variety, the species that had gone before did not allow us to tell stories different from the one that seems actually to have happened. But men and women who, as my father always said, were really very recent arrivals, seemed already to have had a history as flexible as our imaginations (of course they did).

Then there was a pause and often a time of fierce discussion. What we had to do was to create the basic geography and climate of an island that we would imagine had parted from one of the main continents long ago in a far prehistoric era. It lay now, without the intervention of people, in a cold or warm sea, under blue or grey skies, covered with rain forest or grasslands in a geography that we had to decide. The first people would come across the sea by coracle about lunch time on Saturday but first we had to map out exactly what they would find. Once the argument was over we had until bed time to draw a coastline and connect the pattern of rivers to their mountain homes.

On Saturday morning, my father would not join in the game. He had to work. It was our job also to work. We steadily developed the map locating lakes and marshes, tracts of forest, deposits of coal and iron, places rich in fish or herds of horses, weaving a complicated graphic patchwork of signs and symbols that we all understood from having played the game together so many times before. After lunch he returned: now his role was to sketch in the early history of the island. He asked us if the first men there were fishers or herders, foresters or farmers. Where would the first small towns have been? Did trade begin with the mainland? What was it? Where did the men first begin to make iron? At which river crossing did a really great city grow: a city big enough to control the island as a whole and turn its people into a single nation? As he wove this story out of our suggestions, adopting some discarding others, we recorded the traces of the island's history on our map.

Skilfully he would take us through to an island of scattered towns and cities, linked by a primitive road system and with the first signs of industry beginning to emerge. Then it was, around 1750 by the European clock, time for tea.

The teatime pause marked a second moment of change in the game. It was as dramatic as the moment when the first two-legged, upright creatures emerged. A period of exponential development was about to begin. And, for the first time, the game would become competitive. While we ate our boiled eggs and toast, the industrial revolution engulfed the island.

Father would start the evening session by inventing a character. Frequently he was called George Jobson. A mining engineer much addicted to tea, he was fascinated by the power of the steam that rattled the lid of his kettle. In that sound he heard great things; the rumble of pumps, the hiss of winding gear and the rattle of colliery tubs. A mechanical horse was his dream and many a night would find him in his windswept cottage working metal by the light of a guttering candle. On its first outing the machine ran away and frightened the Vicar who thought the devil had come to eat him. But George's employer Matthew Birmingham liked what he saw and the two men formed a company - imagination and money brought together in enterprise - to build and operate mechanical horses.

And so rails and railway companies had come to the island.

Now the game turned into a railway battle, modelled on the real railway mania of the 1840s and 50s. Jobson's and Birmingham's company were the founders and got off to a flying start: they had ten free turns and we threw dice to see which of the four of us would be their company, laying down ten inches of single track or seven inches of double track before any other lines had appeared on the map at all.

There were strict rules to govern these early stages. Each company had to start its line where there was coal and each company had to link coal to iron ore before it could branch off in any other direction. It took extra turns to build tunnels and bridges. Turns were used up establishing workshops and city termini but without them the system could not operate. One company could not cross the route of another without complex negotiations: secret deals were common. Sometimes joint lines and projects were launched to save time and money. By bedtime the first skeletal railway system, drawn on the map in coloured inks, had appeared and my father would leave us to finish the game by ourselves on Sunday afternoon. However, he had one further surprise in store.

The Sunday afternoon phase was a long drawn out and marvellously enjoyable completion of the system. It began after lunch to the discovery that my father had made a series of additions to the map. That is to say, he had looked at the implications for urban and industrial growth in the embryo railway system and had enlarged towns and established suburbs accordingly. These became a focus for new and competitive railway building. Valuable turns were taken up establishing four-tracked mainlines, works had to be enlarged and commuter traffic in the capital demanded the building of a subway. In rural areas, single track branches began to reach even the remotest villages, bringing people and produce to the main lines and on into the cities. The island was becoming the workshop of the world and these imaginary railways were its life's blood.

Nobody won the game even though it was competitive. That was not the object. The point was to enjoy projecting our intelligence into imagining how things had happened and to make plans for how they might be. My father was a solicitor but this was perhaps the most brilliant design game that I have ever played.

\*

In recent years, I have spent considerable amounts of time playing with children. Because my studio is situated at home, it is quite usual for neighbouring children to come to play in the studio. When this happens they end up using exactly the same 'designerly' equipment that I do.

