Coláiste Náisiúnta Ealaíne is Dartha
NATIONAL COLLEGE OF ART AND DESIGN
FACULTY OF EDUCATION

Design methods and their application in the classroom

A dissertation submitted to the Faculty of Education
in
candidacy for the
DIPLOMA FOR ART AND DESIGN TEACHERS

by

Marianne Browne

June 1994

CONTENTS

INTRODUCTION

IN THIS dissertation I will attempt to discuss how design shapes our daily lives and why design education is a vital part of the pupils development in our modern world. Design education helps develop the pupils approach to the examination of a given problem and relating this to their own experience which encourages them to generate innovative solutions through ideas, materials and images.

As an aspiring art, craft and design teacher I was anxious to examine how design education could benefit the pupil. We are moving into the 21st century and it is important that this new generation of young people become familiar with the process of technological and social change in our world. Design education is a step in this direction. It is the wonderful interdisciplinary nature of design education that could enrich the pupil's learning, which is essential for their developmental growth, emotional expression and creativity.

Chapter I discusses what design is and tries to define good design and how the aims and value of design in post primary education could be approached.

Chapter II discusses design methodology and the importance and characteristics of design methods and also their relationship to craft. It also looks at the application of design methodology in post-primary education.

Chapter III gives examples of lesson plans for a craft design project with a second year class. The pupils work is then discussed and analysed in relation to their design methodology and progress.

Chapter I

DESIGN AND DESIGN EDUCATION

What is design?

Design is a human activity in which everyone is involved, everything around us made by man has been designed. The process of solving problems is what design is essentially about. The word 'design' is used in many ways. If you look up a dictionary it will suggest a number of meanings, for example –

> 'Design' a drawing, plan or sketch to serve as a pattern from which to work, The arrangement of detail, form and colour in painting, weaving, building or other artistic architectural or mechanical forms.(1)

The word design has various meanings and it is impossible to offer a universal definition. To understand the meaning, you have to consider how it is used, by whom and in what context. Different designers specialise in different aspects of design, fashion designers, graphic designers, craft designers etc. Some design is intuitive and spontaneous, but a great deal of design involves research by trial and error.(2). According to Langdon design has essentially to do with the ability to conceptualise and evaluate plans for the future.(3) Designers are forever bound to treat as real that which exists only in the imagined future and have to supply ways in which the foreseen thing can be made to exist.(4)

However, these designs do not necessarily mean originality. Frequently design is about developing old ideas to suit new conditions. There are five general aspects of the design activity; idea generation, information gathering, evaluating, modifying and making.(5) It is the instability of the problem

that makes designing so difficult and fascinating. For this reason it is important to understand and observe in a critical way the forces that shape our man-made environment.

From a need for change, may emerge new ideas, which can be tested and pondered over.(6) There are no absolute principles for 'good' design, according to Aylward, good design usually means an acceptable solution within the given constraints.(7)

One priority of good design is to achieve a balance between functional and visual elements so that neither takes over from the other, achieving this balance between function and appearance has always taxed the designer. Barnes says that the dividing line between art and especially technology becomes blurred when function is a factor.(8) When function is mentioned what immediately springs to mind is 'product design' which is the conception and manufacture of new man-made objects which are usually three-dimensional. Design has not exclusively to do with whether an end product is two or three dimensional, nor is it fundamentally associated with function or visual elegance. Design is associated for example with the creation of a poster or a piece of metalwork, these are two preconceived ends and their common factor is design. The idea, the definition of the problem, the thinking, the planning, the reflections, the correlation of parts, this is the process of design.(10)

Good designing comes from continual research and the pleasure of creating new ideas. It also may come from ingenuity and inspiration. Design education is vitally important to try to develop a critical understanding of human needs and gaining experience in evaluating whether these needs have been met adequately.(11)

Aims of design education

Design education is an investment for the future. According to Burden design education is crucial to every child's experience because it is essential to the development and promotion of growth, emotional expression and creativity. Young people growing up in a modern world should be required to look at the influences which designers have upon the world and have a display of critical awareness of their observations.(12)

Design education develops an inquiring attitude in the pupil, helping them to formulate and ask question and encouraging a healthy scepticism. The required experience should be built into the practical work, but must leave room for practical and imaginative expression. Practical work involves finding out about the character and limitations of a wide variety of materials together with the appropriate techniques.(13)

The process of design is concerned with much more than the outer appearance. Pupils will have to become efficient in examining a given problem and situation, in undertaking research and compiling data on problems, in analysing information, in proposing responses to the brief and in choosing most appropriately. To develop pupils response to a practical conclusion, they must be able to analyse and evaluate the result and communicate this to others.(14)

The main requirement of the Junior Certificate Syllabus for Art Craft and Design is that the product or final statement of the pupil's development be in relation to the objectives of the syllabus. They should be able to identify, describe, analyse a problem or task and propose a solution to the same.(15) Sometimes this is a slow laborious process, but sometimes the solution will come with a leap of insight and will take the form of a dramatic change in the

way the problem is perceived by the pupil.(16) The design problem posed by the teacher should be simple and straightforward.

Design ability is something everyone possesses at least to some degree, designing requires you to think and be imaginative in your problem solving and creativity, since you will be dealing with objects, actions and ideas in your mind.(17) According to Langdon the external manifestations depend on internal ability to model, known as cognitive modelling. The term 'cognition' is a term intended to embrace all these processes of perception, attention, interpretation, pattern recognition, analysis, memory, understanding and inventiveness, which go to make up the human consciousness and intelligence.(18) Cognitive thinking is vital in any creative or artistic endeavour, but is especially important in the process of design.

