

A quarterly Review of International
Visual Communication Design

Issue number 4, 1972

icographic

4

Price per issue 1 US dollar

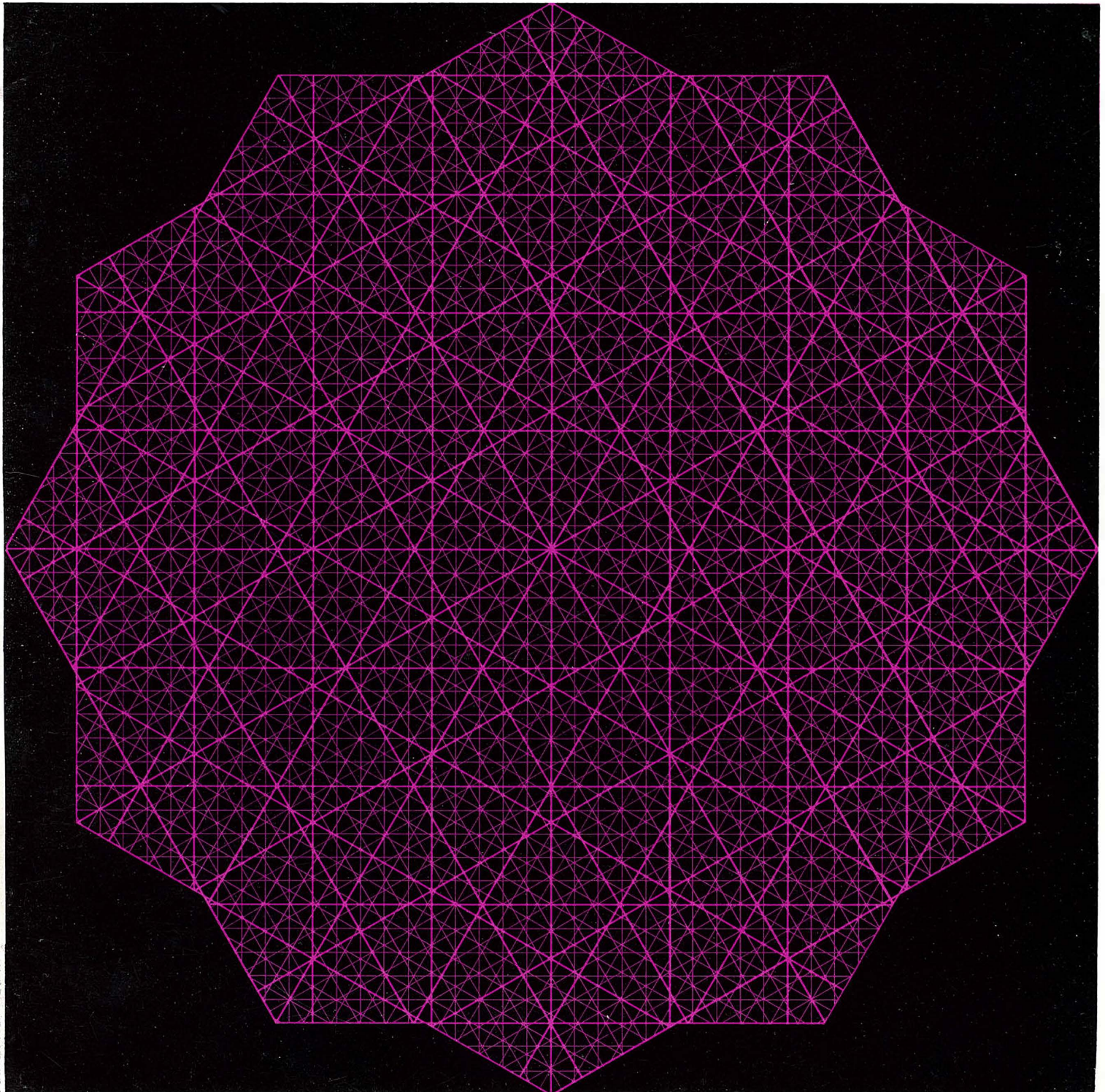
Published in London by the
International Council of Graphic
Design Associations

Contents include

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about learning
Creativity: a teachable skill?

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Letraset 

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Published quarterly by	The International Council of Graphic Design Associations. <i>All correspondence to</i> 7 Templeton Court, Radnor Walk, Shirley, Croydon CRO 7NZ, England
Sponsored by	Letraset International Limited St George's House 195 Waterloo Road London SE1, England
Paper supplied by courtesy of	Culter Guard Bridge, Salisbury Square House, Salisbury Square, London EC4 Cover printed on Hi-Fidelity Art Board 280g/m Text printed on Hi-Fidelity Art Paper 118g/m
Printing of issue number 4	Nexus Graphics Limited 5 The Grove, Ealing London W5, England
Design and layout of issue number 4	Patrick Wallis Burke Herb Gillman
Acknowledgements to	Typography Unit, University of Reading and School of Graphic Design, Ravensbourne College of Art and Design
Subscription rates	
Countries within Europe Subscription rate for 4 issues (including postage)	US Dollars 3.50
Countries outside Europe Subscriptions rate for 4 issues (including postage 2nd Class Airmail)	US Dollars 6.50
Recommended price per issue	1 dollar (USA) 40p (UK) 3.5 DM (FGR)
	Subscriptions must include four issues. Unless the publishers are notified immediately after the appearance of the fourth issue that a subscription is to be discontinued, it will be treated as renewed.
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Special announcement

The Board of the International
Council of Graphic Design
Associations is pleased to announce
the *Letraset International Limited*,
have agreed to finance the next
four issues of *icographic*.

Their generous gesture will be of
considerable assistance to both the
journal and *icograda*.
This is particularly gratifying in view
of the enthusiastic welcome accorded
icographic, both from within and
outside our organization.
The Board feels particularly indebted
to the Executive Editor, Guest
Editors and contributors who have so
readily lent their talents to this
venture.

John Halas,
President and Founder Editor:

Education is the general title under
which might be grouped our various
contributions to this fourth issue of
icographic.

The concern of our contributors
takes one of three specific forms.
The first group consider the problems
of educating and/or training graphic
designers. The second group is
concerned with the work of trained
graphic designers in the field of
education, whilst the third group
discusses what might be termed the
technology of education and
training.

The education of 'graphic designers'.

Visual Communication is the latest
title for the profession that is still
called *graphic design* in most art
schools, and *commercial art* by the
majority of the lay public.
It is a very young profession. Many
of its leading exponents had little or
no formal training for the business,
they simply invented the job as they
went along, altering or expanding
their roles as the demand for their
services grew.
As a newcomer, Graphic Design was
fitted uneasily into the traditional
scheme of things. It started life by
being thought of as some kind of
abberant art activity. To the artistic
elite, of course, it could only be
considered as a mediocre, second-
rate artistic activity, since it was
inevitably tainted by both technology
and commerce. Graphic Design thus
became one of the 'applied arts';
a sub-category of painting, known
as 'commercial art'.

Other forms of industrial design such
as 'product design' suffered much the
same fate. Since product designing
involved some consideration of three-
dimensional shape problems it could
be properly classified as a sub-category
of sculpture. In its early days it was
known as *styling* which is still the
name that best describes the activity
to the man in the street.
But during the last decade, Graphic
Design and some of the other
industrial design disciplines have
begun to move away from the applied
arts towards the applied sciences.
In graphic design there is now a
vigorous minority who are striving to
make the business more scientific.
Certainly it could afford to be a good
deal more rational, but can it ever
become an applied science? And even
if it tried, would not the scientific
elite regard it as a suspect scientific
activity when so many of its findings
can only be based upon intuition or
plausible reasoning?
Ever since the various industrial
design professions came into existence
there seems to have been a sort of
tug-of-war between the arts and
sciences for their control. In Britain,
evidence of this struggle is reflected
in the various educational systems
that have been set up to teach them.
Some authorities were clear that

design should be taught in *art schools*. Other authorities seem just as sure that design should be taught in the *Polytechnics*. Few authorities seem willing, at present, to consider autonomous design institutions as a possible alternative.

As far as graphic design is concerned, the adoption of the neutral term *visual communication* is a bit misleading.

The bulk of the present day graphic designer's work is concerned with *advertising*. In advertising, the designer functions as a tool of marketing, and his work is concerned primarily with influencing the preferences of consumers.

As a designer who is now involved with the education of future designers, I have to accept that advertising is an indispensable part of our current marketing systems. I do not, however, have to pretend that I like that fact. Nor do I have to pretend that advertising has anything to do with *communication* as I understand the word. As Raymond Williams says;

"...the only practical use of communication is the sharing of real experience. To set anything above this is in fact quite unpractical. To set selling above it may seem normal, but it is really only a perversion to which some people have got used: a way of looking at the world which must be right and normal because you have cut yourself down to its size."

This heretical view is one that is shared, I suspect, by a large number of graphic design teachers. Many of them have come into education, not because they failed as professionals, but because they couldn't work up enough enthusiasm for using their problem solving skills on the kind of 'communication' that is devoted to the continuous praise of many kinds of consumables that might otherwise be singularly resistable. Walter Plata would seem to share this view. He describes the particular problems involved in training visual communicators in East Africa. In a country where the consumer population totals only 1% of an approximate population of 3 millions there is less need to train designers who are concerned only with, as he puts it, "fairy tales for Mr and Mrs Consumer."

More urgent is the need to train African designers who communicate in a way that is appropriate to the language and environment of their people, and prepared to tackle more pressing problems than sales promotion.

Walter Plata also gives his impressions of the National Institute of Design, Ahmedabad, India, accumulated during a recent visit to this remarkable school.

Al Gowan, Editor of *Designcourse*, has also been travelling. He has managed to visit design schools and design offices in England, Scotland, Wales and Ireland. His article was prepared shortly before he returned to the United States and is, as he points out, a preliminary attempt to sort out his impressions following an arduous schedule spread over several weeks.

Graphic communication demands skill of both mind and hands. Jurriaan Schrofer, a designer from Holland, lets us see something of the exploratory manual skills that often characterise good graphic design. Although most of these works were produced in response to actual commissions, they are part of the designer's output that the client seldom sees. They are the "finger-exercises" that help him to extend his future range of possibilities.

Graphic design for education

Education in the more industrialised countries has been slow to readjust to the needs of the twentieth century. In Europe and America many experts are suggesting that present day educational modes of thought are inadequate. They maintain that many educational practices are based on philosophical premises that are no longer self-evidently true and, as a result, are out of harmony with the needs of the individual and society as a whole. In pursuit of its aims education still ignores important aspects of the human personality - the worlds of the senses and the emotions. It has also tended to overvalue ways of thinking which depend on language for their expression. Education is still largely concerned with training future personnel to manage, maintain and expand existing technological societies, so it is not surprising that it has tended to view art education as irrelevant to its major aims. Increasingly, however, it is being conceded that art education might have a *functional* contribution to make to general education.

Kurt Rowland, a designer and teacher, has already made a notable contribution to the resolving of some of these problems. He has written and designed two sets of books that form a means of providing courses in *visual education*. The first of these, *Looking and Seeing*, is already well known and has been welcomed by teachers in many countries. The second, *Learning to See*, appeared in 1968 and offers a basic course in visual education consisting of five textbooks, each with a workbook and a teacher's book.

In his article, Kurt Rowland discusses the particular problems that face the designer when he wishes to present a visual argument.

We show also a selection of material

from a range of books designed by Geoffrey Butcher for 345 Limited. As the name of the publisher suggests, these books are designed to aid parents to help their young children to develop through play, at home, in their pre-school years.

The technology of education and training

Art and design teaching, in common with much university teaching, is largely an amateur business. It is generally accepted that if you know your subject then you will soon discover how to teach it effectively. Undoubtedly there are many men who, without any kind of pedagogical training, are 'naturals' as teachers. Unfortunately, there are also many who, never having been taught, never succeed in learning how to encourage learning in anyone else. David Warren Piper, an educational psychologist, gives us a general introduction to what is currently known about learning, a subject that has been one of the major concerns of modern psychology. He concedes that although research has been extensive, as yet it has little help to offer the teacher when he tries to decide how to present himself in front of a class. Nevertheless, he believes that a better understanding of the principles underlying learning and finding the means to successfully apply them, could radically improve the standards of teaching in all kinds of schools.

Professor Edfeldt, an eminent Swedish psychologist, discusses the particular difficulties of designing educational programmes for adults. His views have relevance to anyone teaching in a school of art and design. Too often, he observes, it is assumed that adult education is just like children's education, only more so. He believes that there are very important differences that need to be recognised if teaching is to be effective.

Tom Warren, an American psychologist and researcher, asks whether it is possible to *teach* people to be creative.

The word *creativity* is, unfortunately, only a vague, evaluative term. It can be used in connection with almost any human activity of an artistic, scientific or inventive nature, but most people think of 'the arts' when they first encounter the word.

Even if the word is used in a vague way, everybody seems to think that creativity is important. It is frequently asserted that the quality of our community life, or even our country's economic survival, depends on the proper fostering of creative talent. As a result, some scientific investigation has been carried out, in the hope of (1) finding ways of detecting creative potential, and (2)

devising teaching methods that will successfully develop creative ability.

Tom Warren provides a scholarly review of the present state of investigations into this important question. He concludes that the various creative thinking techniques which have been tried are not likely to dramatically transform design education. Nevertheless, given the dearth of educational ideas within the design schools, such methods deserve serious attention.

My own article describes my attempts to identify student attitudes concerning the arts and the sciences. The reasons for my interest grew out of my discovery that many students in design schools shared stereotypical views of science and scientists; art and artists. Since problem-solving is influenced by personality and motivation, the attitudes which a student brings to his chosen area of study will tend to predetermine his chances of success. More importantly, perhaps, the way in which a student perceives himself often determines which of his mental gifts he feels free to display.

Executive Editor

Letter to the Editor

Dear Sir,

Would you please allow me the space to thank all contributors to whom the credit for *icographic 3* must go. May I also use this opportunity to point out the great difficulties under which a publication relying on voluntary labour, such as *icographic*, is edited and produced. In particular, whilst I wish to apologise to the contributor who complained about technical shortcomings in the reproduction, I must state that those contributors who least adhered to the dates agreed between us, themselves considerably aggravated the difficulties of production once the agreed schedule was breached and breached again.

To ask contributors to supply a brief synopsis of their article is a practice accepted by many serious publications. To take it for granted that editorial enthusiasm must actually produce the synopses as well as the translations is not entirely fair, and in itself delays editorial and physical production. In the interest of the Executive Editor and all future Guest Editors, please let us adhere to delivery schedules and supply synopses for translation - including, if at all possible, one or both translations!

Ernest Hoch
Guest Editor *icographic 3*

Creativity: a teachable skill?

T F Warren

T F Warren, an American psychologist, is currently a member of the Faculty of the University of Wisconsin, where he is engaged in teaching and research

icographic, 4, 1972, pp 3-5
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In 1950 a watershed of sorts was reached in the investigation of creativity. J P Guilford, in his farewell address as president of the American Psychological Association, strongly urged psychologists to study this intriguing concept. Several years later, a corollary of Guilford's suggestion was articulated by Harold Harding at the Annual Creative Problem Solving Institute on the University of Buffalo campus.

Harding stated;

"... American Higher Education, I regret to say, oriented more towards *critical* thinking than *creative* thinking. We produce critics rather than artists, or poets or inventors in the broad sense of these magnificent words. Our ... students far too often grow up in an atmosphere of skepticism, of indecision and doubt, and of strong negative conditioning (1962, p4).

The situation has not changed much in the past decade. Although more research has been done regarding creativity concepts, few classrooms have reaped tangible benefits either in the form of teachers trained in idea production or from materials which suggest valid strategies. A body of literature presently exists regarding creative thinking techniques which can serve as straightforward, operational base for the development of teacher-training programs and instructional materials relating to creativity. Potentially, creative thinking techniques can be applied to school disciplines traditionally associated with creativity, such as art, design and literature, as well as to disciplines such as history and mathematics where creativity is not usually thought of as an important factor.

Perspectives for studying creativity

Some people regard the process of creativity as hallowed ground outside the scope of organized investigation. According to such a view, creativity mustn't be tampered with, and somehow will be contaminated if studied. Others see a need for systemized research and proceed via several different approaches.

One such is the operational approach. Creativity is defined by reference to tasks and techniques which elicit or teach methods for producing new and useful ideas. Gordon (1961, 1969), Osborn (1963), Parnes (1962a, 1962b), and Crawford (1954) have been most active in initiating the development of industrial and professional creative thinking programs which are just beginning to be appreciated and studied by educationists. Creative thinking techniques are "conscious and deliberate procedures for producing new combinations of ideas". (Davis, 1969, p540)

Regardless of which methodological or conceptual approach is preferred, creativity seems to involve two ostensibly opposed characteristics. On the one hand is something akin to organization, lawfulness, predictability, order, planning, nurture, and science. On the other, one finds play, fantasy, intuition, mystery, nature and art. Bruner (1962) was talking about a similar dichotomy in his "right and left hand" analogy. The right hand is lawfulness, order, geometry, and taut implication; the left is sentiment, fantasy and intuition. Hunches are sometimes tamed by shifting them from the left hand to the right hand.

In assessing the historical development of creativity conceptualization, Gordon (1961) also alluded to two quite different factors.