I never have much difficulty in recognising the similarities between their activities and mine. One example will serve to show how evocative this can be:

CHRISTOPHER

Age 3

The suggestion is that Christopher might like to do some drawing. Christopher enjoys drawing and knows where the coloured pencils and pens are kept. But on this occasion he also chooses a transparent ruler and a pair of really razor sharp black handled scissors. This is worrying.

"Those are very sharp," I say, "I'm not sure it's a good idea to use those!"

This makes them irresistibly attractive and he holds them very tight. I make a mental note to get some safe infants scissors and keep them in the pot alongside the sharp office pair. But I also realise that the battle is lost. From now on it will always be the sharp scissors that Christopher wants to use.

"Well," I say, "you must be very careful with them. Always carry them pointing down. Watch our for your fingers. Never point them at anybody!"

These instructions are thoughtfully received. Christopher looks at the points of the scissors and sees in them possibilities he hadn't imagined before. I just hope he doesn't start using them with the same exuberant abandon that he brings to his bright green plastic sword.

I give Christopher a pile of crisp sheets of white paper, blank one side, our address and wrong telephone number on the other. He immediately gets down to work. At first, the sequence goes like this:

- \* The ruler is placed across the paper lengthwise. Clearly it is intended to divide the paper in half. Using a red coloured pencil a very careful line is drawn alongside the ruler: the ends of the line overlap the edges of the sheet of paper. This is all done slowly and with deliberate concentration.
- \* Now very quickly, not using the ruler, seven or eight other lines are drawn freehand. They are parallel to the ruled line and although not exactly straight they are skilfully drawn and form a grid of lines across one half of the paper. These new lines do not overlap the edges of the paper. Because of the speed with which they are drawn they are slightly hooked at an end where the pencil has started to go back for the next line without completely coming up and off the paper surface.
- \* The scissors are used next. The cuts are made roughly across the sheet in the opposite direction to the lines. This cutting begins quite slowly but it is so satisfying that it quickly speeds up so that the desk is soon covered with strips, some fully cut out some still joined together at one end.

Each of these operations clearly gives intense pleasure. It is enjoyable to handle these grown up tools in such a purposeful way and to see how the sheet of paper can be changed through marks and cuts. But it is also fascinating to notice that the strips that result from all this work are of no

use. The intention isn't to produce strips. It is to do interesting work which has all the appearance of adult activity. It is only later, in the garden, that the strips blow about to become a kind of confetti which reacts to the wind in ways which are unpredictable and therefore funny.

After the sequence has been repeated a number of times, a new approach develops. One of the uncut half sheets is laid over a whole sheet. On the uncovered half of the whole sheet Christopher begins to draw. The first shape is partly determined (I think) by the shape of the half sheet. The outline almost fills the sheet and is rounded at one end and pointed at the other. It is definitely fish-like. Christopher scribbles little knots of colour that join onto this outline and then using the pencil in a completely different way shades in part of the outline keeping the shading carefully inside the outline.

"It's a shark," he says, "Look at his teeth. He's scary!"

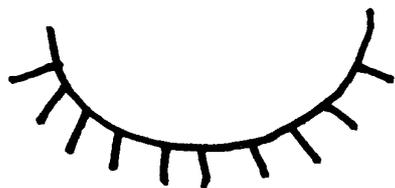
After having said this the teeth are drawn in using a sinister slimy green colour.

They are done like this:

First a smiley mouth is drawn



Then teeth on one side only



These teeth are drawn with remarkable care. They stay precisely on their side of the mouth and this is not at all an easy thing for a three-year old to achieve.

Finally the other teeth are drawn in with the same care.



This piece of drawing is actually outside the outline of the 'shark' alongside the head end. Next a neat round eye is placed in the middle of the head end. Three bold red lines now criss-cross the body and some token green shading is added at the tail end. These are not done carefully and I sense that the drawing is coming to an end.

I like this drawing a lot and am very interested in the process of creative association or 'syntactics' that enabled Christopher to make it. I am about to congratulate him on it and ask him if I can keep it in my collection when he takes the scissors and starts to cut out the drawing.

What he does is shocking to an adult. He does not cut round the outline. Instead he chops across the outline and ends up cutting a large hole out of the middle of the shark. The cutting is very quickly done - it is exciting - but again it is also careful and intentional.

The shark drawing isn't important any more because it has now led on to something else. It is quickly discarded. Instead the cut out disc becomes the focus of action. Christopher holds it up in front of him. Because he has recently been playing at pirates and his Granny has made him a black velvet eyepatch, he holds the disc in front of his eye.

"I'm a pirate."

He growls frighteningly.