Designing is essentially a matter of thinking about what it is you want to do and how you may achieve your ideas. The ability to make judgements, and the ability to conceive in the mind's eye with imagination, are necessary. Two considerations are immediately relevant to the nature of design education. Firstly, the progress brought about by scientific and technological change and also the increasing range of human choice,according to Green.(19)

Design education is interdisciplinary by its very nature. Problem-solving activities can inspire artistry and craftsmanship. Art and Design cannot be compartmentalised. It is wrong to suggest that thinking and feeling should be isolated from one another. Aylward believes that the natural way to demonstrate the link between thinking and feeling is to engage in designing, since this cannot be done well without clear thinking about function and a deep feeling about the material and form.(20)

According to the syllabus for Art Craft and Design for the Junior Certificate Examination

- Art emphasises ideas, feelings and visual qualities.
- Craft emphasises the proper use of tools and materials.
- Design emphasises planning, problem-solving and completion using drawing as a means of thinking.(21)

If they were isolated, art would lose the complementary rational rigour of design and design would lose the complementary expressive skills of art. The amalgamation of art and design is both vital and stimulating.(22) Good design work involves the identification and selection of materials and skills. No longer are pupils expected to distinguish craft from art, they use art and craft skills in solving design problems especially in the new syllabus for Art, Craft and Design for the Junior Certificate examination.

Practical craft skills involve finding out about the character and the limitations of a wide variety of materials together with techniques. It is necessary to become aware of the practical problems of materials and construction, as most of the work created by the pupils is practical. Craft skills provide pupils with the confidence in making, producing, constructing and manipulating. The skill of making and producing are interfaced with the design process and the whole builds upon developing an appreciation of materials and associated technologues.(23) However, for maximum benefit in design education, art, craft and design must be held as essential co-existing complementaries for the pupil's proper educational development.

In the new Junior Certificate syllabus for Art, Craft and Design, the teacher must select a minimum of one option for ordinary level and a minimum of two for higher level. Figure 1 gives the listing of the different

options for the Junior Cert, from these a diverse view of creativity emerges, However, one common factor exists and that is the process of design. Design education potentially embraces all these areas for it is concerned with the influence that man's decisions and products have on society and the form which they take.

According to Bernard the introduction of a design brief begins to move the pupil towards an analytical problem-solving approach, it would be a mistake however to assume that the work is exclusively problem-solving, but a common approach to some of the work, is another way in which varying disciplines can be linked.(24) However the nature of the idea (or feeling being expressed) or the function of the object being made should determine process and the materials required. Two-dimensional Art, Craft and Design is primarily concerned with the exploration and development of ideas and emotion, based on the pupils experience real or imagined through two- or three-dimensional Media, in ways which can be expressive and functional.(25) This sets the ground work in design education where creative thinking inspires originality, innovation, flexibility and divergent thinking which can occur in any discipline whether it be concerned with problem solving or expression.

For this reason, design education is not an exclusive process, it is very relevant to the practical subjects of woodwork and metalwork. In the rationale of the woodwork syllabus; the design project and realisation is concerned with solving practical problems in a manner which reflects individuality and creativity. This process is seen as the basis for all project work. Activities that are planned should contribute to this 'area' and design is seen as a means to an end, rather than an end in itself.(26) Design should be an essential part

4. COURSE STRUCTURE

4.1 The core syllabus

Drawing				
Observation/analysis	]	Drawing	]	
Recording	]		]	
			]	
Two-Dimensional			]	
Art, Craft & Design			]	Art and
			]	
Image making	]	Painting	]	Design
Image manipulation and development	]	Printmaking	]	
	]	Basic photography	]	Elements
Lettering	]	Graphic design	]	
Lettering and image	]		]	and
			]	
Three-Dimensional			]	Support
Art, Craft & Design			]	
			]	Studies
Additive	]	Modelling/Casting	]	
Subtractive	]	Carving	]	
Constructional	]	Construction	]	

The core syllabus is described in more detail in sections 5 - 7.

4.2 Options

In addition to the core syllabus a minimum of one option for Ordinary Level, and two for Higher Level students, will be studied. The treatment of each option should reinforce and develop the core experiences.

Choice of options from the following (each option to include Drawing and Support Studies as relevant):

Animation	Film-making	Screenprinting
Art metalwork	Graphic design	Soft sculpture
Batik	Jewellery making	Strip cartooning
Block printmaking	Leatherwork	Tapestry
Bookcrafts	Mixed media sculpture	Theatre design
Calligraphy	Modelmaking	Toymaking
Carving	Modelling/casting	Traditional crafts (e.g. lace, hedgerow basketry etc.)
Computer graphics	Packaging	
Embroidery	Photography	
Fabric print	Pottery/ceramics	Videomaking
Fashion design	Puppetry	Weaving

4.3 In teaching any option, the appropriate design process, including drawing and visual research, and the relevant Support Studies must be part of the learning situation.

FIG. 1. The Junior Certificate Art, Craft and Design Syllabus, Roinn Oideachais. P.S.

of the pupils education at the different levels of post-primary school education, thus developing their skills in problem-solving, evaluating, discussing, making etc., which are invaluable for adult life.

According to the syllabus,the study of design should include a 'theme' or a 'source', the pupil should have a clear statement about its subject matter and why it has been chosen. Natural and man-made objects are a valuable source of design work. The 'theme' should motivate the pupils in analysing and observing natural and man-made objects or other artist/designers work, and sharpen their visual and critical appreciation. The art elements observed in these objects can be introduced directly into the design, stimulating a curiosity about the structure of our environment as an enriching source of design education.

Design education should enrich the pupil's natural ability to construct and manipulate the image in the minds eye, so as to encourage realisation of the pupils' ideas in a constructive and analytical way. Design education should provide pupils with experience in seeking out information and resources and judging their usefulness or not, and conveying this information through a variety of means such as drawing, sketching, making, analysing, calculating and evaluating. Problem-solving and decision making are central to this process and to learning, but more than that, it is a fundamental part of the pupil's everyday life.