"The traditional nineteenth century view of the nature of creativity places heavy emphasis on the fine arts and poetry as the 'only' creative enterprise, and asserts the primacy of individual genius in such a way that all human creative experience is hustled into the dark limbo of personal mystery. The common-sense twentieth century view of the creative process has become complicated by insistence on some method of measurement. How can we test for the mysterious quality of 'creativity'? How can we single out the creative individual in the democratic mass? How can we train individuals to become creative in the complex societies which we call education or industry? In other words, the twentieth century view of creativity is bifurcated into, on the one hand, a mysterious personal element that cannot be understood and, on the other hand, a quality that may be tested for and taught to anyone". (Gordon, 1961, p8)

A related question that arises when dealing with operational or *forced* creativity (ie using idea-generating techniques such as brainstorming) involves their relationship to intuitive, primary/natural creativity. One might ask, "is this *artificial* creativity equivalent to the real thing?" A final answer is not available since too little research has been done to make a definitive statement. Several investigators, however, do give qualified support for the idea that much similarity exists between the two realms. For instance, Mason (1960) and Arnold (1962) felt that training in *conscious*, learnable creative thinking techniques will result in increased *intuitive* creativity. Conscious effort will stimulate, awaken and strengthen one's creative potential. Osborn (1963) and Parnes (1962a) agreed that techniques may very likely be a first step to utilizing one's creative potential. Davis, Manske and Train (1967) noted that

many creative thinking techniques were first suggested by very creative people. It may be that their own "natural creativity" is well represented in the operationalized processes that are currently being taught in college and professional creative problem solving courses.

Techniques: a rationale for their existence

Bruner (1964) takes a strong stand in arguing for the important role of techniques in the development of intelligence.

"... the development of human intellectual functioning from infancy to such perfection as it may reach is shaped by a series of technological advances in the use of the mind. Growth depends upon the mastery of techniques and cannot be understood without reference to such mastery. These techniques are not, in the main, inventions of the individuals who are 'growing up'; they are rather skills transmitted with varying efficiency and success by the culture..." (p1).

Bruner goes so far as to suggest that the principal evolutionary change in man "has been alloplastic rather than autoplasic. That is to say, he has changed by linking himself with new, exter-implementation systems rather than by any conspicuous change in morphology ..." (p1).

Referring specifically to creative intelligence, Guilford (1962) suggested;

"Like most behaviour, creative activity probably represents to some extent many learned skills. There may be limitations set on these skills by heredity; but I am convinced that through learning one can extend the skills within these limitations". (p188)

Davis (1969) noted the teachable nature of creative attitudes, abilities and techniques. Attitudes may be defined as "learned, emotionally toned predispositions to react consistently, favourably or unfavourably, towards persons or objects or ideas" (Klausmeier and Goodwin, 1966, p343). A positive attitude towards novel ideas is important to creative development, and several creative thinking programs and strategies purposely seek to develop such attitudes, eg, Osborn's (1963) brainstorming; Covington, Crutchfield, and Davies' (1966) *Productive Thinking Program*; Myers' and Torrance's (1964, 1965a, 1965b, 1966a, 1966b) *Idea Books*, and Davis and Houtman's (1968) *Thinking Creatively*. Although creative abilities are usually thought of as unlearned, according to Guilford (1962) they possibly can be

strengthened. He suggested giving students exercises similar to the tests used to measure creative ability. Practice in such basic abilities as remembering, free-associating, discerning problems, being original and flexible, perceiving relationships, imagining and elaborating on wild ideas, plus others, is provided in the Myers' and Torrance *Idea Books* and in the Covington, Crutchfield and Davies program.

Techniques: descriptions and research

Attribute listing

Crawford (1954) defines the attribute listing technique succinctly by saying, "Each time we take a creative problem solving step we do it by changing an attribute or quality of something, or else by applying that same attribute to some other thing (1954, p96). "Thing" here is broadly conceived, including technological, literary, musical, and artistic materials.

Brainstorming

Brainstorming is a technique especially suited for group participation. Brainstorming sessions have long-term and short-term goals. The long-term goal is the solution of an important problem. In the short run, however, the goal is the production of a large number of ideas which may have potential value as solutions. Osborn (1963, p156) lists four basic ground rules of brainstorming:

1

Criticism is ruled out

Adverse judgements of ideas must be withheld until later.

2

'Free Wheeling' is welcomed

The wilder the idea, the better; it is easier to tame down than to think up

3

Quantity is wanted

The greater the number of ideas, the more the likelihood of useful ideas.

4

Combination and improvement are sought

In addition to contributing ideas of their own, participants suggest how ideas of others can be turned into better ideas; or how two or more ideas can be joined into still another idea.

The most important yardstick of brainstorming's success has been its wide acceptance as a useful tool for generating ideas.

Synecotics

Several techniques may be classified under the heading of synectics. The word is derived from the Greek "synecticos" which means the "joining together of different and apparently irrelevant elements" (Gordon, 1961, p3). The conscious use of metaphor is a key to the synectics

process. Aristotle (*Poetics*, in Butcher, 1951 translation) noted that artists recognize the value of "giving a thing a name that belongs to something else". Gordon extends this process and maintains that metaphorical thinking can be taught.

After more than 20 years of experience with teaching and refining metaphor-based creativity concepts, Gordon (1969) stated:

"... the most important element in the creative process is *Making the Familiar Strange*, because scientific breakthroughs as well as visual and literary innovations depend on strange new contexts by which to view a familiar world" (p3).

Gordon described three operational mechanisms, each metaphorical in character, for *Making the Familiar Strange*, all of which provide a non-rational, playful, stimulating atmosphere. They are *Direct Analogy*, *Personal Analogy*, and *Compressed Conflict*.

"Direct Analogy is a simple comparison of two objects or concepts" (Gordon, 1969, p16). English teachers might include "metaphor" and "simile" under the rubric of Direct Analogy, eg, "The windblown sand bit at our faces," "The wall was rough as a gardener's hand," respectively. Gordon noted many examples of how Direct Analogy stimulated discovery in science.

"Brunel developed the concept of the caisson by noting the boring capacity of the toredo, a ship worm. Alexander Graham Bell used Direct Analogy to develop the telephone receiver. His telephone notion was derived from the function of the tiny bones of the ear. Many basic nuclear theories are a clear comparison with an astronomy model (p17).

Personal Analogy is a description of how it feels to be a particular animal or object. It involves empathizing with other things, the more completely, the better. Gordon (1969) identified levels of involvement in Personal Analogy from superficial recitation of the overtly obvious to strikingly uninhibited success in "becoming" the object in question.

He noted some scientific discoveries that seem to suggest the use of this technique. For example,

"the great Dutch chemist Kekule ... in attempting to solve the riddle of the molecular construction of benzene ... imagined himself to be a snake swallowing his tail. This Personal Analogy led to the concept of the molecules being set in a circular pattern" (p23).

Also, Dr T A Rich, a scientist with over 100 patents involving electricity and electronics,

"puts himself in the middle of a problem, trying as he says, to 'think' like an electron whose course is being plotted, or imagines himself (to be) a light beam whose reflection is being measured" (p23).

Compressed Conflict, the third synectics technique for *Making the Familiar Strange*, "is a poetic, two-word description, on a high level of generality where the two words don't seem to fit and sometimes actually contradict each other" (Gordon, 1969, p24).

Examples might include "imprisoned freedom", "velvet strength", and "nourishing flame". Compressed Conflict has similarities to the other synectics techniques, of course, since they are all metaphorically based. However, the surprise factor is at its highest intensity with this technique. On the other hand, Compressed Conflict provides the most insight into a problem. It is, however, the most difficult to use.

Examples of Compressed Conflict in science include Cajal, the Nobel prize winning developer of the neuron theory, who referred to the "protoplasmic kiss", and the vaccine developer Koch, who began a series of experiments with a "safe attack" (Gordon, 1969, p26).

Bionics

Bionics is a design engineering concept with many similarities since it involves investigating the

"structure, function and mechanism of plants and animals to gain information for analogous man-made systems" (Bionics, 1963).

It is a way to

"study basic principles in nature and emerge with applications of principles and processes to the needs of mankind" (Papaneck, 1969, p6).

The number of inventions and improvements that can be traced to the study of analogous structures, functions and mechanisms in nature is very large. The eye of the frog helped develop an electronic property filter which suppresses certain phenomena, whilst allowing others to pass. Beetle's eyes have suggested improvements for advancing film in aircraft cameras. Moths' and bats' ears have aided in developing radar anti-jamming devices. The European warbler (which navigates by sun during the day and by the stars at night) has been studied to help improve navigational procedures. The low friction properties of whales and porpoises have suggested improved propulsion systems for submarines. In earlier days, birds were closely studied by aspiring aviators, and other natural phenomena suggested man-made levers and wheels. Papaneck notes a difference

between early designs and inventions and those exemplifying modern bionics.

"Whereas we may consider the first hammer an extension of the fist and the first rake a type of claw, bionics today is less concerned with the form of parts or the shape of things than it is with examining how nature makes things happen, the inter-relation of parts, the existence of systems ...

If the Industrial Revolution gave us a mechanical era (a static technology of moveable parts), if the last sixty years have given us a technological era (a dynamic technology of functioning arts), then we are now emerging into a biomorphic era (an evolving technology permissive of imitation)" (Papaneck, 1969, p6).

Morphological Synthesis/Analysis*

Next we turn to a technique which is at the other end of the playfulness-organization spectrum. Davis (1971) defines morphological synthesis/analysis as follows:

"One first identifies two or more dimensions (or attributes) of the problem ... Second, one lists ideas for each of these dimensions ... Finally one evaluates the huge number of all possible combinations".

From the tremendous number of ideas produced by such combination, most will be useless. However, a few may be quite promising, themselves, or may inspire a related idea.

Attribute listing works best with very specific problems while use of morphological analysis should deal with generic and basic matters. The morphological analysis technique involves stating the problem as broadly as possible and also defining the dimensions broadly.

Free Association Technique

This technique was developed in the tradition of stimulus-response oriented experimental psychology. Its behaviouristic origins have been articulated by Maltzman, Bogartz and Berger (1958).

Maltzman's basic originality training procedure involved giving persons the same training list of words several times and requiring them to give different verbal associates each time the list was presented. This ostensibly forced the subjects to respond more originally, as the number of presentations increased. Maltzman found this tendency seemed to transfer to test lists (Maltzman, Bogartz and Berger, 1958; Maltzman, 1960). However, several other studies have noted less than clear-cut results.

Checklists

Another idea-finding technique is called the checklist method. Davis (1971) writes;

"the checklist strategy simply amounts to examining some kind of 'list' which could suggest solutions for a given problem" (p91). "List" is broadly conceived and can include such diverse sources of ideas as: deliberately constructed hints; the yellow pages of telephone books; want ads; dictionaries; Thesauruses; department of hardware store catalogues, and, the most inclusive of all, "the things around us". Like other creative techniques, checklisting forces the user to draw from sources that are very available, but not obviously relevant to a given problem.

Although some research has been undertaken to investigate the checklist procedure, (see Cartledge and Krauser, 1963; Davis and Roweton, 1968; Davis et al, 1969; Roweton, 1969; Torrance, 1961; Train, 1967; and Warren, 1970) results are something less than conclusive.

Conclusion

Laboratory research attempting to learn more about creative thinking techniques is just beginning and is sometimes inconclusive. Reports from industry, although not formulated in experimental paradigms, consistently support use of creative thinking techniques where product improvement is needed. Educationalists who value idea production should keep a watchful eye towards developments regarding these techniques. Entire "creativity" courses or smaller units within existing courses could be implemented in schools where there is no conscious effort to encourage the production of original or useful ideas.

The distinction Abraham Maslow (1968) has made between "Special Talent Creativity" and "Self-Actualizing Creativity" is useful when discussing idea generation in an educational setting. *Special talent creativity* refers to the situation in which an extremely capable individual has produced a product which others think is original or useful. "Product" is broadly conceived and need not be tangible. *Self-actualizing creativity*, on the other hand, is characterized by an increased awareness or broader perspective in a growing person. This type of creativity can become operative in virtually anyone.

For persons who possess *special talent creativity* creative thinking techniques could be cumbersome and get in the way of their

"natural" creativity. It must be noted, however, that such persons through testimonials regarding their own thinking processes, have been instrumental in *developing* creative thinking techniques (Davis, Manske and Train, 1967).

For many other persons strategies such as creative thinking techniques may be quite useful. The techniques can be catalysts for generating new perspectives and products, or they can promote positive attitudes toward creativity (Davis, 1969).

In any event, there is not a surplus of good ideas emerging from our schools. Creative thinking techniques will not provide the panacea which magically transforms education, but it will be interesting to give them a try. So far this has not been done.

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Footnote*

Both terms, "morphological analysis" and "morphological synthesis" have been used to label this concept. Some writers (eg Osborn) use the former, while one of the inventors of this method, Allen, prefers the latter. The present writer will use "synthesis" since it more aptly emphasizes the "joining together" nature of the process.

We are indebted to the publishers Davis Poynter for permission to publish this abstract from a book of readings in art and design education, edited by Davis Warren Piper, which is to appear this autumn

Visual communication in East Africa

Walter Plata

Walter Plata lectures in the Department of Design, University of Nairobi, Kenya. He was educated and trained in Germany, where he started designing visual communication in 1950. In 1961 he began teaching as assistant professor of graphic design at Rhode Island School of Design and has since been both a designer and teacher in many countries

The Department of Linguistics and African Languages furnished this Swahili translation of visual communication: *uelezaji njia ya kuangalia*. Swahili-speaking ayahs, cooks, lecturers, students translated it back into English as *demonstration through watching, to know by looking, to get information by way of seeing*: useful definitions of a term referring to a rather new activity in East Africa.

Visual communication is an exchange of messages which can be seen. Together with messages which can be heard they make up the bulk of human communication, which (in his *On Human Communication*) Colin Cherry defines as an activity which establishes a social unit from individuals by the use of language or signs. Communication is the condition *sine qua non* of an individual's and of a society's survival and development.

The more industrialised societies became, the more they needed efficient communication systems. These they got with audio-visual telecommunication media. But also the old media of visual communication had to perform more efficiently in more complex communication situations. A new professional was needed to plan, to design visual communication.

The graphic designer appeared, trained in a new kind of school, the school of design (or art and design or craft and design). The best known and influential of this type of school was the Bauhaus, which operated first in Weimar, then in Dessau, between 1919 and 1932. In all these schools a designer was trained whose ability and capacity rested on intuition, creativity and personal experience, fine qualities which, however, cannot be measured or described precisely. Neither can such a professional's output - his design - be measured and verified precisely. This largely explains why in 50 years of schools of design and designers no theory of design has yet been written.

For the past 50 years in Europe there has been hardly any communication between schools of design and their graduates, and universities and their graduates. And there was no need for it. Psychology, engineering, mathematics, philosophy, economics, as well as design, were taught and practised for development and progress, which was visualised also in columns of figures: communicating how many cars, chimneys, stockings, soap powders, cigarettes, books, guns, pills... were produced and sold. Scientists, artists, commercial artists and designers - among others - were all busy developing Mr and Mrs Citizen into Mr and Mrs Consumer. Visual

communication was mostly unilateral one-way messages from the producer to the consumer, urging, asking, persuading, yelling at him to consume more, to throw away, to buy, to spend ...

The vast majority of people calling themselves graphic designers are still engaged in "designing" this kind of visual communication, called advertising - 90 percent of them, according to the BDG (Bund Deutscher Grafik-Designer) in Germany, the oldest professional society of graphic designers. Their training for the design of this kind of visual communication, often to visualise the gags and gimmicks of sales managers and promotion men, was and is adequate. No advertiser rightly is interested in his advertisement as a means to transmit information as fast as possible, because in 95 percent of advertising no information is transmitted, if we understand by information data which increases the knowledge of the receiver. If we can qualify what is transmitted in the vast majority of advertisements as a special kind of literature, as fiction or fairy tale for Mr and Mrs Consumer, then we may say that the invention of these tales and their presentation to the public is closer to art than to design.

The graphic designer of today who calls this activity "design" should have kept his old designation as *commercial artist*. Intuition, creativity - if he owns and cultivates these fine yet not precisely measurable qualities - will make his work and himself more successful than if he had these qualities which make a designer find a problem, state, describe and analyse it, programme its solution based on data and the fixation of selected measurable variables, visualise the solution leading to or resulting in the problem's solution. The solution will be a product which fits into and develops an economic and socio-cultural situation of whose many components usefulness and beauty are just two. If the product were only to be beautiful, an artist could cope with the problem.

The commercial artist, now often calling himself a graphic designer, was and still is successful. With his help in the highly industrialised countries called "developed", quasi-perfect consumer societies were established and are functioning.

In these societies more and more of their members in the last ten years had similar experiences to that of this writer: walking in the main streets of Birmingham, Frankfurt, Gothenburg, Kyoto or Pittsburgh one has to yell into the ears of one's companion to communicate with her. Not only the Hudson, Rhine and Thames stink but even the small

streams one encounters in "recreational" areas where one spends holidays. In Los Angeles, in Bolton, on the autobahn in the Ruhrgebiet on bright days it suddenly becomes greyish-black: smog: visual communication of societies whose members have highly activated certain parts of their brains but who have lost the ability to reason, who produce as much dirt as soap and consume both.

Recently a change has started to take place in these "developed" countries. Politicians campaigning for mayorships in urban areas promise the voter to return to him what he once owned: the pleasure of walking and talking in the streets and a blue sky above him. Economists stop cherishing the national production and consumption growth as the developed countries' holy cow. Student protest and revolt against education and training inadequate to make them capable of solving problems in a new society in which they no longer want to be powerless specialists and manipulated consumers. An alarmed and scared public backs very expensive educational reforms and new programmes. Implementing them in Europe, the first schools of design are being integrated with universities.