"Yo-ho-me hearties," he says, "It's scary."

Christopher's association of the paper shape with an eyepatch reminds me of another way to make paper interesting.

"Look at this," I say to Christopher.

Taking a sheet of paper I fold it up a number of times. Then I take the scissors and cut some geometric shapes in from the edges.

"Unfold it and see what's happened."

"What?"

"Unfold it and see if there's a pattern there."

Christopher unfolds the paper and is delighted by what he finds.

"I'll do it."

He folds a sheet of paper up carefully but equally carefully unfolds it before cutting the shapes in it. To get shapes that don't come to an edge, he has to pierce the sheet with the points of the scissors before beginning to cut.

"Look," I say, "if you fold it first ...".

"I'm doing it," says Christopher firmly. And indeed he does do it but his way. The result is a sheet of paper full of interesting holes. Of course, they are not in a pattern. I see now that it is not the pattern that interests him but the fact that the sheet has holes in it.

Using the latest sheet in the same way as the eyepatch he holds it up to his face. Because it is the whole sheet it completely covers him and as luck would have it - for this is sheer chance - his ears come through the holes while his eyes are immediately beneath another pair. We both realise this at the same time and hook his ears through the holes.

"It's a mask," he says, "it's scary." He makes roaring, growling sounds and I make it clear that these frighten me a lot. I gasp and try to hide my eyes behind my hands. This is very good value. We now play a sophisticated form of peek-a-boo, still enjoyable even at this age (his and mine).

The mask comes down.

"The monster's gone," says Christopher.

"Well I am glad," I say, "I was terrified."

"He's gone."

"Yes, good. And its nice to know he's not coming back. I can get on with cutting up all this paper. He's not coming back is he?"

"Oh no."

"Good. Well. Hum-de-dum-de-dum. I'll just get out the scissors and begin cutting ..."

Suddenly the mask shoots up.

"Oh Lord! Oh help," I yell, "Save me! The terrible monster's back."

I cover my eyes with my hands and Christopher is convulsed by laughter.

This sequence is played out quite a few times.

While its going on the masks - not surprisingly - get a bit scrumpled up. After the peek-a-boo sequence is over, the table is covered with tatty looking sheets of paper full of holes.

Christopher looks carefully at these. He picks two of them up and wraps them round his arms.

"Armbands," he says, "I'm ready to go swimming."

We make suitable swooshing noises for the sea and imitate swimming motions with our arms. Christopher likes swimming and his Mummy has just bought him bright yellow armbands ready for their seaside holiday.

This swimming game only lasts a moment. It's like a happy trailer for the holiday to come.

Finally Christopher sits happily for five minutes simply cutting paper into strips and folding paper up to unfold it again before cutting holes in it. This is all done quickly and purposefully but it is not in order to make something. The strips, sheets and cut-outs are all allowed to fall on the floor. It seems to me that this is a replay of the skills that he has learnt, both to experience again how enjoyable they are but also perhaps to fix them firmly in the mind and to make sure that they are learnt. He may want to use them again when the opportunity comes along.

I have enjoyed this paper play as well. It has reminded me that tools and materials are enjoyable for their own sake and that serendipity is creative. In adult design the synectics game that we played, with one idea leading unpredictably to another by creative association, is recognised as a 'design method'. Any designer will also see much else in Christopher's play that is designerly. The engagement with form, for example, and the recognition of the possibilities and logic of particular materials and processes. Christopher's play has many of the hallmarks of my own work.

\*

Although I have been fascinated by the design aspect of play for many years, it was not until I worked with teachers at the Royal College of Art (1981-1986) that I had the opportunity to probe the link more deeply. Here's what I wrote at the time:

'If we watch children playing free from the inhibition of toys that adults have provided, or the formalities of organised play, what we often see is a very special interaction between things and the imagination. One group of teachers working on design awareness while studying at the Royal College of Art came up with a very simple and evocative general description of this kind of play. They called it 'role playing with props'. I like this. It beautifully describes the actions of a little boy who, all alone and absorbed, pushes pieces of stick up and down a pile of gravel while making the sounds of a heavy lorry. But it also captures the essence of the group of little girls who invite their dolls and teddies for tea and sit them down in front of sycamore leaf plates with bacon and eggs made of yellow nasturtium flowers and strips of pink paper.

'My own informal observations of children suggest at least three characteristic themes around which 'designerly play' is most often organised. These themes are 'Configuration', 'Situation' and 'Story' and they interact with each other, overlapping and changing as the game proceeds. Each may be played out alone or in groups.