REFERENCES

(1) *World Book Dictionary,* (Chicago, Illinois: Doubleday, 1977), p.689.
(2) Ian Burden, John Morrison, John Tiny Ford, *Design and Designing*, (Essex, Longman, 1988), p.78.
(3) Richard Langdon, *Design Policy, Vol 5*: London: Design Council, 1984), p.2.
(4) J. Christopher Jones, *Design Methods: Seeds of Human Futures* (New York: Wiley, 1980). p.10.
(5) Rob Barnes, *Art, Design and Topic Work 8–13* (London: Butler and Tanner, 1989), p. 153.

(6) Burden, *Design and Designing*, p. 77.
(7) Bernard Aylward, *Design Education in Schools.* (London: Tinling, 1973), p. 45.
(8) Barnes, *Art, Design and Topic Work 8–13*, p.145.
(9) Burden, *Design and Designing*, p.59.
(10) Donald M. Anderson, *Elements of Design* (Winconsin: Holt, Rinehart and Winston, 1961, p.11.
(11) Peter Green, *Design Education; Problem Solving and Visual Experience*,(London, Anchor Press, 1974), p.7.
(12) Burden, *Design and Designing*, p.5.
(13) Aylward, *Design Education in Schools*, p.31.
(14) Design Council, *Design Education at Secondary Level* (London: Design Council, 1981), p.6.
(15) *The Junior Certificate, Art, Craft, Design: Guidelines for Teachers, ~~Junior Certificate~~*, (Dublin: Roinn Oideachais, 1992), p.10.
(16) Jones, *Design Methods* p.20.
(17) Burden, *Design and Designing* p.81.
(18) Langdon, *Design Policy, Vol 5.* p.8.
(19) Green, *Design Education.* p.8.
(20) Aylward, *Design Education in Schools.* p.5.
(21) *The Junior Certificate, Art, Craft, Design Syllabus, (~~Syllabus~~)* (Dublin: Roinn Oideachais, 1993), p.1.
(22) Aylward, *Design Education.* p.56.
(23) *The Junior Certificate,Technology* (Dublin: Roinn Oideachais, 1993), p.2.
(24) Burden, *Design and Designing*, p.34.
(25) *Art, Craft, Design (Syllabus)*, p.2.
(26) *The Junior Certificate, Materials, Technology(wood) Syllabus.* (Dublin: Roinn Oideachais, 1993) p.1.

Chapter II

DESIGN METHODOLOGY AND ITS APPLICATION IN DESIGN EDUCATION

Design methods

The process of design is pragmatic. Effective methods of design are needed to achieve a balanced preconceived end. In order to proceed with a fruitful end result, it is necessary to define the problem. Society dictates what these problems should embrace. We tend to accept our surroundings blindly and are not conscious of how they affect our lives, until they touch our daily life at a basic level.(1)

According to Anderson, when observing any man-made structure we should be concerned with two things, appearance and meaning. It is when we are in intellectual blindness that form alone can be appreciated. Artists and designers have the task of separating form from meaning. Theoretically, this is impossible to do perfectly, but they persist in trying, because as designers/artists they are chiefly interested in shapes and colour and new ways of putting them together. (2)

Good design essentially comes through continual research and the capability to think first and then to act. To this end Jones describes three very interesting design methods, which could relate to design education, (a) that of creativity (b) that of rationality (c) that of control over the design process. From the creative viewpoint, he maintains that the designer achieves his inspiration from a mysterious leap of creativity. From the rational view point, the designer is deeply concerned with an entirely rational process.

Whereas from the control viewpoint, the designer is a self-organising system capable of finding short-cuts across unknown territory - this viewpoint Jones states is the one that leads us most directly to the practical value of design-theory and the next step of effective design methods.(3)

The main conclusion of the creative method was that a designer is governed by the inputs received recently from his previous problems and experience, this suggests that no one can become a good designer without the right experience. The capacity to produce output relevant to the problem is dependent upon his being given enough time to use and manipulate images representing the structure of the problem as a whole. From this exploration which may seem long and fruitless, he may suddenly perceive a new way of structuring the problem so that conflicts are resolved. By a'leap of insight' a complicated problem is sometimes transformed into a simple one.

In the rational method, Jones is mainly concerned with externalised thinking and this is therefore based on the rational rather than on the mystical assumptions of the creative method. (4) The rational designer is a person who operates only on information given to him, he uses a planned sequence of analytical, synthetic and evaluative steps until he recognises the best of all possible solutions. This evaluation of the problem is largely linguistic and logical as opposed to a more experimental approach. These characteristics seem like dogmatic limitations to a human designer. He suggests that they are not uniformly bad or good, and in many cases this design method usually ends in confusion, from which the designer usually reverts back to the accustomed creative method. Both systematic and creative design methods have bad and good points in their favour. Both widen the areas of research to a design problem.

In method no.3 Jones combines these two methods into a logical design method, whereby the design effort is divided into two parts:

(a) that which carries out the search for a suitable design.

(b) That which controls and evaluates the pattern of the search (strategy control). (5)

This method replaces the blind searching for alternatives by an intelligent search that uses the external criteria to find short-cuts across unknown territory.

From the dilemma of blind searching for an alternative, Jones sees the self-organising control method as a happy medium between the creative and rational methods.

None of these methods mentioned are complete in themselves. Some mixture of both rationality and intuition are necessary in the solving of any design problem. This mingling of methods allows for a greater variety of personal expression and technique. Each design process can consist of whatever aspects the designer wishes to use to enable him to reach his preconceived end. Design involves imagination as well as technical expertise. Observational, descriptive, analytical and critical skills with good presentation will be required throughout any study of design methodology, according to Burden.(6)

Brainstorming and classification are two methods that can be applied together to solve almost any problem in the design process. Brainstorming is a rationalistic way of using the imagination which gives one confidence in the sharing of ideas, according to Jones.(7) He states that the brainstorming session, in which everyone is expected to contribute freely and in which criticism is ruled out, is a deliberate return to the illogical and ego-centric

talk of children that has been recorded and explained by Piaget and others (8) Classification is an intuitive way of acting rationally, it gives experience of the very necessary art of finding patterns in apparently jumbled information.