Against this background of change and reform in education in general and in the education and training of designers in particular, in the so-called developed countries, the first school of design in Africa between the Sahara and the Zambesi was opened. In 1969 a department of Industrial Design was established at the University of East Africa's College of Nairobi, and shortly after renamed the Department of Design. What was then and still is designated visual communication in East Africa - known as commercial art, graphic design, advertising design - was and is mainly imported from Europe and the US and modelled on it. But here press, magazine, film and television advertising is not in thousands of millions of shillings' business as in the Western countries where its halting would probably cause the collapse of those consumer societies. In East Africa this kind of visual communication is directed to a group of consumers totalling up to only 1 percent of the approximately 30 million inhabitants.

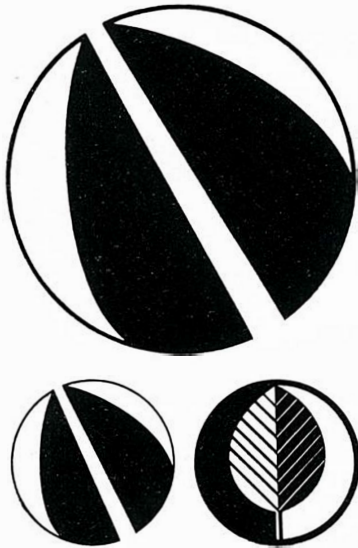
No student in the Department of Design should be specially trained to serve this market and group. The artists and craftsmen needed by the agencies handling advertising are more economically trained within the agencies or at a vocational school. At such a school all young people who in East Africa would professionally handle a camera, brush, pen and typographical rule could be trained faster and cheaper

than for eleven thousand shillings a year at the University. The costly university education justifies the training and education of designers of visual communication - the relevant programme in the Department of Design is still called graphic design - only if the graduate will be capable of taking part in decision-making at management level. For this he will have to be as qualified a professional as a psychologist, economist, physician or architect. Only within the university can he acquire the necessary knowledge.

Being with the Department of Design from its start, this writer would suggest that such a professional could be produced by it if two major changes were effected: that the present three years of undergraduate studies are intensified into an undergraduate study of four years of three terms each year or three years of four terms each year, and that candidates must have a principal pass in at least one science subject and may leave art as subsidiary only.

Now the Department of Design normally gets students whose art teachers in secondary school had heard something of commercial art and suggested the study of "design" because the student was rather good at handling a piece of chalk, a brush, a pencil. The problem of the Department of Design is to get the right students and also to get the right staff; a combination of an experienced designer and a teacher, able to tap sources of such relevant knowledge and programme its flow from other departments to the Department of Design which he himself is not qualified enough to transfer to his students.

All the knowledge necessary to make out of the right student a designer is available in this university. This designer of visual communication, a Bachelor of Arts in Design graduating at the University of Nairobi, will depend on and will be the product of successful communication within the university.



Both symbols were designed for the Association of Medical Students, University of Nairobi, to visualise contemporary medical practice in East Africa. The circular shapes, representing pills, refer to modern medicine while the shapes of leaves and horns refer to traditional medicine. G G Kamau and R C Aguma, graphic design students of the Department of Design, integrated these shapes into functional signs, semantically precise and legible down to small sizes



More often than not a photograph alone is semantically imprecise. To readers who do not understand Swedish this photograph will transmit different messages, possibly each interpreting differently what he sees. However, given the translation of the text, All advertising is not shit, and being told that this poster was designed by two well-known Stockholm art directors for distribution in the Swedish advertising profession (where golden eggs are awarded annually to selected advertisements), the reader will be able to interpret the photograph as a criticism of a large part of advertising



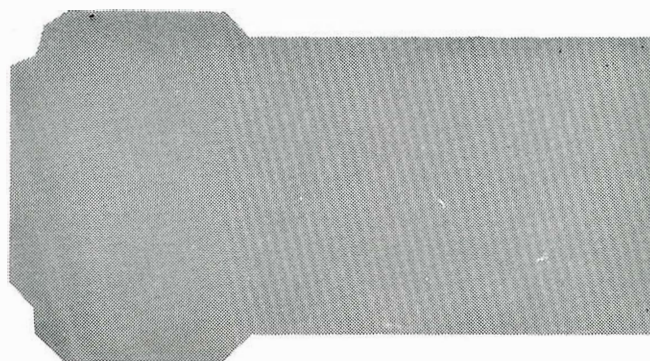
TRADERS TOLD TO SPECIALISE

TRADERS taking over businesses previously owned by non-citizens have been advised to specialise in trade in order to be successful. The advice was given by the Central Provincial Planning Officer, Mr. D. Kungu, when closing a one-week course at the Wambugu Farmers' Training Centre attended by 12 traders from Nyeri District.

Above, a cutting (in original size) from the front page of the Daily Nation illustrating the traditional narrow newspaper column



Posters used to help in preventing accidents in East African factories are imported. Their design is of low quality and consequently they function badly in their country of origin and worse in East Africa, where the receiver of the messages they transmit lives in a different environment and speaks a different language. In co-operation with the Inspectorate of Factories, Ministry of Works, graphics students in the Department of Design are re-designing such posters. Reproduced here are an imported poster and a stage of re-design by D P Karamu



Aerogrammes of such shape are sold at the post offices in East Africa. As a medium of visual communication or a channel usable for the transmission of information they are badly designed for use in offices. Because of their size/shape the typing

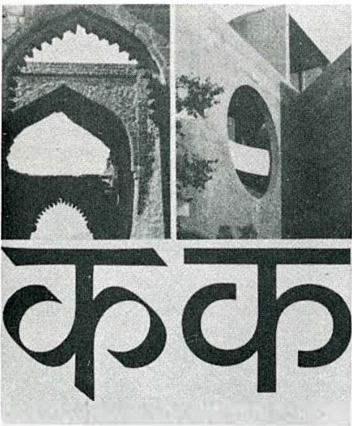
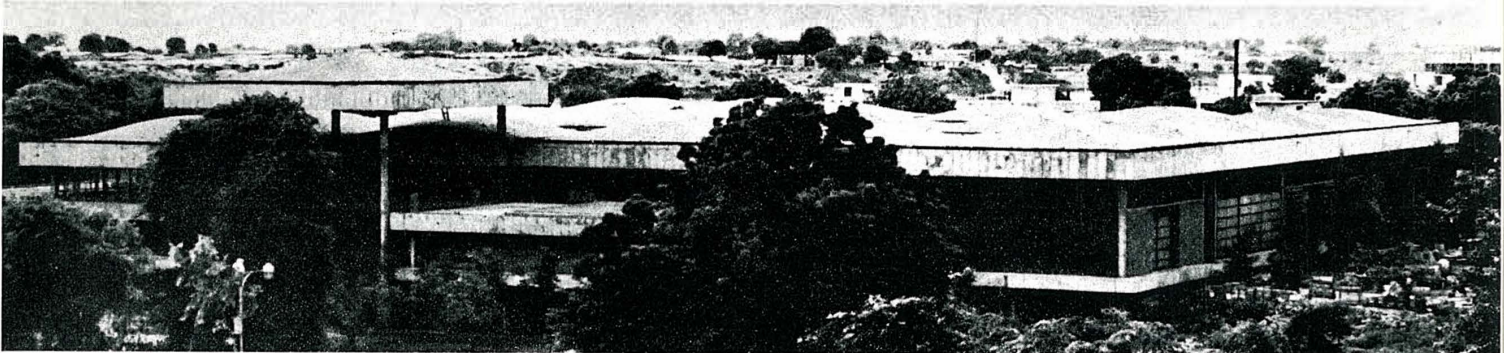
of information and the filing and retrieval of the aerogramme by the receiver present problems. This then is an illustration of the need for African designers with the know-how and authority to design more functional aerogrammes

The design of this medium of visual communication is based on European beliefs and opinions - sometimes qualified as creativity or intuition. Scientists have proved that this traditional newspaper design causes a considerable reduction in the functioning of this medium. The short line - increasing the number of fixation pauses - the many word breaks, the recurring over-wide spaces between words and the excessive number of words set in capitals all dramatically reduce legibility. A designer of visual communication would say that this type of newspaper is very 'noisy' as a channel for transmitting information. Its traditional design also causes a partial waste of the capacity of the channel, which negatively influences the production costs of the newspaper

Top, a general view of NID.

Below, one of the projects undertaken by the Institute, the design of a Devanagari script suitable for mechanised printing. The Devanagari script is used by the 237 million Hindi speaking people of India. Many of the other scripts used by the various linguistic groups in India are derived from Devanagari. Within the context of a

national programme for mass education and improved communication, the development of a Devanagari script suitable for mechanised printing, such as typewriting, typesetting and photocomposition, was vitally important. The consultant for this project was Adrian Frutiger



**क क क कागज अहमदाबाद पनघट
क क क कागज अहमदाबाद पनघट
क क क कागज अहमदाबाद पनघट**

b हिंदी भाषा की पसार-वृद्धि करना उसका विकास करना ताकि वह भारत की सामाजिक संस्कृति के सब तत्वों की अभिव्यक्ति का माध्यम हो सके तथा उसकी आत्मीयता में हस्तक्षेप किए बिना हिंदुस्तानी और अष्टम अनुसूची में उल्लिखित अन्य भारतीय भाषाओं के रूप शैली और परावली को आत्मसात् करते हुए

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18-3-72. Arriving from the Department of Design in Nairobi, after the junk of Bombay airport and downtown Ahmedabad, for the teacher of design a dream comes true: buildings "unmonumental, anonymous, pleasant, unpretentious, workable, unshoddy". Just as Charles and Ray Eames "saw" them and wrote it down in their report of April 1958. The Eames' had been asked by the central government of India for "recommendations on a programme of training in design that would serve as an aid to the small industries; and that would resist the present rapid deterioration in design and quality of consumer goods". They toured through India for three months. As a result of their study they submitted a report - a mixture of a declaration of love for India, a vision of, and a plan for a national school of design. Three years later in 1961 NID was established by the central government as an autonomous national institution for advanced training, research and service, mainly in product and visual communication design.

The bricks, glass, wood, concrete, grass, steel, water, trees, cast-iron, make up an environment of *deja vu*, of buildings or parts of buildings seen in Kyoto, Ulm, Kassel, London, Aspen, Stockholm, Eindhoven: you feel at home at once. It is less warm than out in the town

in the brawling streets - almost cool, and quiet.

The main complex comprises studios, laboratories, seminar rooms, lecture theatre, library, offices - you can breathe, stretch out in them - and workshops. Workshops! Like factories. All with their main floor 3.24 metres above ground level. The entire building is on stilts. The site, 20 acres of land, is on the west bank of the Sabarmati river. Its ground level 2.51 metres below the high flood level recorded in 1875.

NID's first phase is now complete: During this first phase, students were recruited who had already studied for four or more years at schools of architecture, fine and commercial arts. They were educated and trained, mostly by visiting lecturers, mainly from Germany, Switzerland and the United States, all experienced designers. This kind of post-graduate programme gave the NID its Indian staff. Kumar Vyas, product designer, is the Chairman of the Faculty Board. In the Department of Visual Communication, the responsible teacher-designers are Dashrath Patel (exhibition, photography), Ishu Patel (film), Mahendra Patel (typography). Subjects relevant to design, like sociology, psychology, history of art, economics, communication theory, were from the beginning taught by Indian staff. The Indian designers

now teaching have all studied and worked as designers abroad.

NID, now in its second phase, still offers post-graduate studies. But the emphasis is on the undergraduate programme. Courses are offered in the design of consumable products, furniture, textiles, ceramics, exhibitions, photography, films, and printed media. In all, 70 students are enrolled. Student-teacher ratio is excellent: 1:2, 1:3, 1:4. Teaching and training of undergraduates is programmed at 5 years. For the coming academic year beginning in July, the NID for the first time advertised its courses nationally, inviting applications from suitable candidates. It received 800 applications. Kumar Vyas estimates that perhaps 400 will take entry tests, of whom about 30 will secure places. Full student capacity will be reached with 150 students. Tuition fees are 100 rupees per term. The student has also to pay for his private board.

NID's recurrent expenditure is met by grants from the central government and by professional design fees. Staff and students are determined to govern themselves and to stay autonomous. They feel certain that they could keep going, even without public support, just by their earnings through designing.

Their attitude is courageous and admirable. NID is determined to do what Ulm failed to do: to integrate professional practice and design training and, not only survive, but thrive on it. In a school of design in another developing country, Kenya, some years after its founding, students of visual communication also learn and train mainly by working for selected East African clients. But their present programmes could not be financed solely on the fees earned. The experiment at NID is a unique one.

Some of the results, the output of its students and their designer-teachers, were on display on 18-3-72 NID, at the end of its academic year, opened its doors to the public. This writer feels qualified to comment only upon the work exhibited in the field of visual communication. It was as good as any good work done in any design school. It also showed the same weaknesses of such work elsewhere. Design is still thought of as art. Decisions taken are still too often based on opinions, where they might be based on available data. What NID needs, as do other schools of design, is more data upon which to base decisions and to collect data which is already available.

An American view of British graphic design education

Al Gowan

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*icographic, 4, 1972
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Several years ago I saw a documentary film done by two Englishmen about a small town in Kentucky. Because they were foreigners, they saw their subject with fresh perception, and produced an informative, compassionate film. An American would have been too biased to see Kentucky anew.

With that example in mind I have had the audacity to visit Britain and Ireland and snoop around as many design schools as possible within a three months period. Although my work is not yet completed, to date I have visited some fifteen design schools in Britain and Ireland. I have seen a number of Diploma exhibitions, have spoken with faculty, and have had long conversations with students.

I chose Britain because I had been impressed with the quality of design education in Canada during a recent lecture tour there. I found that many Canadian schools have British faculty, and consequently Canada has patterned design education after Britain rather than America.

Scotland

In Scotland it is accepted that design education is a matter of national concern and not only of interest to designers and their clients. The Scots feel they take a more realistic view of the employment problem than their English countrymen. An attempt is made to relate numbers of student places with numbers of posts in industry as well as teaching. It can be argued that since the population of Scotland is small, and since only four Scottish design schools exist, it is easier to project needs than in England. Only in a manageable environment can the problems of a larger society be tested and projected. Perhaps England and America should follow the example of Scotland in this respect. It might be wise not to continue to allow more designers to be educated than the society needs, to ensure quality. The quality of student work I observed in Scotland seemed very high, compared to America.

Ireland

Most design educators in Ireland agree that the Ulster Polytechnic in Belfast is their only comprehensive design school. It alone offers the Diploma in Art and Design (DipAD). But students from the Irish Republic must pay full fees to study in Belfast, and few can afford to do so. As a result, Irish students who study outside Ireland go to England where there are more schools to choose from, and more employment opportunities in design after graduation.

Although there are several schools in

the Dublin area, no single institution gives a student the broad design exposure necessary. The Dublin School of Printing offers vocational training to printers, typographers and the graphic arts. Students there take a short course in graphic design which is well taught, but most students are not serious about becoming graphic designers since the vocational trades offer job-security, union safeguards and are more acceptable to their parents. At Rathmines College of Commerce courses in graphic design are taught but within the tradition of journalism and marketing, which limits the scope. The National College of Art and Design offers students the best theoretical design education in Dublin, but within the fine-art tradition, and with very limited facilities. Every design educator I talked to agreed that if the facilities and staffs of each of the three schools mentioned could be combined, along with the photography courses at the Institute of Technology, students could be offered a good design education in Dublin.

Since an initial survey some five years ago by a group of Scandinavian designers, the Irish Republic has been consciously developing a design industry, in anticipation of Ireland joining the Common Market along with Britain. Since independence from Britain in the twenties, Irish industry has been protected, and has not grown nor attempted to compete. Now the Kilkenny Design Workshops, a community of designers and craftsmen from all over Europe and Ireland are producing high quality ceramics, jewelry and textiles by hand, but with the intent of eventual mass production for export. Coras Trachtala, the Irish Export Board, directs the efforts of industry as well as the Kilkenny Design Workshops. Sensing the vacuum in design education, the Council of Industrial Design as well as several design organizations have devised design competitions, conferences and exhibitions, as well as the International Film Festival in Cork. Ireland will be an interesting place to watch, as the transition from a verbal to a visual society is made. The fact that nearly every Irish family now has access to television will bring this about even if the efforts of education and industry fail. The main factor will be Irish students. They must be led to aspire toward design as a profession.

England and Wales

Most of the visiting and talking to designers and design students was done in England, since there is much more activity there than in any other part of Britain or Ireland. My first impression is that the quality of work and the maturity of students is considerably higher than most

American counterparts. I can assume that the DipAD requirements, which are national standards for the teaching of art and design growing out of the Council of Industrial Design's standards have served to raise the quality of design education. Although the DipAD standards, as well as the work, appears fairly rigid to an American, DipAD seems to work, just as the Art Directors Clubs and National design organizations which flourished in the USA during the mid-fifties served to raise standards until they came to be mutual admiration societies. The DipAD standards might become the same in Britain in time, but one safeguard could well be the External Assessor, a qualified and, hopefully, objective outside judge who comes around to schools to check the quality of student work, and to talk with the students about their Diploma exhibition, the result of three years of study. External Assessors, if inquisitive and demanding, could be a boon to design education in the United States where in most schools faculty with tenure have ceased to grow or to increase the quality of student work. Another impression in practically every British school visited, is that they are superbly equipped with facilities compared to America. Workshops equipped with printing presses, typography equipment, model-making facilities, etc. were not only present in practically every school, but there were full-time assistants who produce designs of students to specifications! This exists at only a handful of schools in the USA, namely Yale University, Carnegie-Mellon University, the Rochester Institute of Technology, and California Institute of the Arts. I was tempted to propose a lend-lease plan, so that Britain could lend us their cast-off equipment and tools so that we in America can get on with the job of design education. Moreover, British students seemed more productive and more mature than American students, perhaps due to the fact that almost all have some sort of grant from the government which ensures that they can give all their time to their education without the necessity to work at part-time jobs as is so often the case with needy students in the USA. Schools with DipAD accreditations require not only a final exhibition of work by all graduating students, but most require a thesis as well, often concerned with comprehensive design projects for community and industry that are equivalent to most Master of Fine Arts degrees granted by design schools in America.