'Configuration is about the careful arrangement of props - bits of wood, model cars, the furniture in a doll's house - where the essence of the play is to make the arrangement as much as to do anything with it. This play extends naturally into making things. The group of teachers who coined the definition of play found that as adults they still kept some mementos of this creative activity. Among the most fascinating was a meticulously drawn identity card for a secret society (perhaps it only had one member). Within the manual skill of a twelve-year old boy it was a masterly forgery. The image of the boy peered out from typical official filigree that was both meticulous and intimidating. Making it involved a high level of imaginative power and an ability to bring imagining into real existence.

'The author still has the timetables for a woodland bus service (the wood was a seaside town in this game) that four of us twelve-year olds then simulated on our bikes. They are complete with graphic cover, details of towns and fares and a range of local advertisement. A remarkable game, because although we would play it for hours on end, we would meet infrequently and then only as our bus-bikes passed one another, raising our hands in serious and silent greeting as we had observed real bus drivers doing. Here the configuration - the design - of the timetable was the essence of the game, creating order around which we could play the bus-driving role. As much time was spent in revising the timetable, improving the connections and providing a better service, as in riding the wood which was, as a matter of fact, rather boring.

'Mothers and Fathers, Doctors and Nurses and Schools are classic situation games. These always seem to involve role playing but the role and the play emerge from the social conventions of the adult world. In situation games, children behave like adults or rather they behave the way that they believe adults behave. The action that takes place is to reveal or to live out what it is to be a certain sort of person filling a specified niche in the grown up world. Today television and the media in general must play an important part in determining the content of such games but direct observation and experience must always be important as well. In 'Shops', for example, experience of shopping is extended in imagination into what must happen when 'I'm not there'. Even four-year olds can step outside immediate experience for long enough to imagine what the grocer has for his tea or what the postmistress says to the postman before he sets off on his rounds.

'It is clear also that these games are far from literal but that the lack of literalness does not always come from a lack of knowledge of the way the world actually functions. It can be about the way the world might function if it was more fun, more fantastic and more responsive to children's values, sense of humour and curiosity. Stepping into fantasy is to imagine alternative worlds in a way that is very suggestive of certain kinds of adult design activity, particularly in such field as a film and fashion, but perhaps on the frontiers of technology as well.

'In these games of situation, stereotypes will frequently prevail over experience just because they are larger than life. So the school teacher is condemned always to be domineering, sarcastic and in embattled warfare with the class who in turn are amazingly naughty, ignorant and tricky. This same image occurs in children's comics and in generations of stories.

'Story play looks like an extension of situation play but its feeling and development are different. War games are a good example. In a war game the story of the action is usually worked out in advance - often with much discussion and acrimony - and then enacted. Of course, it doesn't always go according to plan but who wins, who gets killed, where the attack is to be, more or less have to be known so that the game can keep to geographical, spatial limits.

'I used to play a solitary story game in which I was a big game hunter in the African jungle. The jungle was actually the bus service wood transformed and the trek with its encounters with natives, animals, sickness, snakebite and near starvation was thought out in a saga of heroic proportions before being rather carefully re-lived with spoken monologue, sound effects and props in the chosen setting. This kind of enactment requires sustained imagination of quite a complex kind: it requires a strong ability to live out other lives but it needs as well careful pre-planning and an appreciation of what the environment has to offer in support of human behaviour. Yet a ten year old can easily cope with such designerly complexity.'

## 2 A Framework

The classification of designerly play into 'Configuration', 'Situation' and Story' was useful but it was very informal and detached from other work on the development of intelligence in children. Any classification needed to be knitted into this work and into the growing literature on the nature and content of play. If this could be done successfully, it might be possible to develop a much broader and more comprehensive framework for the analysis of designerly play. This Chapter discusses the work of Jean Piaget, John Gabriel, David Cohen and Stephen A MacKeith to provide such a framework.

A preliminary point worth recognising is that the developmental process in children is extremely proactive and dynamic. It used to be thought that babies were relatively passive, quietly soaking up experience. It is now clear that from the moment of birth (and perhaps before) they actively seek engagement with their surroundings, wanting not only food but also the fundamental reassurance of a human relationship that provides comfort, security and bonding. Their exploration of their world clearly involves 'playing' both with people and objects. Psychologists recognise that babies are curious about their surroundings and appear to want to control and influence them.

One of the founding ideas of modern educational psychology is that, in the process of growing up, children pass through a series of identifiable stages of development. There may be disagreement about the precise nature of each of the stages but that such stages exist is accepted. The stages are seen as being truly developmental - that is, 'wired in' to the development of intelligence by the physical structure of the brain.