Ideally a proper brainstorming session will include 6 people and will almost certainly produce 70 to 150 ideas in about 30 minutes. In the kind of chatting that most people call brainstorming, they will produce only a dozen or less. The rigour of this method is what makes it viable. However Jones insists that the thinking must be imaginative not conventional.(9). This method is a skill used by many art and design teachers. This method of questioning requires skill and ingenuity as it takes time and patience to nurture a pupil's appreciation and awareness of design education. Brain-storming would be a very valid method of expression especially for Leaving Certificate classes, by which time they will have gained knowledge and a critical awareness of their work and the work of others.

To designers in two and three dimensional fields, the most indispensable tool in the design process is the sketch. The sketch serves as a link between the vaguely seen image in the mind and the actual finished piece. According to Taylor design skills involve the extraordinary ability to be able to envisage that which does not yet exist and then to realise it through a planned sequence of activities (10). A painting, or a machine or an architectural unit are too complicated to be seen in the mind's eye, or if seen rather distinctly once, may dissolve not to reappear again (11). The sketch is invaluable for capturing the essence of the initial inspiration. Often the most important parts of the final piece can be visualised, but the connecting links and details will be missing. It is through trial and error that the final design comes together satisfactorily. In three-dimensional

areas of design, the sketch involves the precise drawing made up of coded parts to ensure accurate and identical interpretation by others, whereas with two-dimensional work they use several different kinds of sketches.

An idea may first begin life in the form of a thumb-nail sketch. This involves a miniature image or images of the important structural elements, from which working drawings or sketches are produced to enable the designer to visualise the actual piece or design. Anderson notes that sometimes a glamourised version of the sketch or mock up has to be made to show clients (12).

Basically, whatever design method one chooses to follow, one must feel comfortable with the process. It must tell you what you do not know, but need to know in order to proceed with the solution. According to Jones the person has to identify the questions to be asked and plan their course of action, and if they find themselves on the wrong track, they should be able to go back to the drawing board and swap courses (13). The mind must be free to jump about in any sequence, from one aspect of the problem to its' solution to another as intuitively as possible. Jones also goes on to suggest that chaos, meaningless jumping in at the deep end and creative disorder are well known ingredients of designing. It does not matter if one abandons a well designed strategy (order) and falls into confusion. Jones states that the purpose of any design method, muddled or orderly, is to get ones mind to become familiar with the unknown possibilities and limitations of the 'new' before making any decision (14). It is best to keep constant interaction between both problem and solution throughout the whole design process.

Many design activities require special skills of craftsmanship. In three-dimensional work, such as pottery, silver or goldsmith's work the form and

the materials are an essential part of the design. In craftwork, the designer should know the processes, the qualities of the materials and the practical use of the appropriate tools. There is considerable merit in having few materials to work with. It forces the designer or pupil to think of ways to make a medium clearly expressive, using ingenuity to corner the medium's weaknesses, so that it becomes an expressive part of the person. However when a designer realises his design, the work should show that the person knows how to use the materials and tools with skill and sensitivity. Burden suggests that for this to be achieved, the work should have a design brief which clearly state what the intended design is, with a selection of appropriate techniques, processes, materials and a plan for the person to realise the design, so that it will hold together all the different elements of the work. (15)

Suspicion is cast on objects and activities which defy the normal code of analysis, for example, some potters show little concern for function and actually create teapots that do not pour properly. They regarded 'utility' or function as a handicap, since their superiors in the hierarchy produced only non-useful objects with a visual aesthetic. Anderson states that in America, these potters and other three-dimensional designers, were grouped together into a craft category that was not highly regarded professionally. Unlike painters and sculptors somehow they were tagged with the 'handwork no brains' label and found it hard to become associated with the higher institutions of learning. It is this stigma that has devalued craft and design, especially in post primary education for many years. This idea is gradually changing. Designers are finding greater satisfaction in their inspiration and concepts with the integral marriage of form and function.

Jones makes some interesting comments about the design methods of the eighteenth and nineteenth century craftsmen. He comments on the beautifully organised complexity that has been achieved without trained designers, engineers etc., and with simple tools. Craftworkers e.g. smiths wheelmakers etc. handed down their own little bit of understanding, passing it on to their sons or apprentice through the generations. For the most part, "the details were but dimly understood, the whole body of knowledge was a mystery, and a piece of folk knowledge, residing in the folk collectively, but never wholly in any individual' .(17) This passing on of knowledge or method modified the product by countless failures and successes, in a process of trial and error over the centuries.

This slow and costly sequential searching for the invisible lines of a good design, can in the end give an astoundingly well balanced result with a close fit to the needs of the user. The traditional method of designing by drawing, eliminated a lot of errors made by the slow and gradual evolution of craftworks. The main significance of this was that trial and error was separated from the production by using scale drawing, thus separating the thinking from the making. Jones also suggests that the compatibility of a designed object with the situation in which it will be made and used is a question in which designers are on weaker ground than are craftsmen. (18) This is because designers have to rely largely on memory and imagination, to tell them what will work and what will not work and what can or cannot be made. This difficulty is overcome by designers with constant research, making models and prototypes and also making approximate calculations to check crucial parts. To this end designing requires a good mixture of rationality and intuition, which are two of the key components of solving any design problem effectively.

The process of design itself involves much more than just the outer appearance. To think of designing as just 'problem solving' is to use a rather dead metaphor, for a lively process and to forget that design is not so much a matter of adjusting the status quo but of realising new possibilities and discovering our reactions to them according to Jones.(19)

Matchett's fundamental design method

F.D.M. as it may be called, is one of many design methods described in detail by Jones.(20) This method of design is fundamental to many design processes and may be rearranged or simplified to suit the ability and requirements of second level pupils. The main aim of the method is to enable a designer to perceive and to control the pattern of his thoughts and to relate this pattern more closely to all aspects of a design situation. Briefly what the principles of the F.D.M. tries to outline are:

(a) Thinking with outline strategies

(b) Thinking in parallel planes

(c) Thinking from several viewpoints

(d) Thinking with concepts.