Although each design school I visited in Britain was convinced it was unique, I found the work and the course content fairly uniform. Of course there were exceptions.

At one end of the scale you would have emphasis on systems design, or at least a systematic approach to design problem solving. On the other I found emphasis on the techniques of design. I actually saw one presentation on how to present work to the client, given through the media of video tape. Everything I saw seemed technically competent, so that I began to assume that that must be the easiest goal to achieve. In most instances the "maverick" student who produced comparative rough, but vital solutions seemed to be absent. Ironically, I found one in the same school that produced the video tape mentioned before.

As one who has been a design educator for more than eight years, I am convinced that if "uniqueness" exists at all, it is in the form of strong personal influence on curriculum and the teaching act by a single individual. There is a world of difference, for instance, between Cardiff College of Art and the Bristol Polytechnic, which is only a short distance away in miles. It was good to see that both institutions were DipAD accredited, which would imply uniformity, but presented alternatives for study to student

As a result of this diversity, which I found time and time again, I would not hesitate to recommend a DipAD style system for America without fear of drab uniformity. As it now exists, design education in the United States has virtually no uniformity, and no pressures of any sort. Students receive anywhere from one semester to four years of design education and yet call themselves "designers". Although I refuse to believe that the number of years one spends in design education is the only reliable measure of a student's preparedness, I feel it is just as wrong to give a student the impression that he is a designer with a brief introduction to the subject, which does not allow for his own maturation process.

I was amazed at the regionalism expressed in various places. In England I was advised not to bother to visit Scotland, since nothing could possibly be happening there. Everyone advised me not to visit Ireland, not so much for my person safety, as to avoid a possible waste of time. Nobody thought it worth while to visit Wales. I am glad to say I visited every area, except for Northern Ireland, which I really should have seen, but for limitations of time and funds.

The regionalism expressed seemed strange but then a New Yorker would be sceptical of visiting Texas. We have our own hangups and perhaps it will take a foreigner to tell us what we can do to improve design education in America.

Relating teaching to what is known about learning

David Warren Piper

David Warren Piper is an educational psychologist with considerable experience of teaching in design and architectural schools. He is currently working at the University Teaching Methods Unit of the University of London Institute of Education

Teaching is creating conditions in which learning takes place. It is not something one person does to another, although very often what is to be learned is predetermined by the teacher. The teacher is usually concerned with what is learned, and the way in which it is learned, and with the efficiency with which it is learned. It is reasonable, therefore, that learning theory should be one of the main matters informing teaching practice.

Learning is one of the major concerns of modern psychology; research has been extensive. Yet when it comes to evolving a general theory of education or even deciding how a teacher should cope with specific situations in the classroom, the contribution from psychological theory is strictly limited.

In this connection it is useful to make a distinction between what can be regarded as theories of learning in a biological sense, and theories of instruction. The first is concerned with the internal mechanisms which enable an organism, be it a flat-worm or a philosopher, to learn. Although a knowledge of how learning takes place in this sense must ultimately lead to a clearer understanding of the student at work, the theories are currently expressed in such a way as to be of very little relevance to the teacher faced with the problems of conducting his students through their curriculum. The theories of instruction, on the other hand, are concerned with the external factors which induce and influence learning. Because they are concerned only with observable phenomena they are less in dispute than those concerned with brain function. Perhaps the theories of B F Skinner and N A Crowder are of particular interest, since they have led directly to the development of programmed instruction and teaching machines. These theories, especially Skinner's, spring from the behaviourist tradition of building a general theory of learning from the observation of simple, isolated, and artificial tasks, undertaken in the first instance by animals (usually rats or pigeons) who have no language and who lack the complex social behaviour of human beings. It could have been very difficult, even impossible, to derive these principles from work on humans alone, although, importantly, they are found to apply to human learning. They are, therefore, relevant to the teacher's job, although it often is far from clear how these principles may be applied in the classroom. Further, there is the possibility that there are as yet undiscovered principles which apply only to human beings. It is clear that social motives play an important part in determining human behaviour: at present these tend to be incorporated into educational theory by simple substitution, likening, for

instance, the mastering of three point perspective drawing to learning the way through a maze, or regarding a student's class marks as the equivalent of the rat's food pellet. Such analogies are important, and provide valuable insights into what goes on in the classroom. Danger lies in assuming that these analogies provide a complete picture of how social influences bear on a student's work. The universality of these instructional theories have been well demonstrated: their limitations have not.

The reliance of human beings on intellect and language as a means of shortcutting learning by first hand experience is obvious; but no learning theory begins from the premise that man can behave rationally, understanding rules as well as behaving in accordance with them, or that language is a major instrument in learning (although there have been scholarly attempts to integrate language into existing learning theory).

Despite these limitations there can be little doubt that the efficiency of classroom teaching could be improved considerably by the successful application of current theories of instruction. The only point in question is the relative importance they will eventually assume on a theory of education based on psychological studies of the student at work, applied in an educational system run in accordance with prevailing philosophical and political values.

Many of these principles will be known to practising teachers, but it seems worthwhile attempting to collect a reasonably full list of those which have experimental evidence supporting them. Motivation and transfer of what is learned from one situation to another are the matters of major importance. In addition to these a number of specific points about learning which may be of value to the teacher.

Motivation

The most widely accepted theories regard learning as dependent on gaining rewards, or avoiding punishment. Although such a theoretical model needs to be stretched in order to accommodate such things as learning by imitation, or verbal instruction, it does facilitate an insight into learning by experience which, after all, fills a good portion of a student's time, at least in many courses. The efficacy of reward and punishment as a way of modifying (improving) human performance is demonstrable, perhaps most dramatically by "behaviour therapy" - the process by which neurotic behaviour is replaced by something more

socially acceptable, often by a mixture of physical punishment and social reward.

Most young people come to college with a desire to learn, and this desire can be reinforced by insuring that every student learns something which he regards as useful. It is important that he should fully realise what he has learned. Arranging for a student to have knowledge of results which are a clear demonstration to himself of what he has learned and what he has failed to learn, is one of the strongest known techniques for promoting learning.

There is much to be said for frequent tests which give the student private information about his own performance, especially if the teachers involved can resist the temptation to collect marks, or otherwise use the occasion to make an evaluation of the student's worth.

Human beings are social animals and all of us will do a great deal in order to be liked by those around us. This is no less true of students than anyone else: accordingly, social rewards and punishments, such as being praised or becoming a member of a highly regarded group of people, or having one's name associated with some project which brings prestige among those with whom we associate, are much more effective than those based on awarding different degrees of freedom, or amounts of work, or even money.

Reward is more effective than punishment. A system which continually emphasises the things which a student has done properly and well is demonstrably more efficient than one which solely points out his errors. Yet it comes naturally to most of us to start by pointing out our student's mistakes, and we too often overlook to explain and praise all that he did well. The result is for the student to plan his work so as to avoid criticism, rather than adopting a more positive policy of setting himself goals to attain. An examination system in which the student is required to gain a given mark in order to qualify can, similarly, encourage a student to concentrate on avoiding those things which he must not do rather than pursuing to his best ability those things which he has come to learn. The sophisticated student, like the well-trained athlete, soon learns how to take a hurdle with the least clearance necessary, and with the smallest possible effort. As well as the student doing the minimum amount of work, such an approach has been found to result in students becoming more anxious about examinations and actually turning in lower performances than they are

capable of doing. Also such a condition is associated with a low transfer of what is learned in the classroom to the real work situation.

In universities teachers do not as a rule lead students step by step through the material to be learned. Occasionally, however, there is a call for such an approach. A good strategem is first to reward the student for what he has accomplished well and then to select just one thing which he did poorly. Arrange for him to practise just that one thing, in such a way that he has a good chance of getting it right. Once he has done this reward him. Then proceed to the next thing which needs correcting.

The sooner reward or punishment follows the activity to be learned, the more efficient it is. This is a very important variable, and can make a great deal of difference to a student's speed of learning and tenacity to work. A good teaching scheme gives students immediate knowledge of the effectiveness of their attempts; (this is the principle of programmed instruction which presents a student with an easily assimilated amount of information, encourages him to test his knowledge, and bases the next step on his response). Projects, practical exercises, and discussion groups can also serve to give a student immediate feedback about his suppositions, skills, and the acceptability of his ideas. Many teachers pay insufficient attention to the need for immediacy when informing students of their progress. A 'straight' lecture gives a student no opportunity to be faced with evidence about how much he has forgotten or what he has poorly understood, and it seems to be a characteristic of humans that we think we know and understand more than we actually do: we need to be faced with the evidence. The practice of collecting in a student's written work and returning it to him days, sometimes weeks after he has completed it is likely to impoverish the exercise as a learning experience. Further, attention needs to be paid to the exact information a teacher gives to a student concerning his work. The often cryptic remarks written at the end of an essay, or the coded mark or grade which may mean one thing in the teacher's scheme of values and another in the student's, do not give a student adequate guidance about just what was weak about his work and, even more important, what he needs to do in order to improve it. In a survey of three hundred undergraduates of London in 1967 (unpublished), 60% of them agreed with the statement 'My tutor (or seminar leader) has never given me any idea of the standard of my work'.

Class marks and diploma grades are

artificial rewards which have no existence outside teaching institutions. They can be used successfully to cajole and lure a student through his course work, but may result in the student carrying few of his good work habits over into employment, as the reason for their adoption has ceased to exist. Indeed, any set of rewards and punishments which are extrinsic to the task to be learned are likely to require a contrived situation to sustain them, which can only mean that the student fails to become self-sufficient. Remove the student from the system and the standard of his work will fall. Rewards which are intrinsic to the work are more long-lasting. This seems to be one of the advantages of project-based work which many students enjoy doing.

Often a student's motives conflict with each other and this can result in anxiety and other emotional difficulties. One constant conflict arises from a student's dependence on his teacher for learning, yet one of the things he has to learn is independence. It is unfortunately, too easy for us teachers to pose as authorities, yet the purpose of education, many of us would argue, is to free people from reliance on such authority. If an educational course succeeds in this purpose the authoritarian teacher is likely to find his prestige among his students dwindling; but even the most Socratic teacher may find himself sorely tried by the perverse contrariness of a student struggling to establish the independence of thought that he knows is expected of him.

People, of course, can only work in response to rewards and punishments which they can expect. If these expectations remain unfulfilled the resulting disorientation can lead to anxiety, loss of morale, withdrawal and apathy. (Brainwashing employs the systematic disruption of such expectations). The initial burst of enthusiasm of a student joining a new course may give way quite suddenly to depression as he discovers that the values which he imagined would be used to judge him are not used at all and a member of staff displays indifference to some aspect of the student's work in which he had invested considerable time and a deal of worry. This points to the need for students to understand the objectives of the course that they join, and for staff to be explicit about how they recognise good work from bad. A post hoc rationalisation of why one piece of work is better than another is simply no use to the student who is trying to find out before he starts what he should aim at. It might be taken for granted that a university teacher has the intellectual capacity to analyse what is required, although he may benefit from some guidance over methods of describing objectives and relating them to various educational proced-

ures and he can perhaps be helped to communicate his aims to students at the outset of their course. Good practitioners do not automatically make good teachers, and that is true for the academic as for the footballer.

Of course the teacher is in control of only a small portion of the factors which influence a student's motivation to work. Everybody is affected by what happens outside working hours, and a teacher can only hope to know as much about a student's life away from college as he can do without encroaching on the other's privacy, and then to adjust accordingly. The way in which a student's home and social life relates to his college progress is a topic of growing interest to research educationalists. This clearly is a very complex field of study.

Transfer of training

The greater part of most student's time is devoted to learning but even that time is taken up with activities which are unlike those he will spend his life or even his job doing. Rather he will be engaged in activities which, it is judged, will enable him to do much more besides. Education is based on the expectation that a student will be able to generalise from the specific tasks he practises, so that later he may cope with new, even unforeseen situations. It is taken for granted that he is able to transfer what is learned in one situation and apply it to another. Evidently transfer of this kind is a feature of human behaviour, it is fundamental to man's adaptability. However, it cannot be assumed that transfer is automatic; for it to occur at all the student must perceive the connection between the situation in which he learned and that in which he is required to perform. It is because of this that learning to analyse situations to their fundamentals is at the very centre of education. It seems that the ability to transfer information is a skill which may be improved by practice, and courses can be strengthened by including such practice. Indeed, a good deal of 'creativity training' consists of just such practices.

One cause of poor transfer then, is lack of practice, another, mentioned earlier, is that the motives which drive a person to learn are not the same as those which cause him to work the way that he does, (a reason, for instance, why corners are cut with safety measures once a person leaves the training laboratory and gets into practice). Another cause is that it is often difficult, sometimes impossible, to create 'the real thing' on a college course: (a language laboratory does not recreate life in a foreign country, management games do not recreate a business organi-

sation, a laboratory experiment does not often fully recreate naturally occurring conditions).

The obvious way round this last difficulty is to include the equivalent of 'on-the-job training' as part of a course. Thus, language students spend some time abroad, architectural students have a year in practice before qualifying, geology students go on field trips. A balance needs to be struck between practical experience of this nature and more artificial teaching situations. On the job training, for all its strengths, has six major disadvantages: the practitioner responsible for doing a job cannot give his student undivided attention; a balanced programme of practical work cannot always be offered, and tasks may not come in the best order for learning; critical aspects of the work cannot always be selected out for extra practice; coping with students may interfere with the main work programme; there may be little or no opportunity for teaching background material; because of the foregoing difficulties a course consisting entirely of on-the-job training would have to last a long time, and that could be expensive.

The importance of fostering easy transfer is obvious with courses directly preparing students to enter one of the professions, although a general education which takes as its objective that students shall 'learn how to learn' must be depending heavily on the same phenomenon.

There are a number of ways of seeking to lessen the gap between 'training' and 'practice'. One is to assess the student's progress in terms of what they can do, rather than in terms of what they are able to recognise and recall; this relates to the desirability of writing educational objectives in operational terms. A second way is to prepare students to be adaptable, rather than having them well rehearsed in a limited number of set procedures. The difficulty with that strategy is that success in the junior professional positions which a student may enter on completion of his course often relies on a facility with just such a set of procedures; an example would be an architectural student entering a design office as a draftsman or detailer. There is experimental evidence to suggest that even in work that makes only limited demands on a student, those with some experience of a wide variety of situations tend towards greater competence than those with a lot of practice in a few situations. It may be better for a teacher to try to give his students exercises in fields outside his own immediate experience, rather than sticking to those on which he feels he is able to provide the best instruction.

Practising errors

Learning by doing supposes that a student learns from his mistakes, (and as earlier suggested it is important for students to know whether or not they have made a mistake, as soon after the event as possible). An opposing theory is that every time a student makes a mistake he is practising his error, and is therefore more likely to repeat it. From this it is argued that students' work should be arranged so as to keep the probability of error to a minimum and that teachers should avoid mentioning misconceptions, or incorrect interpretations, or false material. The evidence on this matter is inconclusive and most likely both propositions are correct according to circumstances. One interesting study demonstrated that the students who ended a particular course with the least number of misconceptions were those who had most misconceptions at the beginning.

The organisation of material

The more meaningful information that is to say the larger the number of points where information makes connection with already assimilated information, the quicker it is learned. From this follow the commonly accepted axioms that teaching should move from the familiar to the unfamiliar, from the simple to the complex. There do, however, seem to be occasions when both axioms may be profitably abandoned, although there is insufficient evidence to say when these occasions might be.

The way in which a student 'structures his knowledge' is so important to both memory and comprehension that a teacher's time is better spent in helping a student to organise his knowledge than in turning himself into a fount of information. It has been demonstrated experimentally to be more effective to teach a simple outline, and allow the students to fill in the details themselves, than to teach as much detailed information as possible on the principle that the more they are taught the more they will remember. A large amount of related information leads to a condition known as 'mental dazzle' in which learning is impaired.

Complex skills can be successfully taught by breaking them down into portions which the student can learn separately, thus ensuring that all the constituent activities are adequately practised; but it is important subsequently to integrate the separate activities and practise the student in the whole operation. It is in the integration of initially separately acquired skills into a single flowing operation, in which

the individual no longer pays conscious attention to all the elements, which differentiates the experienced person from the learner; think of learning to change gear in a car, or to use a typewriter, or to handle paint. The same applies to other complex skills such as inter-viewing.

Active and passive learning

Teaching procedures which involve the student in some positive activity are generally more effective than those in which the student remains passive. By having to attempt some task the student is made aware of his own knowledge and ability, thus by giving him immediate feedback, correcting the propensity, which most of us have, to over-estimate both. A number of studies have demonstrated the superiority of guided discussion and the Socratic method of question and answer over the simple imparting of information.