It might be argued that the stages as described by Western European psychologists over the past hundred years are culturally determined. However, there is evidence from anthropologists and historians that children in other times and places also show very similar stages of development. For example, Shulamith Shahar, writing in *Childhood in the Middle Ages* (1) shows that medieval educationalists worked with ideas which Jean Piaget would have recognised half a millenium later:

'The authors of medieval works, didactic literature and moral treatises also distinguished several stages in childhood and in human life in general. Childhood was most commonly divided into three stages - (1) *infantia*, from birth to 7 years - early childhood; (2) *puertia*, 7 to 12 (for girls), or to 14 (for boys); (3) *adolescetia*, 12 or 14 to adulthood.'

This is remarkably similar to Piaget's structure (see Table 1).

What Piaget tended to neglect was the social setting in which development takes place. For example, in a recent study, *Young Children Learning* (2) Barbara Tizzard and Martin Hughes highlight the role of mothers in encouraging language development. Whatever their class background, and whatever their own language skills, mothers have the decisive advantage that they know their children very well and share a direct experience of the things they talk about. This intimate relationship means that they operate from 'inside' the child's personal world of ideas and experiences, interests and anxieties.

Our own research highlights importance of social relations in play. Young children use and depend not only on their immediate physical world but also on their surrounding world of ideas and relationships. In attempting to make sense of the chaos of direct experience, children search for useful explanations and analogies in the stories, toys and observations already known to

them. What is more, at any one time, a particular group of stories and ideas may become dominant, providing a key way of interpreting most other experiences.

Table 1

Jean Piaget

STAGES IN THE DEVELOPMENT OF COGNITION

Based on: Jean Piaget, Six Psychological Studies New York, 1967

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1	<p><b>INFANCY</b> Birth to 1.5/2 years A period which precedes language and, according to Piaget, thought as such. It is subdivided into three</p> <p>(a) The reflex stage, characterised by instinctive drives for food and survival and the appearance of the first emotions</p> <p>(b) A stage characterised by the first motor activities, organised percepts and differentiated emotions</p> <p>(c) The development of sensorimotor intelligence (not dependent on language), affective organisation and the first affective fixations with other people.</p>
2	<p><b>EARLY CHILDHOOD</b> From 2 to 7 years A period of intuitive thought processes and spontaneous feelings about people and social relations. At this stage the child is highly dependent on the adult for ideas and concepts.</p>
3	<p><b>MIDDLE CHILDHOOD</b> From 7 to 11 or 12 years A period of learning from direct experience described by Piaget in a famous phrase as the stage of 'concrete operations'. Moral and social feelings and ideas begin to develop and children begin to be able to cooperate purposefully with others.</p>
4	<p><b>ADOLESCENCE</b> From 13 to Adulthood A period when children first become capable of abstract thought. At this stage a distinct individual personality is formed and children make affective and intellectual entry into adult society.</p>

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For example, in her two-year detailed study of Joe between the ages of two and four, Yvonne Outterside (3) found that Postman Pat, Thomas the Tank Engine and Button Moon formed a world of explanation and reference that was extremely powerful. Not only did Joe use the characters and images from these stories as part of his 'world picture' or 'mind set', he actually

searched the every day world around him for ideas and images that would reinforce and relate to these absorbing stories.

What is needed, then, is a model (or models) which can provide a framework for analysing play which will accommodate the developmental, social and cultural perspectives.

The Australian educationalist, John Gabriel, has provided a useful classification of different types of play. This is set out in Table 2. Gabriel looks at play in the widest sense but, for design, it is imaginative play that is the most significant. Children's imaginative powers have not been studied in the same detail as their emerging rationality. This is surprising because fantasy and stories appear to be at the centre of children's intellectual life. However, David Cohen and Stephen A MacKeith have attempted to identify some characteristic ways in which children use their imagination. This is set out in Table 3.

Taken together, these two seem to provide a promising framework.

Table 2

#### A TYPOLOGY OF PLAY

From John Gabriel Children Growing Up, London 1964 and 1971

#### PLAY AND THE DEVELOPMENT OF KNOWLEDGE AND SKILL

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##### SENSORY PLAY

Learning through the senses and developing sensory skills.

##### EXPLORATORY PLAY

More deliberate and controlled use of the senses to find out about the world. Particular interest in handling adult tools and equipment.

##### EMOTIONAL PLAY

Playing provides children with a kind of 'theatre' where emotions are experienced and sometimes shared.

