

The Design of Toys for Autistic Children

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Introduction

A commendable feature of craft students' projects at B.Ed. degree level is the opportunity made available to tackle needy problems too often neglected by the professional designer and manufacturer — a neglect not necessarily caused by a lack of sympathy but rather by the harsh realities of the business world where, in the final analysis, any venture must be financially viable. This often precludes the manufacturer of small numbers of specialist goods for isolated groups of individuals which would not provide the cost effectiveness of mass production or, indeed, where insufficient finance is available for purchase.

Such a project might be that of designing toys for autistic children, although it could be argued that this is not such a minor example at all for it has been estimated that there are over three thousand children suffering from autism, giving a problem comparable to that of deafness or blindness. However, unlike these other afflictions autism manifests itself in a variety of modes of behaviour requiring varied treatment and consequently a range of design solutions. In terms of actual hardware such a project might involve less technical sophistication than many sixth form projects — yet its value must be judged in terms of originality and ability to answer a human need.

The neglect of the problem of autism becomes more understandable when one realises that the concept of Early Infant Autism was identified as late as 1944. Yet the folklore, of many countries abounds with stories, for example, of infants reputedly stolen soon after birth and replaced by children with fairy-like characteristics, being delicate but showing indifference to pain and pleasure, and giving no affection or response to human contact. One specific example is that of the Wild Boy of Aveyronne who in 1799 was found running naked and covered with scars, and when eventually captured was taken to Paris as a specimen of

interest. The boy displayed no signs of response to most human contact, showed no reaction even to pistol shots fired close behind him, but sometimes responded intently to small sounds.

More recently the characteristic actions of autistic children have been described by Barbara Furneaux in *The Special Child* (Penguin, 1969) as follows:

An autistic child is a child who probably does not speak, who does not want to play or to use toys, who may have no interest in sand, water or similar materials, who may sit for long periods completely inactive or engrossed watching the movement of his fingers, perhaps twiddling a stick or piece of string, or who may have frenzied bursts of hyperactivity, who is not interested in food, even sweets, or who may be a compulsive eater, who ignores or over-reacts to sounds, who does not react to heat or cold, pleasure or pain, who indeed may at times attack himself savagely in such ways as hitting his head against a wall or viciously biting or scratching himself. A child who above all appears to want no contact with another person however loving the approach may be.

Such children therefore constitute a group who differ from other mentally handicapped children, displaying identifiable types of behaviour which when considered in their pure form are unique to this type of child. However, the symptoms are many and varied and often contradictory. Even the cause of autism is not yet agreed; some researchers emphasise cerebral disfunction, others emphasise parental upbringing, and whilst the latter is more tenuous it is an interesting finding that parents tend to come from a higher educational and occupational background.

The autistic child is handicapped in such a way that prospects of normality are remote. And yet chances of improvement

are real if suitable treatment is administered. The children have some capacity for learning, albeit minimal, and effective teaching can be enhanced with appropriate equipment. Because play constitutes an integral part of education it was felt that, despite all the problems, the design of toys for autistic children was a feasible proposition — toys not simply for recreational purposes but with educational objectives in mind, toys which might play some role in the recovery of the children.

Against such a background Graham Merrett spent a period of study at 'The Lindens' the school for autistic children of which Barbara Furneaux is Headmistress. The behaviour of the children was carefully studied and matched against known research with a view to formulating lines of approach to the problem of toy design. One immediate impression of the children was of contradictions displayed in sensory perceptions, in some respects demonstrating hypersensitivity and in other hyposensitivity. For example, Graham was often examined by touch and smell, being prodded and having his arm lifted and smelled, only to be nonchalantly discarded afterwards.

After discussions with the staff of the school who offered extremely valuable advice, sufficient information was available to point to the concept of a common theme for each toy relating to the senses — touch, smell, sight and sound — with the designs accommodating the characteristic behaviour of autistic children. A number of fundamental principles were established and as with all design problems a number of conflicting elements had to be resolved: the toys should be safe yet very strongly made: they should be simple and unsophisticated yet capable of extending new concepts: and they should be stimulating yet offer security through uniformity and repetition.

Subsequently a number of prototype toys were developed in the workshops of the College of St. Mark and St. John to be returned

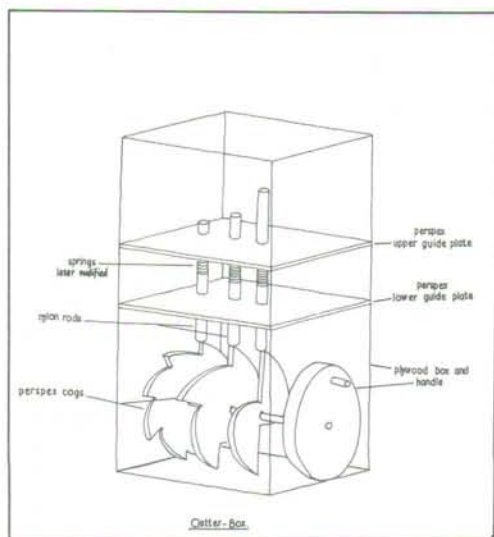
to the school for testing over a period of several months.