Massed and spaced practice

As a general rule it is often more effective to divide learning time into a series of short, active periods separated by short rest pauses, than to work the same total time in long periods. The optimum length of time depends, among other things, on how much a task can be divided before it loses continuity, or before the separate sections become meaningless. There is therefore, no optimum time which can be adopted as a rule of thumb; nevertheless, the principle is an important one to bear in mind, in order to counter-balance the tendency to organise the student's work programme into a few long sessions, for the sake of administrative convenience and cost.

Retroactive inhibition

It has been discovered that the retention of what has been learned during one period can be impaired if the activity which follows it is concerned with similar material. This is known as retroactive inhibition. As with the previous cases this does not suggest an obvious course of action for the teacher, since the phenomenon has been discovered in laboratory studies. Its importance in the classroom is not easily demonstrated. The teacher can play safe by separating similar material when there is no obvious virtue in holding them concurrently.

Over-learning

The maximum retention of information or a skill is obtained when practice is continued beyond the time when the student is first able to accomplish what is required. The length of time which training should be continued varies from task to task and can only be determined by

experience. Adding one third of the learning time is offered as a very rough rule of thumb.

Reminiscence

The ability to remember what has been learned, or to perform a task is not often at its peak immediately after the end of a learning period. The amount remembered increases for a little while before a person begins to forget. This kind of recall is quite passive and requires no effort. As the time involved in reaching the peak is more likely to be measurable in minutes, than in hours, information about reminiscence is more relevant to the organisation of activities during teaching periods than to the time-tableing of examinations.

Position of information in the learning period

People required to learn things by heart tend to remember things from the beginning and end of a learning period better than things from the middle. This is irrespective of the length of the learning period, so advantages may be gained by students working in relatively short bursts.

When people are required to pay attention, as in lectures, the attention level rises to a peak shortly after the start, once as it were, people have settled down. Thereafter attention fades, rises to a fresh but lower peak shortly before the time when the period is expected to end. One study noted that students were able to recall 70% of what was said in the first ten minutes of a lecture but only 20% of what was said in the last ten minutes. There is no constant optimum length over which people can pay attention but by and large one hour seems too long, the optimum seeming to vary between twenty and forty minutes. This seems a good argument for breaking up a lecture period into a number of sections in which different media are used, or in which students are required to do something other than listen or watch.

Speed of learning

The quality of a person's performance does not increase steadily with the amount of practice which he has. If the whole of the learning process is observed, progress is usually found to be slow at the beginning, quick in the middle, and slow at the end. A student learning a completely new skill may show little progress to begin with; this does not necessarily adumbrate a poor performance later. Usually students start a course with many skills at least partially developed: rapid gains at the beginning can create a false expectancy so that disappointment ensues later as progress drops off.

When learning complex operations, a whole series of skills may have to be mastered. Learning to type, for instance, involves learning to locate the keys, to control new finger movements and the development of a smooth set of actions for typing common words as units rather than a letter at a time. In such circumstances the student's progress is typified by a series of bursts interspersed with plateaux where no visible progress is made. The plateaux occur as a student embarks on the acquisition of a new skill, and so an apparent dropping behind of a student may indicate that in terms of development he is ahead of his classmates. There is a story told of a typing school run by one of the armed services which systematically failed its best students for dropping too far behind a target rate of progress which was a straight line drawn on a graph.

Conflict between these principles

It will be seen that some of the principles above run contrary to one another: for instance, the need to organise work into meaningful sequences and the desirability of short work periods. In these cases a balance has to be struck and herein lies one of the skills of a good teacher. It seems impossible always to predict which principle will be overriding in a given circumstance and so the need for adaptability and an opportunity for a teacher to try again if the first attempt fails, are fundamental requirements.

Learning at home for pre-school children

345 Limited is a company specialising in the production and marketing of aids to pre-school education. Their products are aimed at helping parents to guide their children's development, through play at home. They have developed materials for three main areas, pre-reading activities, number sense and speech development. A series of books includes picture stories, rhymes, puzzles, tear-out games and gramophone records.

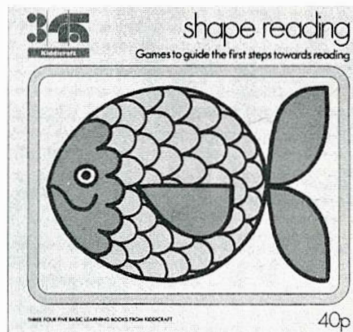
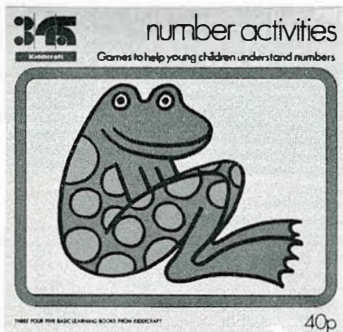
The company has two main product groups: a 12 month 'Nursery Course' which is sold direct to the public through the mail, and a range of books which are distributed through retail outlets.

The 'Nursery Course' is bound into twelve separate parts, which are mailed monthly to subscribers. Each month comprises 10 graded activity cards, an 8 page explanatory booklet containing further ideas, suggestions and items of information, and a 7 inch 45rpm gramophone record of rhymes, songs and stories. The present retail range of 9 books and 3 gramophone records are each designed to concentrate on one aspect of a young child's pre-school educational needs.

Right, pages from Shape Reading, a book which aims to encourage a child's powers of observation and awareness of words. In an introductory guide the designer's explain how each page in the book can be used. Their notes are given under each of the pictures

Iris Grender, Editorial Director, and Geoffrey A J Butcher, Art Director, collaborated for a number of years on the monthly Nursery Course before developing their ideas into this series of books. Iris Grender taught in Infant and Primary schools before starting her own Nursery School in Kent. She has three children of her own and this width of experience has helped her to shape the techniques employed in the books. Geoffrey A J Butcher has two children and has co-ordinated the design and illustration of all the products since the company was formed. 345 Limited runs a nursery school for children of widely differing backgrounds and this has been useful as a design laboratory for testing visual ideas and drawing styles.

Below, a selection of covers from the range of 9 books and 3 records currently produced by the company

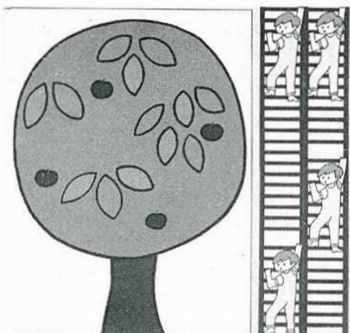
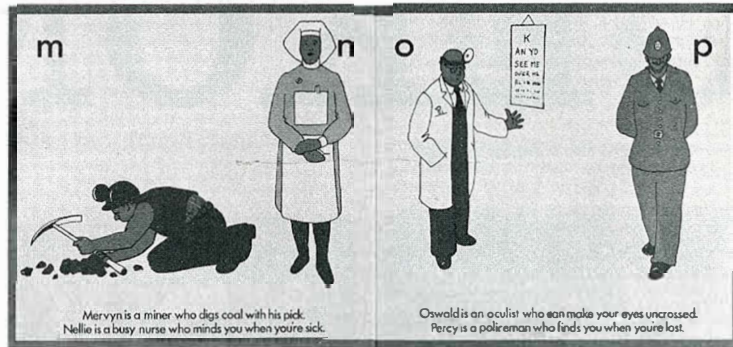
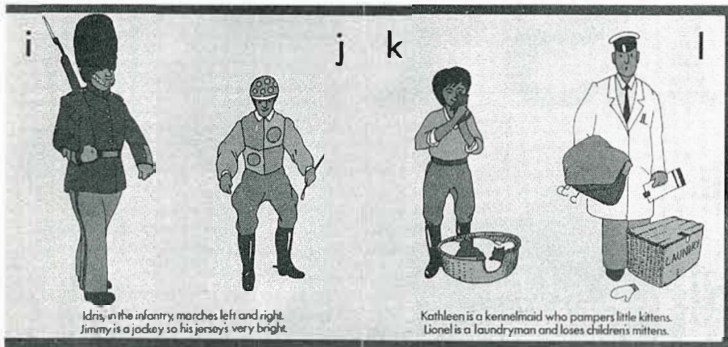


Two spreads from Alphabet Sounds, a book which aims at helping a child build up associations in his mind between the look and shape of each letter of the alphabet and its special "phonic" sound. In an introduction to the book, the designers explain to parents the aims and attempts to meet. "As adults accustomed to reading, if we think about the alphabet at all we think of it as A, B, C and so on; and

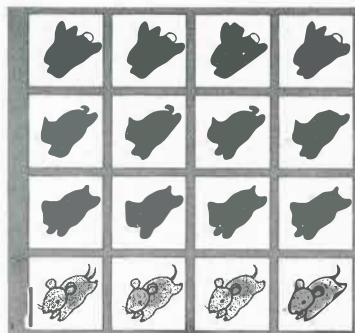
if we speak that aloud the sounds we make are Ay, Bee, See. But we are in fact assuming a knowledge of "phonic" sounds that young children have yet to learn. Ignoring this, and teaching them the formal adult alphabet can cause them great confusion. For example, using our adult alphabet, a child faced with the word 'cat' would sound it 'see-ay-tee' and that will not help much - for the child must wonder "Who or where or

why or what is a seeaytee?" Who can blame children thus confused for giving up the attempt to read?" They go on to explain further that "Conrad and Oswald are the key to the kind of game we play in this alphabet, for we have introduced each letter by means of a character and his or her occupation. A lot of these people's names and the things they do will be familiar already to many children, but some of them

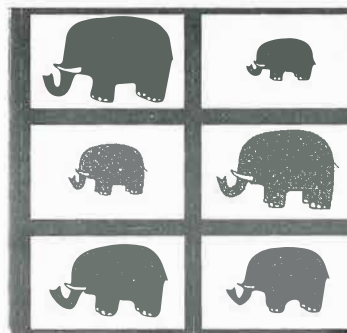
won't. The "phonic" sound for Y, for example, is as in 'youth', and there simply isn't a common name beginning with Y that has that sound. Throughout the book an attempt has been made to secure consistent use of "phonic" sounds such that when the letters C and O occur elsewhere, they are given the same sound value as in Conrad and Oswald. The illustrations for Alphabet Sounds are by Ed Lister



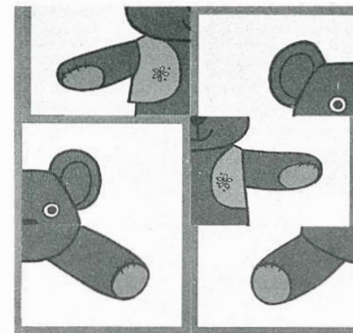
Page 1
Tear out the ladders to make four of different lengths. By playing with them a child will discover that all four apples on the tree can be picked simultaneously, or that the boy on the tallest ladder can pick all four apples. Size grading is one of the skills involved in reading. It helps a child to recognise the difference between large and small words and letters.



Page 2
In each of these lines of animals is an odd one out. Search along each line and help your child to find the oddity. Scanning from left to right is a basic aspect of reading most Western languages, and this skill can be practised with pictures. For example, point along the row of rabbits and ask "Has every rabbit got a tail?" Young children love repetition, so the more you repeat such questions, the more of a ritual you make the game, the better.



Page 5
Simply tear out the elephants and play a game putting them into a line in order of size. (It is easier to start with the biggest). All shapes, words and letters are partly patterns, but since these elephants are all exactly the same shape they are harder to sort than different patterns of the same size. Sympathetic help never harmed anyone. If you are asked for it, give it. You are playing this game together, after all.

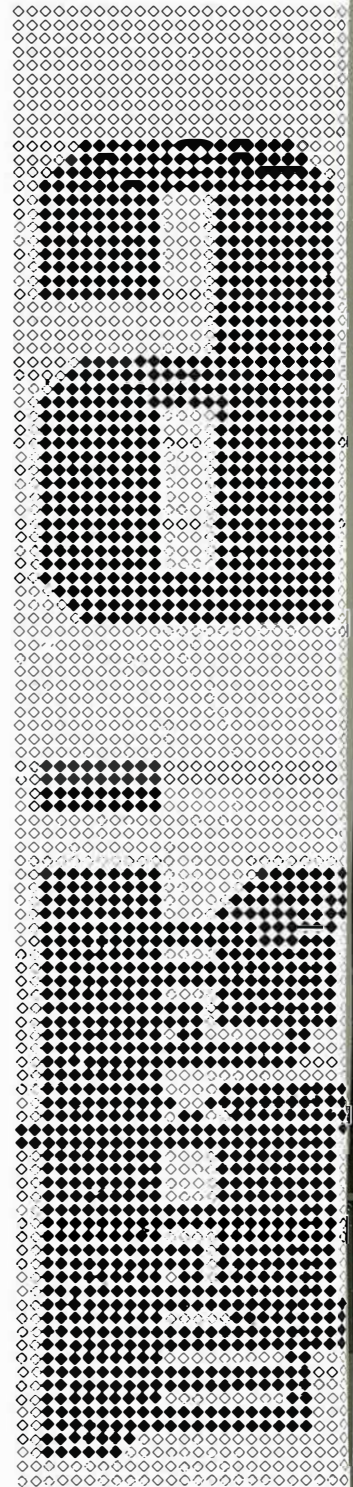


Page 7
In any form of jigsaw puzzle a child is sorting out shapes. It needs great skill to see the difference between U and V, for instance. In solving this teddy bear puzzle your child will be sorting shapes very similar to those in printed words. Don't give the game away and say what the picture is. There are ways not to help as well as ways to help. Children derive enormous, joyous wonder and sense of achievement in making their own discoveries.

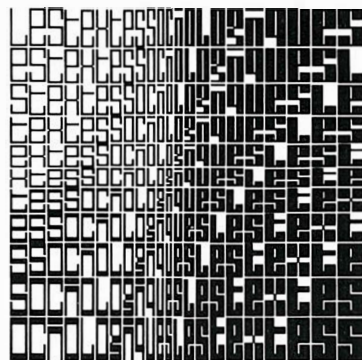
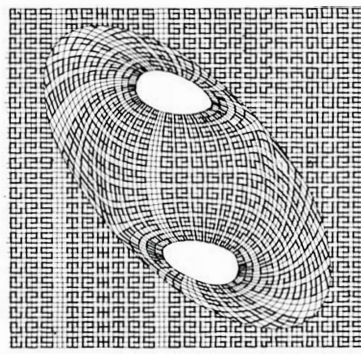
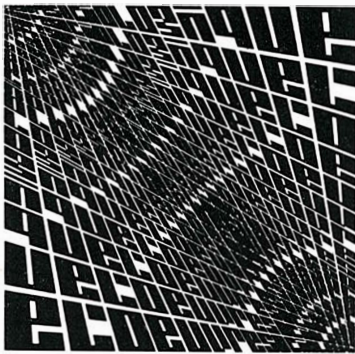
From a company journal.
 An approximate English translation
 is To want to know is to reach
 towards the future

Top, book jacket for a series, 1970

Below, a detail from a cover design
 for the yearly report of the
 Amsterdam Council, 1967

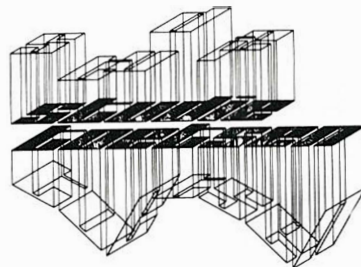


Sketch designs for a series of book
 jackets, 1970



Calendar, for Cloeck and Moedigh
 1967

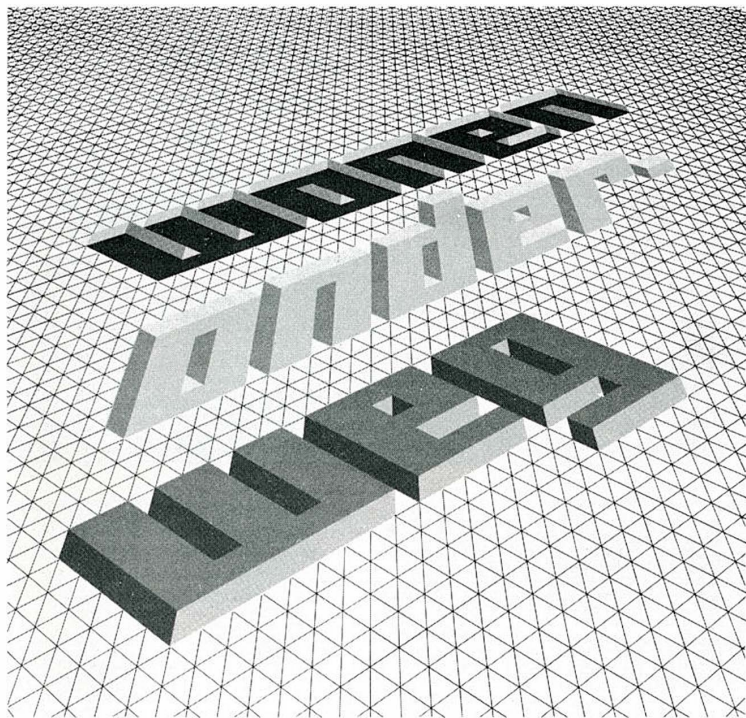
design for book jacket, 1968



The 'finger exercises' of Jurriaan Schrofer

with acknowledgements to the artist and to the publishers of the Dutch magazine *Graficus Revue*

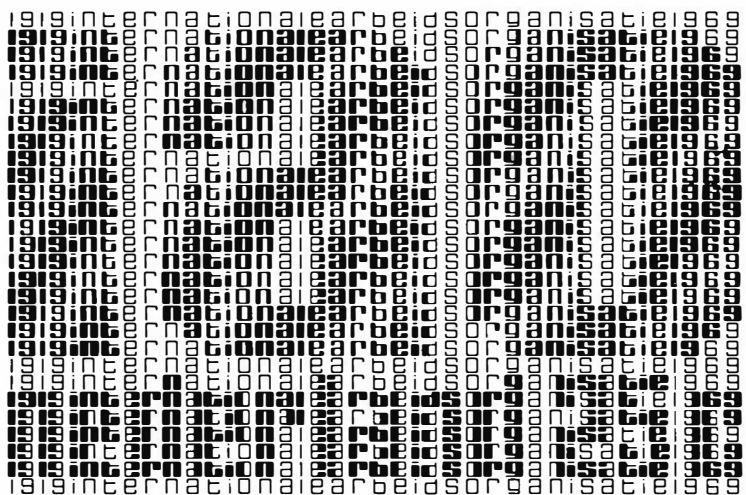
icographic, 4, 1972



Design for a book jacket, 1970

We show a small selection of works by the Dutch graphic designer Jurriaan Schrofer. They find a place, not just because they are pleasant to look at, but because they characterize an important aspect of visual communication. All forms of visual communication demand skills of mind, hand and eye. Schrofer shows us what he calls his 'finger exercises' that lead, hopefully, to better future performance. It is a good description.