Some types of play evoke specific emotions - caring, fear, aggression.

##### IDENTIFICATION PLAY

Through play children identify with other roles and characters. They learn about the world by enacting.

##### SOCIAL PLAY

Playing with other children provides a social world that is at least partly separate from adult society. Children develop their own social rules for play.

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Table 3

CHILDREN'S IMAGININGS

From David Cohen and Stephen A MacKeith *The Development of Imagination*,  
London 1991

A DESCRIPTIVE CLASSIFICATION

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- 1 SIMPLE CREATIVE BEHAVIOURS
  - 1.1 TRANSMUTATORY  
Imagining that one object is another, quite different object
  - 1.2 ANIMISTIC  
Imagining that an inanimate object has life - often turning it into another person
  - 1.3 INVENTING PEOPLE  
Imaginary conversations  
Imaginary friends or companions
  
- 2 ACTING A PART
  - 2.1 PRETENDING TO BE A MACHINE
  - 2.2 PRETENDING TO BE A NON-HUMAN LIVING BEING
  - 2.3 PRETENDING TO BE ANOTHER (Particular) PERSON
  - 2.4 ENACTING AN INCIDENT  
For example: a battle story, a ceremony or ritual  
(See JUST WILLIAM for a brilliant evocation of the power of 'enacting an incident')
  
- 3 IMAGINING TAKING PART
  - 3.1 LISTENING TO A STORY  
Under this category we should include watching film or TB as well as stories told by an adult or being read to
  - 3.2 READING A STORY TO ONESELF
  - 3.3 CREATING A DRAMA (or story) USING A 'STANDARD' PLOT  
for example, producing Cinderella using a model theatre
  
- 4 INVENTED STORIES
  - 4.1 'FREE-FLOATING' DAY DRAMS  
Spontaneous uncontrolled reverie  
A study in 1933 (Jersild, Markey and Jersild) identified 31 typical topics for children's day dreams

- 4.2 **PRE-SLEEP SERIAL STORIES**  
An 'evening-dream' type story which continues from one evening to the next.  
Sometimes told by one child to another
  - 4.3 **DAY-TIME STRUCTURED STORIES**  
Usually told silently to oneself but sometimes shared between children
  - 4.4 **PARACOSMS**  
The term invented by Silvey to describe the creation of a complete and self-consistent world
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### **3 An Analysis**

In CHILDREN DESIGNING, I explained that John Gabriel's categories have a developmental aspect to them. A small child is fully capable of 'Sensory Play' but finds the 'Social Play' impossible. However, Gabriel clearly recognises that the social and cultural world surrounding the child provides the building blocks of experience that the child has to use.

The same is not true of Cohen and MacKeith's categorisation of children's 'imaginings'. We do not yet appear to have a useful picture of the developmental aspects of imagination, though we may sense that the imagining of a full-formed 'paracosm' is a late development compared to imagining that an inanimate object has life.

The material in the following Tables is a basic attempt to analyse a mass of observations of 'designerly play' into the categories used by Gabriel, Cohen and MacKeith. The observations have been made over more than a decade by myself, my partner Krysia Brochocka, students at the Royal College of Art and Yvonne Outterside.

To my mind, the precision with which a designerly thread can be followed through all these instances of play and imagination, gives powerful backing to the proposition that design ability is the common inheritance of all children.

## TYPOLOGY OF PLAY

from GABRIEL, 1971	EXAMPLE	SPECIFIC DESIGN ASPECTS	DESIGN CAPABILITY
<b>SENSORY PLAY</b> LEARNING THROUGH THE SENSES AND DEVELOPING SENSORY SKILLS	Using sand and water in a sand-pit	Exploration of the qualities and capacities of materials Exploration of physical realities Developing manual skills	Ability to predict how materials will behave Ability to predict the relationship between cause and effect Ability to control and handle materials
<b>EXPLORATORY PLAY</b> MAKING MORE DELIBERATE USE OF THE SENSES TO FIND OUT ABOUT THE WORLD CONNECTING DIFFERENT KINDS OF SENSORY EXPERIENCE USING TOOLS AND EQUIPMENT IN AN EXPLORATORY WAY	Playing at cooking: Using plants and other materials to represent food Connecting the taste of the food modelled with the appearance of the materials used Exploring cooking by using toy saucepans and equipment	Using one thing to stand-for or model another Exploration of the qualities and capacities of materials Developing manual skills Understanding that making is a process	Ability to model and to use models Ability to predict how materials will behave Ability to control and handle materials and simple tools Ability to plan ahead and to recognise cause and effect in making
<b>MANIPULATIVE PLAY</b> EXPLORATORY PLAY DEVELOPED INTO LEARNING HOW TO DO SOMETHING GAINING 'MASTERY' OVER A PARTICULAR SET OF TOOLS AND EQUIPMENT, OFTEN THROUGH PRACTICE	Playing with a new construction kit: Learning about the new technology Learning through direct handling Learning through following instructions	Using components to make things Being able to understand a new technology and learning its potential for designing and making Developing manual skills Learning about the relationship between words, pictures and actions	Ability to experiment with, understand and make planned use of new materials and technology Ability to understand the relationship between components and modules and whole structures or products Ability to use components and materials as a source of design ideas