(e) Thinking with basic elements.

Essentially, what Jones is describing are Matchett's teaching methods which are a very individual experience. Matchett persuades each student to describe his characteristic method of tackling a problem and to suggest improvements on it. The fundamental principle of Matchett's method is to begin with whatever is familiar to the student and not to impose upon him a new method in which he may never feel confident and may abandon

at the first signs of difficulty. It is when the student realises that he is actually learning to perceive and control the patterns of his thoughts that he is willing to incorporate the F.D.M. modes of thinking. Matchett states that good design is the optimum solution to the sum of the true needs of a particular set of circumstances and that designing means discovering and reconciling conflicts in a multi-dimensional situation.

PRINCIPAL OUTLINES OF F.D.M. (a) Thinking with outline strategies which is the first of his outline objectives, is attains after following the modes of thinking to perceive, to control and to extend the pattern of thoughts about design problems.(i) The student must attain the ability to decide in advance upon a strategy, for example a sequence or network of design actions or thoughts. (ii) The ability to compare what has been achieved with what has been planned. (iii) The ability to produce processes for producing processes.

(b) Thinking in parallel planes is where the student partakes in a detached observation of the thoughts and actions of oneself and one's colleagues during a design project. It includes such things as being aware of the degree to which the designer is in control of his colleagues, or being controlled by them and the focussing of attention upon the pattern of thought while designing.

(c) The pupils must be able to think from several viewpoints – this process is very similar to thinking in parallel planes, but is directed at the solution to the design problem instead of at the process of finding it.

(d) Stage four involves thinking with concepts. This mode of thinking is the hardest to understand. It appears to consist of the imagining or drawing of geometric patterns to enable a designer to relate the F.D.M. checklists, listed below to the pattern of his memories and thought. Figure 2 shows diagrams produced by Matchett and his students which illustrates this mode of thinking - The main purpose of 'thinking with concepts' appears to be to

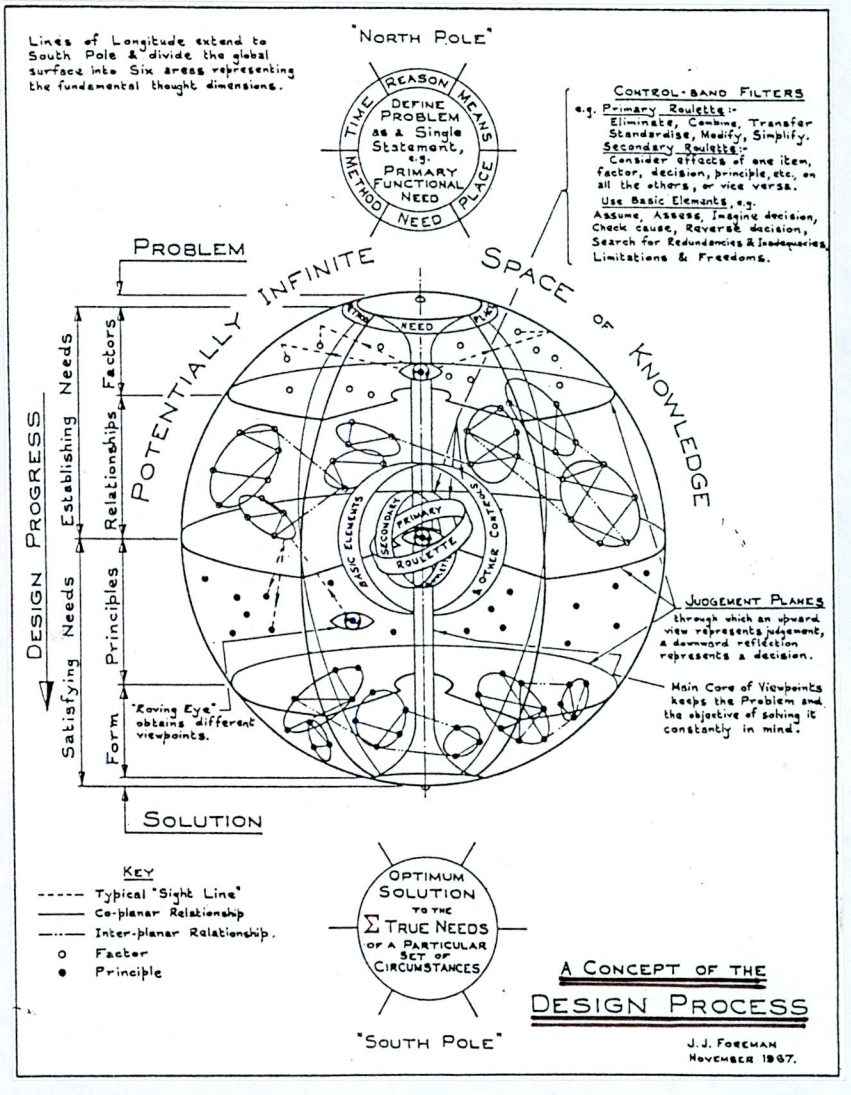

Fig. 2. Jones, Design Methods. P.187.

provide the designer with a memorable pattern of the relationship between the design problem, the design process and the solution.

(e) Finally, the method of thinking with basic elements is the most rational of the five 'modes of thinking', it refers to the use of small units of thoughts or actions that commonly occur in any problem solving process. Matchett calls these units 'techtams'. The main purpose of 'techtams' is to make the designer aware of the large number of alternative actions that are open to

him at each point of decision making. Matchett characterises and puts these techtams into selected groups some of which are listed below (21)

GROUP 1 – involves the decision options:

- for example to recognise a need,
- recognise inevitable element,
- imagine decision,
- tentative decision,
- firm decision,
- cancel decision.