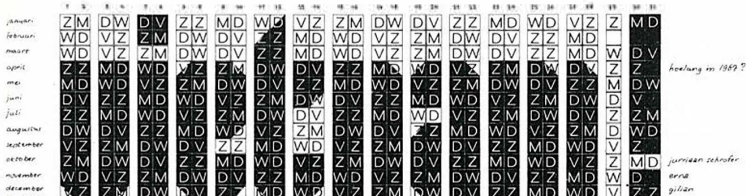
Most of these works grew from the starting point of an actual commission. They represent attempts to extend the brief; to test out different possibilities. Most graphic designers will find them easy to recognize. They are the explorations that the client will seldom see unless, by some chance, his needs and our discoveries coincide. More often they are records of the cul-de-sacs, the blind alleys that we encounter on the way to a solution. These works seem to demonstrate many of the characteristics that we urge our students to display. The ability to pursue an idea to the bitter end; to squeeze it dry and, more importantly perhaps, to discard it when it no longer seems appropriate for the job in hand.



Design for a postage stamp, 1969

Schrofer's preoccupations in this set of drawings are part of an ancient tradition. Visual writing has a very long history. What is presently called literature is material that was transmitted and preserved only by word of mouth until the invention of writing. For many centuries written literature was no more than a record of spoken language. The invention of printing silenced literature. Printing turned literature into a visual medium; *meaning* was given *form*. In earlier societies, with a greater sense of awe than our own, it was a matter of course that important utterances deserved worthy presentation. Even our more utilitarian society often pays considerable attention to choice of form when the occasion demands it. We hand our university students diplomas, sometimes printed on imitation parchment. We pay attention to the forms of lettering when the meaning of the text seems to rule out a casual scribble.

Schrofer's offerings are not high art but they seem to share some of the traditions of our mediaeval predecessors. For a monastic scribe, the setting down of the holy word was an act of devotion. And, no doubt, they too gave time and love to the development of their illuminated initials, textual patterns, ornaments, which could then serve as vocabulary for future compositions.



New Year Card, 1967

Upper left, a spread from 'Pattern and Shape'. It shows how a number of apparently unrelated patterns are all based on a single mathematical principle

Upper right, a spread from 'The shapes we need'. It comes from a chapter called 'What is a visual language?' The pictures attempt to show in a simplified form the visual language of the Middle Ages - a period in which the spiritual side of life was more important than the physical reality

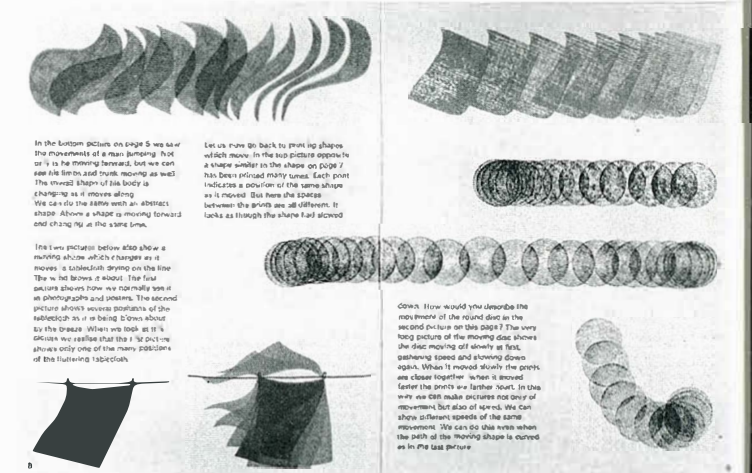
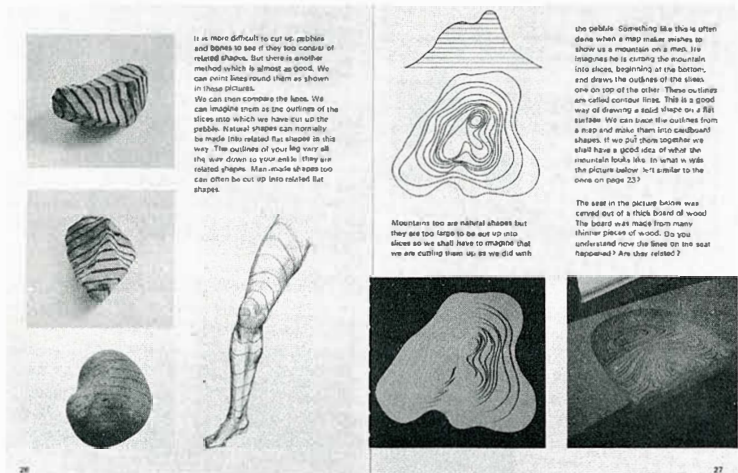
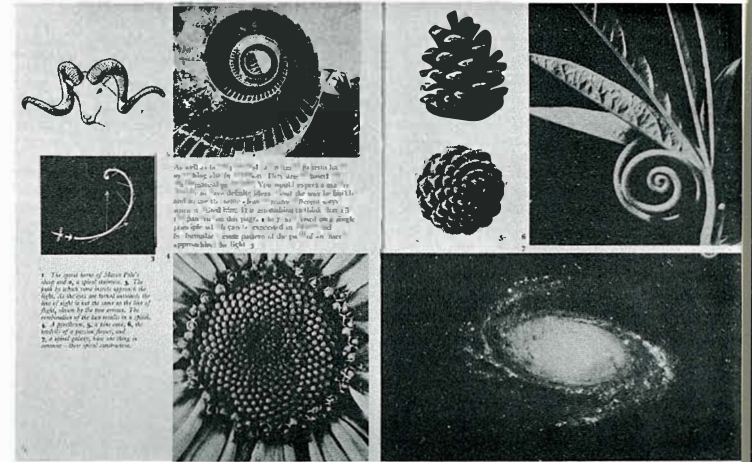
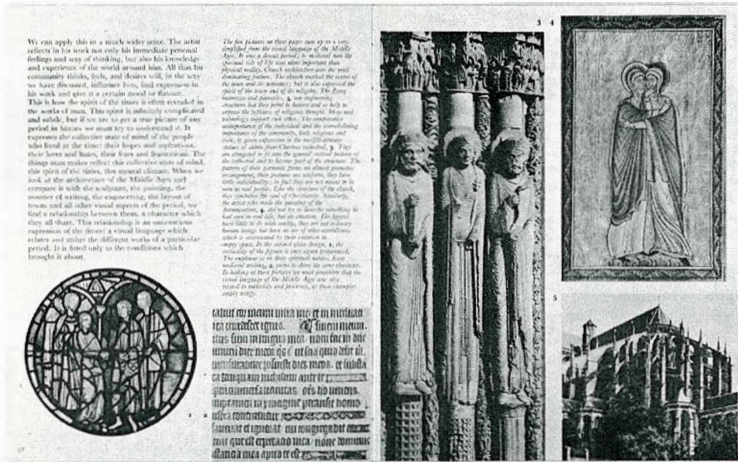
Lower left, a spread showing how shapes can be understood by making use of contour lines

Lower right, a spread showing how by printing the changes in shape and position of objects a sensation of movement can be achieved

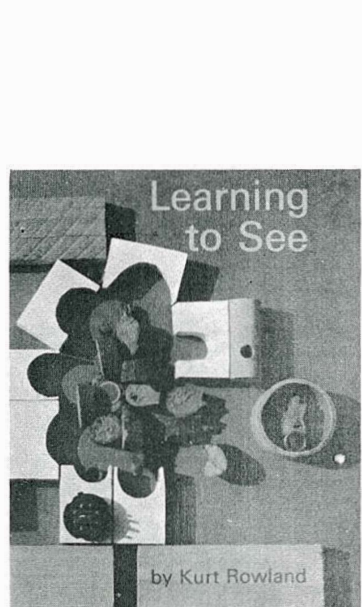
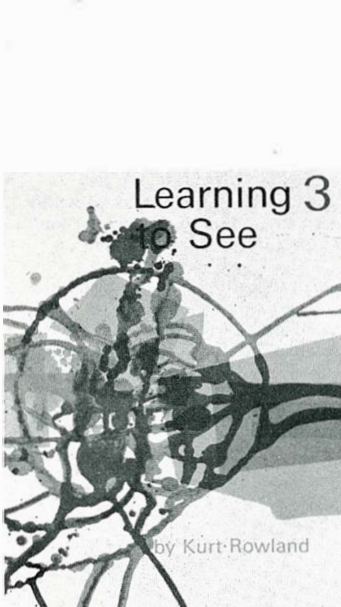
Designing books that present a visual argument

Kurt Rowland

Kurt Rowland was born in Vienna. His freelance career began in 1951, and his association with a London educational publishing firm provided the impetus for him to write and design his remarkable *Looking and Seeing* a series of books for schools designed to act as courses in visual education



Below, two of the cover designs for the *Looking and Seeing* series



From the point of view of production, storage and ease of reference the book is certainly an advance on the scroll; but viewed purely as a means of communication the book is not nearly as efficient as we would like to believe. To break up a continuous text into arbitrary lengths is not in the best interest of communication, for it disrupts the flow of language or the continuity and logic of an argument. Human adaptability or ingenuity overcomes this inherent flaw. Memory and often a sense of rhythm help us to bridge the critical gap between the end of one page and the beginning of the next. But in a book with a visual subject matter this flaw may become more serious, for visual memory is not greatly developed in the majority of people and does not carry from page to page. The continuity of a visual argument is soon lost when its own natural rhythm does not correspond to the division into spreads.

is written, ie, an argument is put forward in a neutral form: the type-script. Next, illustrative matter is researched, bought or commissioned. Finally the two are put together: the book is designed. Because there is normally little correlation between these stages books, particularly educational books, are far from efficient. Too many, even those which actually went through the hands of a professional designer, are only superficially easy on the eye, but do not present their subject matter efficiently. The intractability of a text thought up in abstraction without reference to the medium of the book, but nevertheless considered inviolate, is usually to blame. It is not often that the sequence referred to above is shaken up so that the different stages may develop simultaneously, or even reversed, as in the case of the two series of educational books, *Looking and Seeing*, for Secondary Schools, and *Learning to See*, for Primary Schools. Both series deal with Visual Education and explore aspects of art, architecture and design.

This is, of course, basic and every designer of books is fully aware of it. The trouble, he may reflect, is that such books tend to be produced in three distinct stages. First of all a text

When I began work on *Looking and Seeing* I found myself in the happy

The myths of art and science

Patrick Wallis Burke

Patrick Wallis Burke, Executive Editor of this journal, is also Principal Lecturer in Graphic Design to the School of Graphic Design, Ravensbourne, a Diploma College near London

I have been trying to teach design students for a number of years. More than long enough to know that there are no easy answers to the problems of an educational programme. I got into teaching because I was a designer, not because I was a teacher. In universities and colleges of Art and Design in Britain it is tacitly assumed that if you are a skilled practitioner, then you will find ways of teaching your particular specialization. Over the years I have come to regard this as a very questionable assumption. Training people is a highly skilled task in its own right. It demands certain attitudes, knowledge and skills that cannot be taken for granted in the practising designer, or artist, no matter how skilled he may be in his own field.

Like many of my colleagues, I have subsequently spent a lot of time and thought on trying to make good earlier deficiencies; trying to improve my performance as a teacher. In this continuing apprenticeship I have been helped by the fact that I was; and still am, primarily a designer. For teaching, I soon discovered, is a *design* problem. To be effective it has to be based upon a rational analysis of the job to be done. From this must grow a teaching programme *designed* to achieve defined results, and based on a sound knowledge of all the available materials, processes and resources.

Since coming to Ravensbourne I have been concerned with helping the School of Graphic Design to re-examine its aims and methods of teaching. As a result of these studies a new course was planned and is now beginning its third year of operation.

One of the features of the new course was an introductory teaching programme devoted to what was described as "design thinking". Thus all students spent the first two weeks of their course in giving some formal consideration to their own thinking and that of their fellow students. In designing this short course I hoped that it might meet the following basic objectives;

1
It would allow the student to demonstrate to himself some of the difficulties that are commonly encountered by all human beings in a problem-solving situation.

2
It would allow the student to use these experiences to derive some useful observations about his own performance as a problem-solver.

3
It would allow the student to demonstrate to himself that some of his difficulties in thinking might be due to the use of ineffective strategies, rather than to any lack of mental

ability.

4
It would allow the student to consider, and begin to devise various formal, logical approaches to the identification and solution of design problems.

The programme would stress the fact that it was in no way intended as a means of stifling a student's bright ideas. Its aim would be to make them better at evaluating the consequences of their bright ideas when they have them.

The students selected for the graphic design course at Ravensbourne come from a variety of Foundation Courses. Foundation Courses are thought of as being, broad, general introductions to the many kinds of work that go on in a college of Art and Design.

Obviously they vary a good deal in their character and effectiveness. They also have to select their entrants from among those secondary school students whose educational achievements, for whatever reasons, fall below the standard which would secure them a place at a university.

At present, the secondary schools in Britain seem unable to offer students the means of seeing the connections between a wide variety of apparently unrelated subjects. Nor do they seem willing to include much in the way of creative problem-solving in their study programmes. Consequently, the Foundation courses could offer the student an opportunity to re-define his picture of the outside world. Our experience is that few Foundation courses are providing such an opportunity. This is unfortunate, and it gives the Diploma Colleges additional jobs that can only be described as 'remedial'.

The first of these jobs is to allow the student to consider their so-called creative thinking since, for the most part, they have been allowed to take their thinking for granted. Solving a design problem, or indeed any kind of problem, involves intelligent behaviour. The hallmark of intelligent behaviour is being able to adapt to the environment in a creative way. But this is more difficult than it appears. Many people, including students, still tend to think of intelligence as a fixed entity; believing that some people are born bright and some dim. They appear to visualize intelligence as a commodity of which everyone gets a certain amount at birth, and that this initial legacy will largely predetermine the extent of an individual's future achievement. Present-day research contradicts such a simple-minded view, but it will take a long time for such research to permeate our educational system, especially when the concepts involved are difficult to

grasp and their implications run contrary to the established order.

However, this concept of intelligence as a fixed potential is likely to remain deeply ingrained, since so many things are in its favour. Little, if anything, can be done about the vital pre-school years, whilst teaching methods are unlikely to change as long as it is believed that nothing can be done to develop a student's innate intelligence. As a result, the idea that it might be possible to teach students to be intelligent, just as we now teach them to solve mathematical problems or speak a foreign language, is likely to take some time to gain acceptance.

In Art and Design schools "intelligence" or "talent" seem often to be thought of as things which come in fixed amounts. Either a student has got "it" or he hasn't got "it", and there is nothing much that can be done if he hasn't got "it". Teachers who think this way will also believe that their observations of a student's intelligence enable them to predict how well he or she will do. All tasks that they then ask the student to perform will be based upon such estimates. Most students then obligingly turn out work to the standards that their elders regard as appropriate and thus, to some extent, the prophecies are always self-fulfilling.

The second job that many Foundation courses seem to leave unconsidered is that of helping students to form useful concepts of what will be required of them if they wish to pursue a particular profession. Becoming a graphic designer, for example, demands certain attitudes, knowledge and skills. Like any of the design disciplines it requires the student to have a problem-solving organization of mind; to exhibit intelligent behaviour. But the way a student thinks is determined by the way in which he perceives himself and the world about him. The attitudes that a student brings to the study of his chosen area will largely determine his chances of success, since problem-solving is influenced by personality and motivation.

Each student joins his Diploma course with definite motives and a well-established personality structure. So that, in planning any kind of introductory programme it is useful for the teacher to know something of the ways in which the students perceive their selected option. Misconceptions, or unhelpful attitudes of mind have to be located early, so as to give the student time to discard or modify them, or even to choose another area of study.

It was to make a small beginning in this direction that I introduced a

small group of questionnaires. These were given to the new students before they began any formal studies. The results from one of these were startling enough (to me, at least), to prompt me to record them in some detail.

Kant pointed out, as have others, that we do not just perceive the world, we give it *order*. Everything that impinges upon our consciousness is subjected to some kind of filtering process. From an almost limitless amount of sensory data we select, reject, or discriminate in some way. Sometimes we undertake this filtering in a consciously deliberate way; we weigh up alternatives; carefully examine evidence and form judgements. At other times our filtering process is less rational. We accept or reject things intuitively; allowing our prejudices to influence the judgement we make.