Development of the Prototype Toys Clatterbox

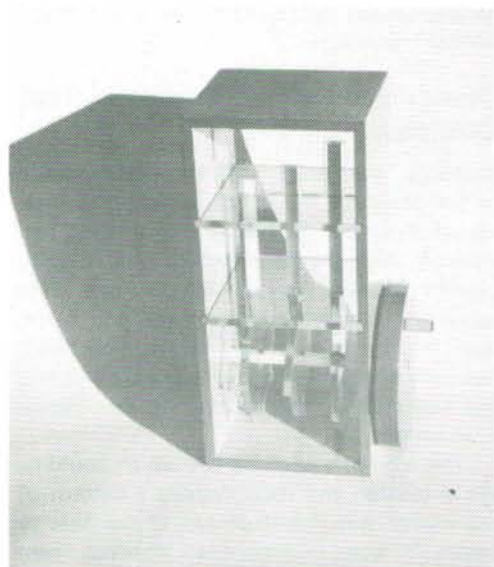
Probably the most striking characteristic to be observed in autistic children is their repeated pattern of bodily movements, particularly with the hands which often display bizarre actions. As an example, one child could be observed running back and forth, back and forth, twirling a straw in his hand, not only at morning and afternoon playtimes but also several months later repeating identical actions.

The idea of a working toy which could be set in motion and itself display a pattern of movement was therefore one of the first to occur. Because in general all children seem to have a fascination for handles and more specifically autistic children often respond to a continuous noise, the clatterbox was developed as a toy to provide more than a mere visual stimulus.

After experiments with various materials and movements a prototype was completed, made from brightly finished plywood, heavy



the game, children matching numbers or textures.



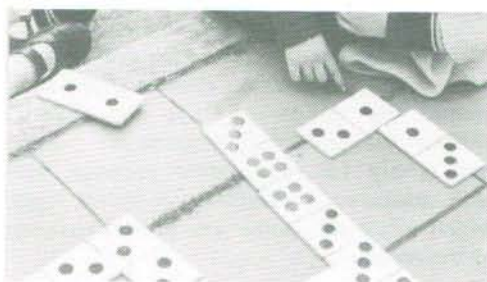
The final Clatterbox prototype

gauge acrylic sheet and nylon. As the handle turned cogs raised plungers in set patterns producing clicking noises of a tone similar to that of a metronome. At its simplest the clatterbox was pleasant to operate, watch and listen to, but as the child became more involved questions might arise 'Which rod goes the highest?', 'Which rod goes the fastest?' etc.

Tactile Dominoes

Another characteristic of autistic children is their tendency to exploit the 'immediate' sense of touch as opposed to the 'distant' sense of sight, and so the idea of tactile dominoes was developed as a game of dominoes with a difference.

Each block was relatively large, being 150mm x 74mm, with a maximum of only four dots and, most important, different numbers of dots had different textures to facilitate matching. The dots were of emery cloth, leatherette, felt and corduroy, and were inset in white melamine laminate. Simple number work could be covered with

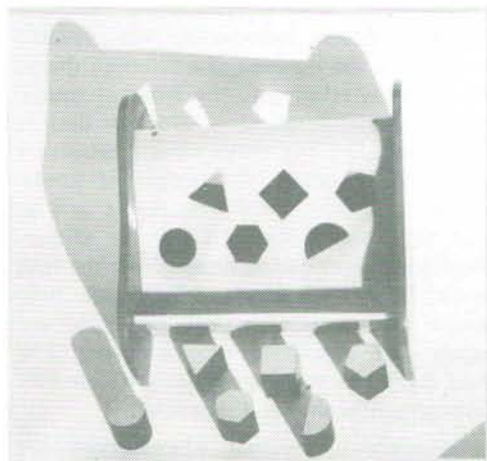


Using touch to find a 'three'

Posting Box

This was a toy designed to promote that aspect of touch whereby the child perceives shape and form as opposed to texture. Essentially it consisted of a shaped box concealing a variety of shaped blocks which could be fed in or out through corresponding holes. For 'posting out' armholes were cut in the back of the box and it was hoped that the combination of activities would provide a valuable exercise.

A moulded acrylic sheet formed the basis of the toy, having six shaped holes each with a slight lead in for the hardwood blocks. The



The final posting box prototype

sheet also had a curved lip to catch the blocks as they fell out. Like all the toys the box had a brightly coloured exterior, in this case yellow, and its inside was painted black to emphasise the dark shapes of the holes.