<p><b>EMOTIONAL PLAY</b></p> <p>PLAYING AS 'THEATRE' - A PLACE WHERE ACTIONS AND EMOTIONS ARE ENACTED AND OFTEN SHARED</p> <p>SOME TYPES OF PLAY SEEM INTENDED TO EVOKE SPECIFIC EMOTIONS - CARING, FEAR, AGGRESSION</p>	<p>Playing Mothers and Fathers</p>	<p>Learning about different people's needs</p> <p>Understanding that designed things - a house for example - are the way they are because of their practical function and emotional significance</p> <p>Using 'props' in a realistic way to support and extend the role play</p>	<p>Ability to be 'in someone else's shoes' and to understand their needs and point of view</p> <p>Ability to understand material culture as an expression of people's practical and emotional requirements</p> <p>Ability to understand the role played by material culture in people's lives</p>
<p><b>IDENTIFICATION PLAY</b></p> <p>'THEATRE' PLAY EXTENDED INTO MORE SUSTAINED IDENTIFICATION WITH OTHER ROLES AND CHARACTERS</p> <p>THE PLAY ALMOST BECOMES THE CHARACTER</p>	<p>Pretending to be the driver of a fire engine:</p> <p>Wearing appropriate clothes</p> <p>Reading about firemen</p> <p>Making drawings and models about firemen</p> <p>Extended play using a variety of props</p>	<p>Understanding the relationship between a particular role or job and the equipment needed to sustain it</p> <p>Designing and making equipment and written and graphic material to sustain a role and make it more satisfying and realistic</p>	<p>Ability to design and make for a particular purpose</p> <p>Ability to translate imaginative activity into material expression</p> <p>Further extension of the ability to understand the role played by material culture in people's lives</p>
<p><b>SOCIAL PLAY</b></p> <p>LEARNING THROUGH THE PERSONAL AND SOCIAL RELATIONSHIPS INVOLVED IN PLAY</p>	<p>Being part of a group of children building a tree house or den</p> <p>Planning together</p> <p>Making compromises</p> <p>Cooperating in building including allocating tasks</p> <p>Deciding how to use the den</p> <p>Improving it in the light of experience</p>	<p>A complete design and make project in the context of real social relations and with 'full-size' material for making</p>	<p>Involves a full range of design abilities from investigating people's needs, developing ideas, making compromises, selecting tools and materials, trying out ideas, making and evaluating as the basis for further improvements.</p>

**CHILDREN'S IMAGININGS**

Cohen &amp; MacKeith, 1991

**1 SIMPLE CREATIVE BEHAVIOURS**

	EXAMPLE	DESIGN ASPECTS
<b>TRANSMUTATORY</b>  IMAGINING THAT ONE OBJECT IS ANOTHER, QUITE DIFFERENT OBJECT	Imagining that the area behind the sofa is a mountain cave.	Ability to use modelling in a free, imaginative way.
<b>ANIMISTIC</b>  IMAGINING THAT AN INANIMATE OBJECT HAS LIFE - OFTEN TURNING IT INTO ANOTHER PERSON	Imagining that the fossil of a small shellfish is a live snail called George. Talking to him. Arranging his meals and home.	Ability to imagine and understand what other people need.
<b>INVENTING PEOPLE</b>  IMAGINARY CONVERSATIONS IMAGINARY FRIENDS OR COMPANIONS	Talking with Doris, a constant but naughty companion. The conversations are about exciting pranks and 'bad behaviour'.	Ability to imagine and understand events and behaviour which are unusual or not experienced at first hand.