GROUP 2 – demonstrates the judgment of options:

- Assume,
- weigh, and compare,
- extrapolate,
- no further action,
- to predict

GROUP 3 – are the process options:

- to continue in the same direction,
- to continue plus increment,
- to change direction,

- to check back,
- to advance check
- to scan,
- to resolve conflict.

GROUP 4 – are the tactical options :

- to assess risk,
- to check consequences,
- compare with another decision,
- to divide action,
- adapt another decision,
- to concentrate on a smaller area,
- to reverse decision and try alternatives.

GROUP 5– deals with concept options:

- when to use concept,
- change plane of abstraction,
- use outline strategy,
- change viewpoint,
- compare with existing system,
- compare with emerging system.

GROUP 6 – deals with the obstacle options:

- to pass obstacle,
- to destroy obstacle,
- to remove the obstacle,
- to commence new action from zero,

The sequence of Matchett's methods is not to be followed rigidly, each designer has to decide for themselves when to tackle each stage, when to repeat a stage or when to skip a stage. The main point is to enable the designer to restructure their experience and thoughts to match both the essentials with the variety of a design situation.

The F.D.M. checklists seem to be a development of the standard work study questions of what?, when?, why? etc. These lists of questions are an invaluable tool to tap into the design thinking process, especially for evaluation purposes, for example when studying a design situation.

(1) Questions such as which of the needs are

- vital?
- very important?
- important?
- desirable?

(2) What are the needs at each stage of the lifespan of the design product?

- designing and redrawing,

- development,
- production of components – assembly,
- testing and adjusting,
- finishing and packaging,
- distribution,
- usage and misuse,
- maintenance and serving.

(3) This stage looks at what can be learnt by asking the six fundamental questions of work study:

- what has to be done? (needs)
- why has it to be done? (reason)
- when has it to be done? (time)
- where has it to be done? (place)
- by what or when has it to be done? (means)
- how has it to be done? (method)

(4) The final stages of the design process involves how each part of the design can be

- eliminated,
- combined,
- standardised,

- modified,
- transferred,
- simplified.

Finally the F.D.M. is assumed to be one of the few systematic methods to show evidence of working well with everyday design methods.(22) Critics of the method claimed that it achieved no more than the expected results of concentrated work. Others say that the results come from Matchett's unusual ability and cannot be maintained without him. Matchett himself claims that he has found a way of changing "the threshold of consciousness and of perceiving and manipulating the structure of thought," He admits that there are "emotional undertones and unpalatable aspects" but because every student "personally controls how far he will go, dangers are minimised". but it cannot be denied that drastic improvements in design methods are achieved by the deliberate manipulation of the thinking process (23).

Finally, from the design methods described, it can be observed that there is no fixed theory or method of design. One design method may be suitable for one person, but may be unsuitable for another. Each individual has to recognise what method or methods will have to be combined to produce an effective and changing method to solve any design problem efficiently.

Application to design education

Contrary to the popular belief that art comes easily to the talented few for whom it is intended, in reality, any worthwhile artistic achievement involves challenge, struggle, discipline and the enjoyment arising out of the effort and ultimate achievement, according to Taylor and Taylor. (24).

There is no general theory from which an art and design teacher can select an appropriate design method. When pupils are designing and making they

are trying to achieve an end product as simply and effectively as possible. Pupils are encouraged to distinguish between the problem and the solution which may open new alternative ways of looking at their surrounding and human needs (25). To be able to solve a problem, the pupil must first recognise that a problem exists. We as a society are often unable to see a problem because we have been surrounded by other people's solutions for so long. Much of the work of design has to do with the recognition of a problem situation, even if we are not aware of it (26). Essentially when trying to teach design methods, especially in post primary school, one has to identify the problem and the solution and choose an appropriate design process.

Jones (27) suggests a method, where the pupil or student, not the teacher find the problem. It is very important that no criticism is given to any of the pupil's suggestions, but to question the pupil's theory. The pupils should be encouraged to abandon work that leaves them cold and be ready to start again. This is a very adept method for the senior classes, when they have reached a level of self criticism and personal development, especially when they have chosen a source or theme that they may have very strong feeling for. Basically, pupils will be frequently using very simple and similar materials and processes to make images and objects within both a personal and social context. (28).

Many of the pupils early design experience will be largely concerned with choosing materials and ideas. This practical work involves finding out about the characteristics and limitations of a wide variety of materials together with the appropriate techniques in both two- and three-dimensional work. These experiences have to be built into the practical work, but must leave room for personal expression and imagination (29). This work usually grows

out of experimentation, with manipulation and control of materials and processes. Art and design activities draw on both personal concern as well as dealing with externally dictated problems. Thorough research, investigation and preparation invariably repays itself, helping to develop and realise often complex ideas, special to the pupil, which are expressed through new techniques and processes (30).

Two major requirements are necessary for any design activity, that is the pupil should be able to recognise a problem, propose a reasonable solution, organise it and evaluate it. The pupil should also be able to look critically at his surroundings and other designer's or artist's work as a source of inspiration for his own practical work. According to Aylward this delicate balance between the theory and the practical is almost inseparable (31). One method as described by Alyward, suggests that the pupil has to be able to review the problem and produce his own brief. He should also be able to produce a sheet of sketches with notes of as many solutions to the problem as possible. A mock up or drawing is then made of the best idea and it is checked against the original design brief, from which a production model is actually made. The pupil then has to consider the design from the users' and buyers' viewpoint, where the pupil will learn that in practice, most solutions are compromises (32). The connection between the buyer, the designer, the maker, the user and the observer is a perfect opportunity for the pupil to become familiar with the world of business and communications, thus becoming more aware of their immediate environment.