Bell Posting Box

A later development of the original posting box was this less complicated alternative which had the added incentive of a 'reward' mechanism activated by a successful posting. The new box contained only three basic geometrical shapes positioned such that falling blocks struck against bells positioned below. White melamine ends to the shapes aided visual matching with the holes and made the bells sound clearly.

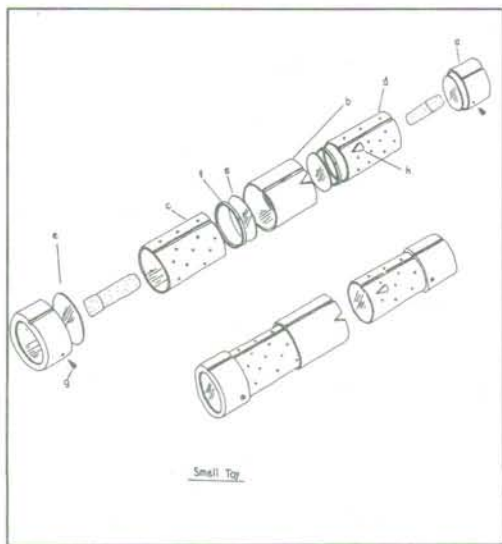
Smell Toys

The importance of smell to autistic children led to the development of toys whose parts could be matched by smell. This would seem a simple enough design brief but a number of problems arise: pungency fades in time and replacement material might not be available; many of the most suitable smells

come from liquids which are difficult to contain in a toy; strong odours readily overpower weaker ones, etc. However, the following were eventually chosen for the prototypes: coffee grounds, soap powder, menthol, peppermint, bath crystals, mixed herbs and after-shave lotion.



Matching Smells

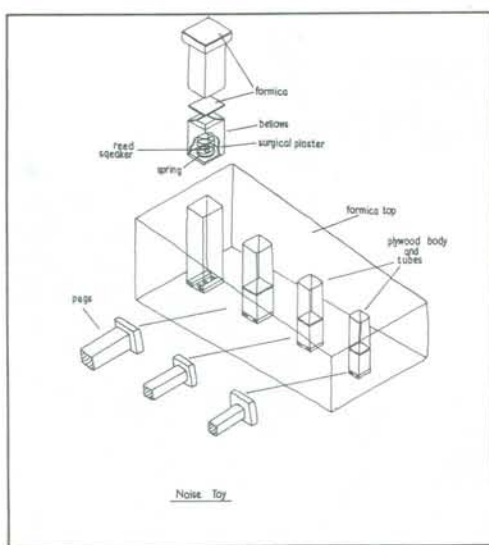


The toys themselves were essentially interchangeable containers for the smells which could be paired together. Plastic drainpipe, suitably drilled with holes, stop-ends and connectors as available from builders merchants for domestic plumbing were the basis of the construction. A line along the sides of the tubes which could be matched plus small, different socket shapes for each pair were built in. The smells were contained in removable muslin bags closed by Velcro flaps and could therefore be cleaned and refilled. Liquids such as peppermint essence were poured onto cotton wool for insertion in the bags.

Squeaker Toy

Echolalia, the constant repetition of a word or phrase, and the common tendency to over

react or under react to different noises indicates that sound has a particular significance for the autistic child. A toy was therefore designed which would 'reward' the child with a different squeak each time a set of pegs were inserted in their correct holes.

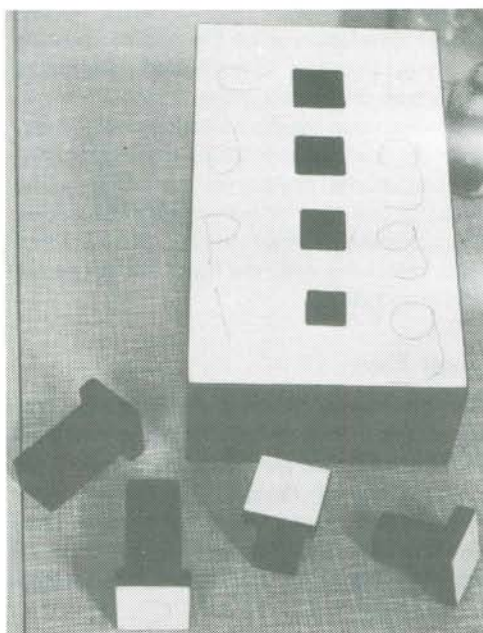


Basically the toy was a box with four holes diminishing in size and depth. Four pegs fitted these and operated squeakers when correctly placed. The construction of the squeakers posed a few design problems but these were soon solved with the help of surgical plaster and talcum powder! A useful feature of the toy was the facility for letters or numbers to be written on the surface and peg tops so that on fitting the correct peg the child completed a simple word or sum and produced a squeak at the same time.