**2 ACTING A PART**

	EXAMPLE	DESIGN ASPECTS
<b>AS A MACHINE</b>	Imagining being a truck delivering a load of gravel	<p>Ability to understand the function of products</p> <p>Ability to imagine how products and things are used</p> <p>Ability to see the functioning of products as a process related to people</p>
<b>AS A NON-HUMAN LIVING BEING</b>	Imagining being an elephant in the circus	<p>Ability to imagine the needs and ideas of others</p> <p>Ability to recognise that different people need different things to sustain them</p>
<b>AS ANOTHER PERSON</b>	Imagining being the owner of a famous dress shop	Often some ability to imagine that conflicts and dramas may exist about people's material circumstances and what they might need or want.

**ENACTING AN INCIDENT**

Acting out an accident in the kitchen which happened when Grandma fell over and scalded herself

Ability to plan a sustained role play involving 'props' as well as people  
Ability to explore the problems caused by products and places as well as their advantages

**3 IMAGINING TAKING PART**

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	EXAMPLE	DESIGN ASPECTS
<p><b>LISTENING TO A STORY</b></p> <p>INCLUDING LISTENING TO MUSIC OR LOOKING AT ART</p>	<p>Looking at Monet's paintings of his garden</p>	<p>Many pieces of art, music or writing either <u>show</u> design (Monet's garden) or are about people designing and making (The Little House on the Prairie)</p>
<p><b>READING A STORY TO ONESELF</b></p>	<p>Reading The Little House on the Prairie</p>	<p>But all also share in common the basic aesthetic qualities such as sequence, rhythm, colour, tone, structure, pattern.</p> <p>Direct experience of these can activate children's own aesthetic awareness and design ability</p>
<p><b>CREATING A STORY USING A 'STANDARD' PLOT</b></p>	<p>Working with other children to put on Cinderella using a toy theatre but with home made props, costumes and characters</p>	<p>A complete design and make project in the context of real social relations.</p> <p>It involves the full range of design abilities from developing ideas through to making and evaluating through the medium of the performance.</p>

4 INVENTED STORIES

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	EXAMPLE	DESIGN ASPECTS
<p><b>FREE-FLOATING DAY DREAMS</b> SPONTANEOUS REVERIE</p> <p><b>PRE-SLEEP SERIAL STORIES</b> 'EVENING DREAM' STORIES WHICH CONTINUE FROM ONE EVENING TO THE NEXT</p> <p><b>DAY-TIME STRUCTURED STORIES</b> USUALLY 'TOLD' SILENTLY TO ONESELF BUT SOMETIMES SHARED</p>	<p>A continuing series of tales about a character based on Paddington Bear</p>	<p>The ability to model and manipulate ideas and images in the mind is fundamental to all design activity.</p> <p>These moments of 'reverie' are spontaneous examples of that 'seeing in the minds eye' which designers have to use consciously and deliberately</p>
<p><b>ENACTED STORIES</b> THIS CATEGORY IS NOT MENTIONED BY COHEN &amp; MACKETH. IT STANDS FOR THE IMAGINATION USED WHEN 'DRAMA' GOES BEYOND AN ENACTED INCIDENT AND INVOLVES A WORLD OF CHARACTERS IN EXTENDED EPISODES OF ROLE PLAY</p>	<p>A group of children Spending the whole weekend 'being' Robin Hood and his Merry Men</p>	<p>Enacted stories relate to design in at least three ways</p> <ol style="list-style-type: none"> <li>1 They require imagining and then realising</li> <li>2 They have to be self-consistent within themselves</li> <li>3 They involve the complex use of places and props in order to make the store real</li> </ol> <p>So, in some ways they resemble a design and make project but they also require an explanation and understanding of the role of material culture in people's lives.</p>

<p><b>'PARACOSMS'</b></p> <p>A TERM COINED BY SILVEY TO DESCRIBE THE CREATION BY A CHILD OR CHILDREN OF A COMPLETE AND SELF-CONSISTENT IMAGINARY WORLD</p>	<p>The invention of an imaginary Farm and farming family called Caleb Jones situated in an imaginary valley in Wales.</p>	<p>In a Paracosm, the enacted story is taken to greater and greater lengths often involving painstaking designing and making to create props, illustrations, maps and other equipment intended to give physical substance to the imagined world.</p> <p>Considerable design ability is required to create and sustain the imaginary world of a Paracosm.</p>
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## REFERENCES

- 1 Shulamith Shahar, *Childhood in the Middle Ages*, New York, 1991.
- 2 Barbara Tizzard and Martin Hughes, *Young Children Learning*, London, 1984.
- 3 Internal paper, Department of Design and Technology, Loughborough University of Technology, 1993.