For those of us who are less than saintly it is this less-rational filtering process which most often influences our everyday behaviour. In many cases it is allowed to influence our choice of relatively unimportant things such as our clothes, our motor cars, or our amusements. Unfortunately, it can sometimes be used to determine our choice of the kind of education we want, or the kind of profession we would like to have.

This particular questionnaire owes its existence to the work of Dr Liam Hudson whose two books *Contrary Imaginations* (1) and *Frames of Mind* (2) helped me to see more clearly that the way in which a student perceives himself and the world about him, may determine which of his mental gifts he feels free to display.

In *Contrary Imaginations*, Liam Hudson looked at two kinds of clever schoolboy and thought he could distinguish two characteristic forms of ability. These he termed the "converger" and the "diverger". To quote Dr Hudson;

"These schoolboys differed not only in the bias of their mental abilities, but also in their choice between the arts and sciences, in their interests and attitudes, and in the expression of emotion.

The converger excelled in the conventional intelligence test; specialized in physical science or classics; held conventional attitudes; pursued technical, mechanical interests in his spare time; and was emotionally inhibited.

The diverger, by contrast, excelled at open-ended tests (tests, that is, which do not have a single, right answer); specialized in the arts or biology; held unconventional

attitudes; had interests which were connected in one way or another with people; and, emotionally speaking, were uninhibited"

Clearly these two descriptions represent only the extremes, but in subsequent thinking about these distinctions, Liam Hudson came to the conclusion that what he was observing was the emergence of two distinct subcultures.

In his later book, *Frames of Mind*, he goes on to suggest that in choosing to become (say) an artist or a scientist, a schoolboy (or schoolgirl) may be responding to profound forces, both from society and from within his or her own personality. The choice that each of them makes will be affected partly by the way they perceive themselves, and partly by the myths surrounding the arts and the sciences.

The word 'myth' may cause some difficulty here, so I will quote a footnote of Liam Hudson's which reads;

'A 'myth' ... is a belief or system of beliefs which although perhaps not literally false, may none the less contain an element of meaning which is true in some more symbolic sense'.

Over a number of years, Liam Hudson has been collecting evidence about the ways in which schoolboys see the arts and the sciences. The evidence that he has so far published has an air of complete self-consistency. The myths about the arts and the sciences are detailed and elaborate and all schoolboys seem to share them. Almost without exception, any kind of scientist is seen by them as being cold, intelligent, logical, dependable, but hard and impersonal. Whilst any kind of artist is seen as warm, imaginative, rather less intelligent, perhaps, but concerned about human relationships.

Since these myths seem so much a part of the common culture of schoolboys and schoolgirls in Britain, I thought it might be useful to find out whether they had undergone any kind of transformation during the year or so that students spend in their Foundation courses.

Although my present research is unsophisticated and limited, I feel safe in reporting that the myths are still alive and well and living comfortably in the minds of most of our new arrivals. The evidence to support my claim comes from a study of the responses that I got from the following questionnaire.

School of Graphic Design
Ravensbourne College
of Art and Design

Programme 1
Question paper 1

Mathematician
Physicist
Historian
Biologist
Graphic Designer
Barrister
Sculptor
Psychologist
Engineer

Part 1

Listed above are nine different professions. You are asked to make various judgements about them. There are no right answers - you are only asked for your personal opinions.

Think about each of these professions and then try to describe the kind of person who achieves success in each of these fields.

For example, what kind of personality do they have?
and what aspects of their personality makes them so suitable?
How intelligent does one need to be in each of these jobs?
How much imagination do they require?
How hard working do they need to be?
How much do they have to be concerned with other people; society in general or themselves in particular?
How valuable do you think their work is to society? and why?
Is the work likely to be exciting, or dull and repetitive?
Is the work likely to be intellectually stimulating?
Or will it involve the emotions?
etc, etc, etc.

Part 2

If these were the only professional activities open to you, could you list them in order of preference with the most preferred at the top of your list and the least preferred at the bottom.

Please take whatever time you need. This is not any kind of test. All that is required is that you express what you feel at this moment in time.

Do not try to guess what kinds of answers I would like to get from you - I don't have any preferences.

PWB/September 1970

This questionnaire has been given to the 54 new students who have joined the Diploma course in graphic design since September 1970. It is an adaption of one devised by Liam Hudson as part of his researches. In essence, it asks the student to describe his views concerning nine typical figures drawn from both the arts and the sciences.

My list of 'typical figures' differs from Dr Liam Hudson's in three respects.

1

I deleted the "athlete", since I could not quite see how this profession (or activity) could be fitted into the arts/science spectrum. Perhaps he was included as some kind of neutral figure.

2

I substituted "sculptor" for the somewhat ambiguous "artist", and 3
I dropped the "novelist" in favour of the "graphic designer" for obvious reasons. Since I am trying to teach the subject, I need as much information as I can get as to why students choose to study graphic design.

But my questionnaire differs from Liam Hudson's in one other important respect. In constructing his questionnaire he made use of the device known as 'The semantic differential'. This device enables the student to record his judgements on a series of 7 point scales between pairs of contrasting adjectives. Examples of such bi-polar adjectives might be *warm/cold*, *intelligent/stupid*, *valuable/worthless*, and so on. This method allows the student to make a large number of judgements quickly. In this way, it is hoped, his judgements will be based on intuitive feelings, rather than upon more rational deliberation.

I almost used this method, but at the last moment decided against it. I felt that new students on their first day in an unfamiliar college and just starting an unfamiliar study, were not the best candidates for the semantic differential. I also agree with Dr Hudson when he notes that many students find these kinds of questionnaires boring and, sometimes infuriating. In the end, I settled for a questionnaire that allowed the student to write a considered account of his or her views. At the start of the paper, I asked students to write only short, concise statements of their feelings about each of the typical figures. After half an hour they were asked to stop so that we might discuss their progress.

By this time, some of them has begun to feel that they did not know enough about some of the professions to be able to comment sensibly. We agreed that they concentrate upon only those with which they felt familiar. After an hour and a half the papers were collected in, whether

they were complete or not.

Not all of the students completed the entire paper. Most, however, managed to write accounts of at least six of the typical figures. On the following page I reproduce a selection of their descriptions. In editing these accounts, I have omitted nothing unless it was either repetitive or impossible to decipher. Most of them are given in their entirety.

The most remarkable thing about them is how closely they echo the views of Dr Hudson's schoolboys. The stereotypical artist and stereotypical scientist loom large in all but a few of the writings. Their views are, of course, one-sided. These are young people who have already decided which side they are on. Their choice of career is founded on the belief that they are entering 'the arts' and they leave us in no doubt why they feel this way.

Their rank order is almost identical to that of the schoolboys. Almost inevitably the "mathematician" trails the field by an overwhelming margin. How could it be otherwise, when he is seen as 'introverted', 'boring', completely unimaginative', 'inartistic', and so on? Few of the students can have met a mathematician other than those who taught them the subject at their secondary schools. If this is so, then mathematics teachers seem to have a lot to answer for. Understandably, perhaps, the "graphic designer" heads the list displaying, in some accounts, almost superhuman gifts of temper and sensibility.

The mathematician

1

"probably I am biased against anything to do with mathematics because I attempted to take it to 'A' level, but I think of mathematicians as boring personalities, completely wrapped up in figures and calculations - you could say dedicated, which you need to be to be a success at anything. A successful mathematician would be mentally hardworking and intelligent, with considerable patience and the ability to persevere with a problem, but possibly he would also be unimaginative and physically uncreative. Dealing with numbers all the time he is relatively unconcerned with other people and society".

2

"Tends to lack vision, will not deviate into other fields, sees the world in terms of figures, the interests of the mathematician do not go as far as the arts; regards art and artists with distaste. They are able to work with a single-mindedness, nothing really stimulates them apart from perhaps

a new theory involving figures; tends to reflect on very boring life.

They require a fair amount of intelligence, very little imagination; but are hard workers".

3
"Someone who thinks logically and everything's clear cut - black and white. The job does not involve the emotions, they are usually dull people personally. It takes a queer kind of logical intelligence to make a mathematician. Work does not involve other people - just numbers and formulas".

4
"One would expect a mathematician to be ultra-intelligent with a brain too big for him almost. The type of person who, when talking about his own subject would stutter because the words were coming too quickly, but with not enough imagination to understand anything but maths he probably would not consider himself a hard worker.

I cannot imagine that he would feel excitement at his work, but certainly exhilaration and intellectual stimulation as he goes from stage to stage".

5
"A successful mathematician is someone who can understand his 7 times table.

A mathematical personality is *hard edged* and therefore this characterlessness makes him suitable. He needs to be extremely intelligent and completely unimaginative."

6
"The mathematician tends to be a rather highly intelligent, hardworking but introverted person.

He is normally dedicated to his work to the extent of following a problem to its conclusion, no matter how long it takes.

His work has quite an important part to play in society, although it is rather repetitive and unexciting (although he probably would not look on it as such).

The work he does is not particularly exciting or imaginative, but at least there is the satisfaction of weighing up a problem and solving it with numbers and formulae, which are the sole tools of his trade."

7
"The mathematician is simply the extension of the bright whizz-kid in the maths class you hated. He's intelligent in abstract things, easily coping with the organization of things which simply exist on paper. ie, seeing the correlation between various formulae and solutions to other problems.

However, although he's brilliant at figures, you can console yourself that he's probably incapable of coping with many of the practical problems of simply living with people day to day.

I feel that mathematicians work very hard - spending long hours in concentrated effort. They seem to

have nothing to do with people ... I can see their role being virtually allotted to computers as it seems not to depend particularly on personality."

8
"A person who is logically minded, clear thinking and concentrates on the job in hand. ... A person dealing with maths professionally must have a substantial degree of intelligence, otherwise they would, perhaps, not understand the reasons behind their work. Imagination plays a small part in their work."

9
"Very precise and unemotional. Obviously needs a good head for figures and the ability to think quickly, but this is not necessarily the same as intelligence. Would probably be of above average intelligence. Needs no imagination at all."

10
"He would appear boring to anyone not interested in his line of work. This could be due to his lack of involvement with the world and other people, and his inability to understand and respect the opinions of others, perhaps not so intelligent as himself. Intelligence, I feel is an all important factor in the making of a mathematician but this is usually accompanied by an absence of common sense."

11
"Possibly an introvert - shy, maybe withdrawn. Intent on one subject only - no other real interests. An ability to concentrate for long periods of time, their *patience* makes them suitable.

Need to be exceptionally bright and quick to solve problems. Dedicated. The work would be exciting to a mathematician but likely to be dull to anyone else. Very intellectually stimulating. No emotions involved."

12
"I would imagine that for a person to be a success as a mathematician he would have the ability to actively enjoy many tedious operations. A prime requirement, I suppose, is the ability to think logically, this for me tends to rule out a high degree of imagination."

Descriptions like these appear over and over again with just a few exceptions. In this selected group of typical figures the *mathematician* and the *graphic designer* are seen by most students as the polar opposites, the other professions forming a spectrum between them. The *barrister*, for example, is given a position nearer the scientific end of this spectrum since his scientific qualities clearly outweigh his artistic ones. The *biologist* occupies a middle position, whilst the *psychologist* is thought of as having qualities nearer to those of the stereotypical artist;

imaginative, warm, sensitive, perceptive, not too hardworking. Here are a few samples;

The psychologist

1
"A psychologist has to be particularly sensitive and perceptive to each individual type of character, although each one of them is then put into some category.

He needs a basic human intelligence, a fantastic imagination and an ability to work hard at understanding things ..."

2
"On the surface a profession which involves other people but I feel it depends very much on the experience of the practitioner.

Trys hard to be scientific and finds this hard. Rewarding work and perhaps one day of great value as a science. Certainly exciting."

3
"This requires academic ability and thus a high degree of intelligence. But also a great deal of imagination and a concern for people.

This profession deals with people."

4
"A thinking, rather than an obviously hardworking job. But a very basic way of helping people, and possibly combining the practical and theoretical. Interest in people and how things work."

It is obvious that most students are not clear what a psychologist does, often confusing him with the psychiatrist, as in;

5
"A psychologist is the person one turns to when 'problems' overwhelm you, or somebody tells you that you've got 'a screw loose'."

The *physicist* and the *engineer* are perceived, naturally enough, as scientists primarily with very similar qualities. The *historian*, however, presents a muddled picture. Sometimes he is seen as the usual dull scientist, sometimes as a flamboyant, romantic figure.

The *sculptor* does not come off as well as one might have expected. Presumably art in a three-dimensional form exerts less appeal to would-be graphic designers than art in two-dimensional form. He does, however, secure a comfortable second place to the *graphic designer*. One short sample will be sufficient;

The graphic designer

"The graphic designer must be objective, rational, intelligent, creative, and highly imaginative and adaptable. People who are successful in this field are usually those who are interested in a great many areas of

study. They must be practical and good at dealing with people. Must have a certain amount of charm ... and be able to convince people that what you want is the right thing, but also be able to accept other people's ideas.

Work likely to be constantly stimulating and demanding."

Like many others, I find it sad to see that so many students have been helped to acquire a picture of our society absurdly divided into 'two cultures'.

They have been led to believe that science makes no appeal to the emotions, and that scientists are never guided by them.

By contrast, they also believe that art is governed only by intuition and the emotions. They can hardly be blamed since this popular fallacy seems often to be shared by art teachers and science teachers alike. Few scientific discoveries are made solely by logical deduction, whilst few works of art are made without considerable *calculated* skill.

And intuition plays a major part in both. To the common mind the creative achievements of the sciences may lack the popular appeal of the arts, for various reasons. I am not qualified to say whether this kind of cultural prejudice is the same in countries other than Britain. I only know that its existence here has created artificial frontiers between areas of creativity that are, in essence, parts of one continuous process.

The responses to the questionnaire tended to confirm my own feelings as to what students believed when they arrived. As a result, some of the initial teaching programme is devoted to discussion of these stereotypes. One of the happier aspects of this work is when I am told by students after completing the programme that they now feel able to reveal that they enjoyed mathematics, or perhaps one of the physical sciences. They had not dared to admit this before, since it did not fit the picture they wanted to create of themselves as artists!

Selected references

1
Hudson, Liam, *Contrary Imagination* A Psychological Study of the English Schoolboy, First published Methuen 1966 Published in Pelican Books 1967

2
Hudson, Liam, *Frames of Mind*, Ability, Perception and Self-Perception in the Arts and Sciences, First published Methuen 1968 Published in Pelican Books 1970

Problems of adult education

Ake Edfeldt

Ake Edfeldt is Professor in Education in the University of Stockholm. He has published a number of books and articles on reading, communication effects, and behaviour modification. He has also produced various television series on general adult education and emotional training at work and in home life

Adult education poses a number of problems when you begin to talk about it. It is education, certainly, but what kind of education? It does not seem to be a methodological entity, nor does it appear to have a specific content or structure. Adult education might be what happens to a university student, or an industrial trainee, to a trade union member going to study classes, or to someone watching a television programme. It might equally apply to someone reading the Highway Code or to the 'rabbit' golfer eagerly seeking help from the club professional.

You just cannot cram all of these activities into a finite set of rules, nevertheless, an obvious and reasonable starting point in designing adult programmes is to analyse the particular educational goals and problems *before* making a choice of teaching devices, course content and methods of instruction. This ought to be self-evident, but in practice adult education is often treated as though it were just like ordinary school education, only more so. It is assumed that adults differ from children only in their capacity to accept a greater load. After the last war the various re-training programmes for demobilised servicemen were designed upon this assumption. As a result, the idea died amid a shuffling of restless feet in the classrooms - phenomenon known to every teacher, and meaning that our adults, like our children, had reached maximal load. The adult, with his or her greater capacity, is already burdened with cares.

But there are some more important distinctions:

The adult learns in a different way. The learning process changes with age. For the adult, the ability to learn more or less *meaningless* material decreases from about the ages of 12 to 15. In exchange, however, comes an increased ability to learn *meaningful* material.

The adult is intrinsically an intentional learner. He knows why he is learning and works towards definite goals. He will read a list of educational objectives to see whether the course covers his personal needs. And while studying he will want to know how he is progressing.

The adult has to be encouraged to join a programme and to remain on it. Adult education is usually voluntary, so that particular motivation is necessary for the student to enrol and, thereafter, to keep him from dropping out.

The adult comes to a particular educational programme with a lot of previous experience and knowledge. This has certain obvious advantages,

but equally it can pose a number of special problems, such as *sensorial competition* (see the closing section of this article).

Above all, the much wider frames of reference of the adult demand that he is given a much more flexible programme. Adults work best at their own pace towards their own individually chosen goals. Individualized study materials, such as are already being increasingly used in children's schools, are essential for adults. Then too, adult education operates by means of discussion and workshop activities. This being an inversion of the traditional school approach in which information gathering is done collectively or given, by means of lectures, with its actual application given over to silent, individual work.

Given the special difficulties that are associated with adult education, I hope that the observations which follow will be of value to anyone engaged in the planning and development of adult teaching programmes. Furthermore, in the light of the growing conviction that all forms of education might profitably exploit some of the newer media, I have some words of caution to offer. The various items of 'hardware' currently available undoubtedly have a major contribution to make to the educational process, but they offer only the *means* to certain identifiable *ends*. Unless these ends are clearly specified there can be no guarantee that multi-media presentation will be any more effective than more traditional approaches. I say this as a result of my work in Sweden and elsewhere.