Press Peg Organ

Music can play an important role in the life of autistic children — singing, for example, is one of the initial group activities encouraged by their teachers and occasionally an autistic child will demonstrate a marked musical ability, although this should not be seen out

of perspective for many children will equally show no interest. However, a press peg organ was subsequently developed from the squeaker toy, essentially operating on the same principle but having eight tuned whistles corresponding to the notes of the



The completed Noise Toy prototype in use at 'The Lindens'

diatonic scale. Fine polythene tubes directed air from the bellows to the whistles.

At its simplest the toy could be explored by handling and fitting the pegs to make sounds, whilst at another level a simple scale could be written on the top face of the instrument with felt tip pen and the reading and playing of tunes could be accomplished.

Children's Responses to the Toys

Exactly how the children would react to the toys was something of an unknown quantity. As it happened, the most immediate response came from less severely autistic children to the clatterbox and posting box.

Despite the importance of touch and smell it seemed to have been the colourful finish which first attracted attention, for the black and white dominoes and smell toys were initially ignored. After a while the more severely autistic children would be content to sit feeling a dominoe or posting block without necessarily looking at it. Generally the children often inspected the toys for some time or built them into towers before actually using them as envisaged.

Over a period of several months no one toy can be claimed to have been more successful than the others, different children having their own preferences — indeed, it was for this reason a number of toys were designed rather than attention being given to the perfecting of only one. All the toys had been designed for rough handling and stood up well to everyday use. The clatterbox had the most vulnerable mechanism and therefore caused most concern, yet apart from the handle working a little loose it survived many hours of use. Whereas one child might watch the rods closely as they rose and fell in sequence another would turn the handle while gazing across the room, perhaps it being the clatter which captured his interest or perhaps simply the turning of the handle.

In some cases teachers were able to draw the child's attention to the fastest, tallest or noisiest rod, but in general the clatterbox seemed to be a toy suited to the older, more capable children. It was suggested by staff that developments of the toy might have reduced or increased numbers of rods and various synchronisations. A box with one or two rods would facilitate the introduction of simple concepts although the attractive sound would be reduced.

The tactile dominoes were the most used toy in the trial period, possibly because a group of children could use them. During construction it was feared the blocks might be too large, but children readily played on the floor and teachers felt the size to be right and the textured dots a valuable asset.

A useful suggestion from Barbara Furneaux was that the number of dots should rise to five to correspond to children's fingers. Also dots one and two were too similar being felt and corduroy.

When the children played alone with the dominoes they often built 'houses' or arranged them in straight lines. Because of this it was felt the potential of the toy could be extended by slotting pieces together to create a tactile dominoe building game. Four pieces would slot together with numbers matching to give a square of blocks for the basic module.

The intricacies of the posting box were mastered by some children on the first day but others were still struggling to insert the shaped blocks weeks later. 'Posting in' was generally a success; unfortunately 'posting out' proved to be too difficult for most children as they were unable to perceive the shapes by touch alone, there being too many blocks with insufficient distinction. Suggested modifications for successful posting out would involve fewer holes and larger blocks capable of being cupped by the hands to perceive shape more effectively.

The school had one blind autistic child and as might be expected she preferred the posting box to the other toys. However her activity was limited to feeling the blocks inside the box and occasionally removing and replacing them. Partly for her the bell posting box described earlier was developed, offering fewer blocks to minimise confusion and incorporating the bells to confirm success.

Matching up the halves of the smell toys proved to be difficult for the children although they did frequently play with the toys and the idea was felt by the teachers to be educationally valuable. Lessons often centred around identifying odours, and toys with more distinctive smells and not necessarily involving the matching of parts might be developed. It is worth noting that the polypropylene tube proved an excellent

material being cheap yet tough. As with the dominoes children used the small toys as building blocks — one boy even managed to use every tube to create a tower six feet tall!

Most children enjoyed playing with the squeaker toy, although in its prototype form it was not particularly successful for letter work as the pegs could be inserted sideways or upside down. Slight modifications should easily prevent this happening. Several children tried to play a tune when the pegs were slotted into place and this inspired the development of the press peg organ already described.

Conclusion

Compared with the span of time devoted to design development in industry, from drawing board to manufacturer, the few months available for a final year B.Ed. project are modest, to say the least. As is the case with all children the responses to the toys were not necessarily the ones envisaged by adult designers. For example, toys meant to generate sounds might be used primarily for building blocks and vice versa.

Nevertheless, the design and testing of these prototype toys for autistic children proved to be a valuable introduction to the problem and it is hoped that other students will be able to pursue the matter further for there are implications for toys in general.

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