Pupils can use drawing as a way of expressing themselves. Drawing is an interdisciplinary activity. Drawing skill is vitally important especially in all areas of designing whether in the form of sketches, working drawings, plans, diagrams or the representation from observation of finished products,

systems and environment. It is important for pupils to be taught how to collect information about the structure and quality of the natural and manmade environment through drawing, in preparation for designing and making, in a variety of media. (33). In making preliminary drawings the pupils are becoming familiar with the appearance, the content and structure of the form they wish to recreate or make.

When children are working with new and unfamiliar media, making a preliminary drawing not only gives the pupil confidence about the appearance of the form, but it also gives sufficient knowledge about its appearance to be able to focus upon the new technical problems involved in the process of making (34). Materials and making are not only explored in terms of expression but also in terms of their function. Although designing must involve considerations as to shape and form, and a pleasing finish, to disregard function however, eventually leads to inefficiency. According to the British Design Council it is necessary to give pupils an appreciation of functional design, as well as a visual sensitivity and a familiarity with the process of problem solving and decision making (35).

Careful observation work is the groundwork of good design. Taylor suggests that in order to distract the pupils from the realisation that they lack the necessary skills of adult art of which they are made aware of, an alternative approach, would be to give them access to a variety of techniques centered around copying processes making them believe that they have skill.(36). However for pupils to develop analytical skills, they must analyse and respond to the natural form, which encourages pupils to observe their environment with close scrutiny and examination. As a project theme, found objects provide a good starting point for an introduction into the process of design. Our environment provides an

abundance of shapes in leaves, textures and patterns of foliage etc. Birds and fish owe their structure to the environment in which they live. All the elements of art and design can be taught through the use of natural objects and our environment.

The exploration of the art elements such as the qualities of line, colour, surface, pattern, shape and form are common to most craft and design activities. In perceiving the man-made world, we are learning a great deal about the variety of simple and intricate shapes of man's creative developments. Nature's war on man's work, often provide fine elaboration of form which can suggest new surface qualities and textures. In the new syllabus for the Junior Certificate Art Craft and Design examination, it has been suggested that the student's direct experience real or imagined, or the natural and man-made world should be the starting point for any project work in Art Craft and Design (37)

Man-made forms are an important part of our environment, but they are so taken for granted, that we do not see them anymore. Pupils must become conscious of their surroundings, if they wish to assimilate them into their designs. Personal judgment and feelings are also good starting points for design work. Personal likes and dislikes may be the basis of the pupil's study, but it should also be tempered by examples of other peoples designs and feelings so that the design is balanced, interesting and original. Drawings made by artists, craftworkers, designers, architects, and planners all provide useful clues to the ways in which drawing can be used to explore ideas for a design activity (38). Pupils should be encouraged to become aware and develop a critical awareness of other artists and designers work to assist them in self criticism.

Jones breaks down designing into three essential stages;- analysis, synthesis and evaluation. To analyse means to break up the problem. Synthesis puts the problem together in a new way. Evaluation tests the consequences of putting the new arrangement into practice. This basic method could serve as a basic design model in design education.(39)

Design education should be dynamic. It should form a new and innovative part of the school curriculum because of its wonderful interdisciplinary potential. The innovative art craft and design teacher should be a catalyst, firing many departments with inspirational ideas, able and willing to engage in co-operative design projects.

REFERENCES

(1) Green, *Design education; problem solving and visual experience*, p. 89.
(2) Donald M. Anderson, *Elements of Design* (Wisconsin, Holt, Rinehart and Winston, 1961) p. 69.
(3) Jones, *Design Methods* p.47.
(4) Jones, *Design Methods* p.48.
(5) Ibid., p.48.
(6) Burden, Morrison, Ford, *Design and Designing*, p.58.
(7) Jones, *Design Methods*, p.1.
(8) Ibid., p.47.
(9) Ibid., p. xviii.
(10) Rod Taylor, Dot Taylor, *Approaching Art and Design: A Guide for Students* (London: Longman, 1990), p.145.
(11) Anderson, *Elements of Design*, p.22.
(12) Ibid., p.12.
(13) Jones, *Design Methods*, p.22.
(14) Ibid., p.12.
(15) Burden, *Design and Designing*, p.81.
(16) Anderson, *Elements of Design*, p.13.
(17) Jones, *Design Methods*, p.19, quoted by George Shirts.
(18) Ibid., p.23.
(19) Ibid., p.xxiii.
(20) Ibid., p.178.
(21) Ibid., pp.180,183.
(22) Ibid., p.185.
(23) Ibid., p.189.
(24) Taylorand Taylor, *Approaching Art and Design*, p.123.
(25) Aylward, *Design Education in Schools*, p.36.

(26) Aylward, Ibid., p.27.
(27) Jones, *Design Methods*, p.xix.
(28) Robert Clement, *The Art Teacher's Handbook*, 2nd ed. (London: Stanley Thornes, 1993), p.209.
(29) Aylward, *Design Education in Schools*, p.32.
(30) Taylor, *Approaching Art and Design*, p.171.
(31) Aylward, *Design Education in Schools*, p.43.
(32) Ibid., p.45.
(33) Clement, *Art teachers Handbook*, p.214.
(34) Ibid.
(35) Design Council, *Design Education at Secondary Level*, p.6.
(36) Taylor and Taylor, *Approaching Art and Design*, p.173.
(37) *The Junior Certificate. Art, Craft and Design Syllabus*, p.6.
(38) Clement, *The Art Teachers Handbook*, p.217.
(39) Jones, *Design Methods*, p.63.

Chapter III

CLASS DESIGN METHODOLOGY AND PROGRESS

In my final chapter I will be discussing examples of lesson plans written for my second year class. In these lesson plans the design process has mainly been applied to craft design, involving inexpensive materials such as paper, card, wire etc. The choice of materials is determined by the children's skill and availability of materials. There is little value in designing with costly materials where cheaper materials could be used as effectively.

The design possibilities using natural objects such as shells, sea-life etc., is endless. I encouraged the pupils to avoid stereotypes and develop their ability to carry through with the design process to the designing of stain-glass windows. The sea-shore is their given theme and design source. In terms of process, design begins where chance ends. The seashore theme encourages the children to examine natural forms which will lead to simplified, identifiable or recognisable abstract designs for their windows.