The adult education programme: planning, preparing and making it work

Some time ago, a project group was given responsibility for the planning, construction and supervision of a new technological school in a Swedish university. They decided that all theoretical teaching would be carried out by means of a closed-circuit television system. Laboratory work, supervised by assistants, would provide the only person-to-person contact. As a result, small lecture rooms were constructed, intended for about six to eight students, who could each watch a single television set. Construction of the buildings went ahead according to this basic concept.

When the different teaching faculties presented their curricula, no amount of ingenuity could fit the facilities and the functions together. In some subjects, such as Statistics and Applied Electronics, there was a general need for both simultaneous and successive presentation of visual material. An Eidoscope might

have provided a solution to the difficulty, but they are an expensive item, and to provide each lecture room with one of these large screens would be far too costly. The only way to handle this educational problem was thus to equip some large lecture rooms, either with Eidoscopes, or with a series of programmed slide projectors. Preparatory work had shown that a series of four slide projectors satisfied the needs of all the subjects requiring a more diversified audio-visual approach. The construction plans of the university were revised accordingly.

Meanwhile, the State Committee for Adult Educational TV Programme Production had received the university's order for 752 half-hour programmes. They returned it, after careful scrutiny, with the recommendation that much of the material would benefit from presentation in a more suitable media!

Unfortunately, there is no perfect combination for a multi-media teaching system. There are always numerous possibilities and combinations, and the problem is to choose the most effective one for a given situation. Hard thinking and somewhat harder experience have produced the following guide to the planning, preparation and working of an educational programme:

1 General goal definition

which means that you first state your general idea of the intended educational process, within the limits set by your resources and the political situation within which you work.

2 Listing of educational objectives

in such a way that there will be one cluster of educational objectives matching every general idea of a goal listed above. This part of the goal analysing process has caused some confusion among educational psychologists as well as among communication experts. How far is one supposed to go in splitting up one's educational objectives into smaller part-goals? There have been a number of taxonomies published, listing the different types of effects in terms of behaviourally defined objectives. Some cover cognitive goals as well as emotional ones. In them goals are broken down into the smallest behavioural units that can be defined in terms of measurable behaviour. But this must not be a mere mechanical separating of the general goals into their constituent elements. Instead, it must be carried out in the light of the educational technologist's comprehension of every single objective. Otherwise, the possibilities

icographic, 4, 1972, pp 21-22
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of generalization will be lost in this procedure.

3 Testing the initial level of knowledge

among members of the target group. Preparing the tests will consist of deciding how far the individuals in the potential target group have got along each operationally defined continuum. On each continuum, scores by tests or simulator data and prediction must be shown. Failures and other specific results from earlier experiments must be included, as this part of goal analysis must provide the educational technologist with a list of all possible outcomes of the educational programme.

4 Stating the task for the educational work now being planned

If the three preceding steps in goal analysis have been fully prepared, this step is little more than a mere subtraction: $2 - 3 =$ our task. We subtract a student's initial level of knowledge or performance from the level defined in the corresponding educational objectives. The remainder is the increase in knowledge or performance that we have to bring about. This is of much greater importance when planning for adults than when the students are school children. The adult student learns better when he or she knows all the final part-goals and understands the general reasoning behind them.

5 Gathering of relevant source materials in keeping with the results of 4

This step covers all the leg-work that may be needed to locate specialists in each subject; it also calls for an evaluation of contending schools of thought, and it is up to the educational technologist to assure fair representation. Often, specialists in different subjects are given training as educational technologists, so they are unlikely to neglect opinions in conflict with their own.

6 Final choice of subjects, content matter, acting experts and media

Content, staff and media are here combined to stress the point that they are interdependent. Each effects, to some extent, the degree of freedom that one has for putting together a curriculum. Once one has decided upon the content, all the other headings are subject to limitations, and if only one medium is available, the entire programme is limited.

7 Actual production of educational material

by this is meant the 'software'.

8 Administration

of the intended material to the intended target groups under the intended circumstances.

9 Testing the effects

in the target group, or in a sample, after the programme has been put through. This step is another simple act of subtraction: $2 - 9 =$ the outcome of the whole educational process.

The subtraction will equal zero if all the given educational objectives have been fully covered. A negative answer to the right will show failure, and a positive figure will show that the programme has been exceeding its goals.

10 Modification

of the total educational plan, or parts of the plan have to take place if the result under (9) has shown a failure in either the total plan or parts of it. If, on the other hand, the results found under (9) are good, the results from that step can be taken as the starting point for an entirely new programme.

For many design educators it will be step number 6 that is of particular interest, so I will close with some of our experiences and findings in that context.

Problems of the use of media in education

Audio-visual techniques were developed on the assumption that learning is improved by presentation through a number of sensorial inputs.

In fact, according to our studies, unless the stimulation is absolutely parallel, the effects can be completely negative.

In a television presentation, for example, where the commentator's voice describes a process step-by-step at the same time as it is shown in terms of moving pictures on the screen, the two versions block each other. The student finds himself watching and not listening or, less likely so far as our tests show, listening and not watching. Even that traditional and much loved device, background music, can interfere with and impair learning effects. Conversely, visual material used as 'filling' will distract from a spoken message.

This phenomena is known as *sensorial competition*, and adults with their broader frames of reference are doubly susceptible to it. This has been demonstrated to some extent by the fact that the average adult gives considerably more answers than a child in Rorschach tests. If an item in the instructional list calls for a message in sound or image

alone, then the creator of audio-visual aids must restrain his creative urges despite his horror of *non-sound* pictures and *non-picture* sound.

Where both are required together, care should be taken to avoid competitive divergencies and, more importantly, *stimulation for its own sake*.

A word now about illustrations. Often there are doubts about which system of illustration is most suitable for a given subject: should drawings or photographs be used? Is there any advantage in using colour? This is a difficult area in which to generalize but our experience suggests the following; Simplified, naturalistic drawings work better than photographs for depicting functions and processes, whereas colour photography works best in the natural sciences such as geography or botany.

In many cases, superfluous photographic details and colours run the risk of creating misunderstandings, either by offering material for convergencies, or by producing wrong associations.

Children, for example, tend to see nothing they can name in highly detailed colour photographs, whilst adults tend to the opposite extreme, often seeing too many things that are irrelevant to the points at issue.

One further point. At one time we used short television 'commercials' to encourage enrolment for a radio and television series on everyday mathematics. For these we used well-known comedians who appeared in situations where things went wildly wrong because of their ignorance of basic mathematical principles. Subsequent interviews showed us that these very well-known performers drew much more attention to themselves than to the message we were trying to convey. On the other hand, when we replaced them by comparatively unknown actors, the audience still failed to concentrate upon the message, since they were busy trying to identify who these actors were. Another alternative, the cartoon film, was not included in this particular study of effective communication, but from earlier experiments it would seem likely that cartoons might be more effective in holding the attention of an audience whilst a message was conveyed, assuming that the cartoon idea and production were good.

Many teachers in design and art schools may find the concept of education being concerned with *behavioural change* somewhat difficult to swallow. Certainly it often proves to be an explosive topic when introduced into discussions with teaching staff unfamiliar with the contribution of modern psychology to the understanding of the teaching and learning process. A little thought will soon make it clear, however, that teaching is only successful when it makes the student in some way different from the person he was before, even if he merely knows more facts, however futile these facts may be.

But if the aim is to develop the intellect to the fullest extent, then this must bring about considerable changes in the student since, by definition, he will be different from someone who has not had his intellect so developed. This is quite apart from any side-effects such as changes in personality, an increase in confidence, an increase or decrease in religious faith, etc, which might have occurred as a result of the basic change.

If this definition can be agreed, then it becomes possible to make considerable progress. For in any kind of teaching clarification of objectives is essential, since it is impossible to determine whether or not teaching and learning are effective if it is not certain what either of them are designed to achieve.

Choosing these objectives is rightly the concern of the art and design teachers. Only they can know what constitutes mastery of their particular field. It is unfortunate, though, that they often lack the skill to be more explicit about their objectives. These are too often expressed in vague terms which are capable of a wide variety of interpretations.

Even when the long-term objectives are determined, the intermediate and short-term objectives prove to be difficult. Such things as the maintenance of student interest; the devising of learning programmes; methods of evaluating such programmes to ensure that they are efficient; all demand considerably more skill than is possessed by the average design or art teacher.

The work of many educational research workers has moved some way towards clarifying the obscurities we face. Much more research is needed, but already much is available that is valuable to us.

Neither of these first two books is new (Robert F Mager's *Preparing Instructional Objectives* was first published in 1962). They are recommended, firstly because they may well be unfamiliar to many teachers working in art and design colleges, and secondly because they will be of value to any teacher who

has ever asked himself these questions. "What is it that I am supposed to be teaching?", "How will I know when I've succeeded in teaching it?", and "What materials and procedures will work best in helping me to teach what I want to teach?".

Preparing Instructional Objectives

Robert F Mager
Fearon Publishers, USA

If you want to take just one small step towards improving your performance as a teacher then *please* read this book! It is short (60 pages), it is easy to follow, and it is amusing. The author has written his book as a programmed text. At the outset he specifies what his educational objectives are (what you should be able to *do* when you have finished his teaching programme), tests your performance, and lets you evaluate it by specifying *his criteria* for your success.

In his foreword, Mager says this;

"Before you prepare instruction, before you choose material, machine or method, it is important to be able to state clearly what your goals are. This book is about instructional objectives. In it I will try to show how to state objectives that best succeed in communicating your intent to others. The book is *not* about the philosophy of education, nor is it about *who* should select the objectives, nor about *which* objectives should be selected. It is assumed that you are interested in preparing effective instruction, and that you have taught, are teaching, or are learning to teach. It is further assumed that you are interested in communicating certain skills and knowledge to your students, and in communicating them in such a way that your students will be able to *demonstrate* their achievement of *your* instructional objectives. (If you are *not* interested in demonstrating achievement of your objectives, you have just finished this book.)"

It should be possible to add to his remarks, that if you are *not* interested in demonstrating your achievement of your objectives, then don't let any of your students read this book!

Developing attitude towards learning

Robert F Mager
Fearon Publishers, USA

If you read the previous book then you will read this one also. It is for teachers who want to be able to demonstrate that their students are likely, as well as able, to use what they have been taught, and are likely to learn more. It shows teachers how to recognise behaviours they can use as evidence of favourable attitude, describes three princip-

les they can apply to help students to be more (rather than less) favourably disposed towards subjects of study, and offers a way of measuring success and a technique for improving upon it.

The management of learning

Ivor K Davies
McGraw-Hill, London

Education and training (in Britain certainly, and possibly elsewhere) now represents the largest single national expenditure.

As a result, many politicians and economists believe that it is doubtful if society can any longer afford the high costs and low productivity that characterises much of education.

In the past, remarks Ivor Davies, ideas have always lived longer than people, but, today, people live longer than most ideas ... We are living, in fact, in an age of instability and discontinuity, when skills based on mechanization are gradually being replaced by skills based on information and knowledge technology. In order to prepare themselves for this new role, education and training require a new conceptual framework against which decisions involving change and innovation can be made.

Davies maintains that anyone who sees his function as only that of *teaching* others, will rapidly become obsolete. He must see himself as being responsible for their *learning* - which is a totally different concept, as the many failures in traditional teaching methods show. Davies depicts his ideal teacher as a *manager*, capable of making the basic decisions that will promote learning in others - sensitive to those things which will inhibit learning; able to operate an intelligent, flexible system based upon his own style; the objectives to be realized; the resources available, and the character of the students involved.

His book goes a long way towards promoting his view of *teaching as managing*. He writes clearly and organizes his material excellently. As in the previous books, it is designed as a learning programme. Each section is headed by a specific set of objectives and at the end there is a Posttest which allows one to determine how successful he has been in meeting his objectives. There is an extensive set of references and a reading list is provided at the end of each of the chapters. He covers such aspects of the *teacher-manager's* job as analysing a learning task and deciding what learning or training are necessary, which audio-visual aids are most appropriate to any given situation; the ideal size of class, seminar, or other form of group; when to communicate in continuous prose, or through heuristics, algorithms, decision tables, etc.

He also discusses the measurement of learning and the management of resources.

This one is a *must* for anyone who is involved in course planning. It should also be required reading for all Heads of Department in colleges of art and design. If they value their peace of mind they will read it before any of their staff get hold of the book. As with the previous books, this too is one that should not be allowed to fall into the hands of students.

Teaching as a subversive activity

Neil Postman and Charles Weingartner
Delacorte Press USA
Penguin Books Ltd UK

An almost impossible book to review. It is polemical, irreverent, and often extremely funny. It is a diatribe against an 'educational establishment' which, in the view of the authors, has 'nothing germane to say about changing our present educational system to fit present realities.' Postman, who is Associate Professor of English Education at New York University, and Weingartner, who is Associate Professor of Education at Queens College, share an aim which they put as "to help all students develop built-in, shock-proof crap detectors as basic equipment in their survival kits." Their thesis is; "That change - constant, accelerating, ubiquitous - is the most striking characteristic of the world we live in and that our educational system has not yet recognized this fact. We maintain further, that the abilities and attitudes required to deal adequately with change are those of the highest priority and that it is not beyond our ingenuity to design school environments which can help young people to master concepts necessary to survival in a rapidly changing world. The institution we call 'school' is what it is because we made it that way. If it is irrelevant, as Marshall McLuhan says; if it shields children from reality, as Norbert Wiener says; if it educates for obsolescence, as John Gardner says; if it does not develop intelligence, as Jerome Bruner says; if it is based on fear, as John Holt says; if it avoids the promotion of significant learnings, as Carl Rogers says; if it induces alienation, as Paul Goodman says; if it punishes creativity and independence, as Edgar Friedenberg says; if, in short, it is not doing what needs to be done, it can be changed; it *must* be changed."

Their formula for bringing about such a change is to subvert the system from within. And the agent of subversion is to be the teacher who is skilled at the art and science of getting children to ask vital questions. Many teachers in art and design schools may fancy that they operate as subversive agents already. But even they might do worse than to adopt one of the

suggestions made by the authors. Tape a piece of paper to the mirror in your bathroom, on which you have written these three questions;

1
What am I going to have my students do today?

2
What's it good for?

3
How do I know?

It is, I think, too late to issue any words of warning about this book. This reviewer's copy was given to him by one of his students.



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The Icograda Audio/Visual Archive and Library provides a two-way exchange of graphic communication, a reference centre, a hire service for those concerned with design, and a storehouse for work of historical interest.

The Archive was established in 1966, in order to collect and preserve for future reference important design lectures which might otherwise be lost or destroyed. Initially, it contained only tape recordings of lectures, but in an area of design which is essentially visual, the subsequent addition of films and photographic slides was a logical progression. A library service was initiated, and the Archive and Library now contains a substantial collection of slides, films, tapes and slide/tape lectures concerned with graphic communication, graphic techniques, and educational matters. The Archive provides a service by designers for designers, and for design education-ists. Much valuable material which might have been lost has been preserved, and is now available to those concerned with visual communication in all its aspects.

Material at present held in the Archive includes international examples of

Poster design
Illustration
Book cover design
Brochure and catalogue design
Editorial design
Packaging
Stationery
Lettering
Calendars
Postcards
Signing systems
Symbols and trademarks
Computer graphics
Tape recorded lectures on design and related areas

Some of this material is available on loan through our library service to professional designers, associations and colleges, and a catalogue of the work held in the Archive, together with details of the hire service and charges, is available.

But to widen the horizons and extend the facilities of the Archive, we need more work - your work, and any help, financial, material, or in the way of services, which you can give us. Funds are strictly limited, and financial assistance is needed to buy essential equipment and to service and develop the project further. Offers of cash or equipment, particularly audio/visual equipment would be most welcome.

Graphic design publications of historic significance, from all countries are required for safekeeping, and we are anxious to obtain graphic material of both contemporary and historical importance, including traditional graphic forms and the graphic aspects of folk art. Examples of architectural and interior graphic work, including super-graphics, super-mannerism and campo-pop, are also required, together with combined slide and tape lectures, and all kinds of audio/visual material. In order to ensure that the Archive covers as wide a field as possible, work from South America, Cuba, Scandinavia, Italy, France, and Eastern countries is particularly required.

Finally, we need representation in more countries, and we would be most pleased to hear from any designer willing to collect together, on behalf of the Archive, work from his or her own country.

Use the Archive . . . and help us to extend its facilities still further

Anyone who is able to help the Archive in any way is asked to write to any of the following addresses:

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The International Council of Graphic Design Associations was founded in London in April 1963. Its headquarters are in Amsterdam. ICOGRADA is an association of independent Member Associations. Membership is open to societies of professional graphic designers and organisations concerned with the training of designers and/or the raising of graphic design standards. Member associations are elected at the biennial General Assembly, which elects also the Executive Board, determines policy and over-all activities and agrees financial arrangements.

The aims of ICOGRADA are:

- 1 to raise internationally the standards of graphic design and professional practice by all practicable means.
- 2 to collect and exchange information on professional, educational and technical matters.
- 3 to improve graphic design training and to assist the interchange between countries of graphic designers, teachers and students.
- 4 to organise exhibitions, international assemblies, congresses and symposia and publish documentation on graphic design and visual communications technology, including a News Bulletin.
- 5 to act as an international forum for co-operation and exchange of views between designers, organisations representing professionals from allied and other fields and those of commerce and industry.
- 6 to encourage the better use of graphic design and visual communication as a means to improve understanding between people everywhere.