I will use two of my lesson plans from this scheme. My interest lies in developing a strong design process with the pupils, catering to the ability of the class as well as giving them an understanding and awareness of the process involved. In the design work much consideration and time was given to the economic use of line, space and shape to create an effective finished design.

Coolmine Community School caters for over 12,00 pupils, many from difficult social backgrounds. It offers pupils and teachers an encouraging

and challenging environment. Art is taken very seriously. The Art Department has two full-time and one part-time teachers, and offers a wide range of activities for the pupils.

Lesson plan no. 1

Time: 10.15–11.45 *Year*: Second

Date: 7 Dec. 1993 *Class*: 20 P 3

CLASS no. 3

Aims: To develop the pupils' awareness of line and shape from a natural object or source in order to create an abstract design for a stain-glass window effect.

Objective: To deepen the pupils' understanding of planning and layout. To break down the form of the shell into shapes using lines and wire drawing. The shapes can be isolated within the lines, which will be later used to create a stained glass window design.

Theme: Seashore

Introduction:Introduce the relevance and meaning of shape.

Q 'What do I mean by shape?'

Q 'What is the difference between this real orange and the cutout?'

A 'flat, circle, one colour, round, heavy, weight, volume, takes up space.'

Q 'Which one is flat?

A 'Paper cutout'

Q 'Why is the orange not flat even if it is the same size as the cutout?'

A 'You can feel or touch it, hold it, it is heavy.'

Q 'What do you call something you can hold?'

A 'Three-dimensional'

SHOW A VISUAL AID OF PICASSO'S PAINTING (1934)

Q 'Why is this painting two-dimensional?'

A 'It is flat, unrealistic, colours etc.'

Q 'If it is flat what is he creating?'

A 'Shapes'

Q 'Describe some of the shapes.'

DEMONSTRATION

Recap on how to work the wire drawing from last week because they did not know how to do them correctly.

1. Get original drawing of enlarged section. Tape it down to the table at the corners of the page.
2. Begin by shaping the wire along the lines of the drawing, bending the wire to create the shape.
3. Gently, tape down the wire to hold in place on the page.
4. Show how to twist the wire together correctly when joining new sections of wire.
5. Before starting, place a strip of masking tape and a strip of selotape at the edge of the table,so that the pupils will be able to tape down the drawing to the table and the wire to the drawing. Use the masking tape to tape down the wire to the page, as the masking tape doesn't tear the paper as much as cellotape. Use the cellotape on the table as it is stronger.
6. With finished wire shell, place a sheet of A2 size paper, on the table with the wire drawing on top.

7. Demonstrate how to draw between the lines leaving a quarter inch on either side of the wire.
8. Demonstrate the importance of the crossover of the lines when the lines overlap on the page. Using a rubber, rub out the intermediate lines to create new shapes with an unbroken line.
9. Once this is completed, a sheet of tracing paper the same size as the working drawing is used to trace the design so that they will be able to transfer the design on to the black sheets.

Show an actual black frame completely done to demonstrate the next step. At this point show and discuss a glass window done by Harry Clarke as a reference to what the end product will entail.

Visual aids orange, cut out orange, Picasso drawing, original shell drawing, shell wire drawing, working drawing – layout of the design, Harry Clarke window.

Task Finish off wire drawing correctly and begin work on the layout of the design, overlapping to create interesting new shapes.

Materials Pencil, wire drawing, black sugar paper, sugar paper, tracing paper.

Evaluation

'How did you get the shapes on the page?'

'How did you decide to arrange your design on the page?'

'Why so you think the wire drawing created an interesting mixture of shapes.'

'What aspect did you find the hardest to do?'

'Why do you think the crossover or overlapping of shapes is important or not in the design?'

Lesson plan no. 2

Time: 10.15–11.45 *Year*: Second

Date: 10 Jan. 1994 *Class*: 20 P 3

CLASS no. 5

Aims To develop the pupil's awareness of line and shape from a natural source, so as to create an abstract design for a stain-glass window effect.

Objectives To deepen the pupil's understanding of line in a natural object and to develop the pupil's awareness of the design process.

Theme Seashore

Introduction Visual aid of Louis Tiffany's work.

Q 'What lines can you observe in this work?'

A 'Big, black, thick, curvy.'

Q 'Describe the variety of shapes these lines create?'

A 'Curved, unidentifiable shapes.'

Q 'Define the difference between form and shape. Recap.'

Q 'Why do you think Tiffany's shapes are interesting or not?'

Q 'From what source do you think he got his inspiration or ideas?'

A 'Nature, insects, birds, flowers etc.'

Q 'What specific design would you prefer in his work and why?'

Q 'Why do you think these materials would be most appropriate?'

Q 'How do you think we are going to create our stained glass design using the wire drawing?'

Q 'What materials would you use to create the stained glass effect?'

A 'Crepe paper, tracing paper, plastics, sweet wrappers.'

A 'Because they suggest transparency.'

Q 'Why do you think a source or theme is important for your work?'

DEMONSTRATION

At this point the pupils have their layout design of the abstract shapes completed as well as the tracing sheet. It is very important to have a tracing of the shapes, because they have to work out where they overlap in the drawing, so as to create new shapes between the wire lines.

1. Demonstrate how to create new shapes by overlapping.

2. Show how to create a second identical black frame from the first.
   The first black frame was created by laying down the tracing paper and transferring the shapes on the frame, using a blade, carefully cut out the shapes to leave the lead effect of the window.

3. Cardboard (old pieces of mounting board) is placed under the paper, so that the blade does not damage the table.

4. Demonstrate how to apply the glue on to the frame properly and how to apply the coloured paper or wrappers on to the picture.

5. They have to decide on their own colours from the choice available, either as isolated colour or to use one colour for a group of shapes.

6. Old newspaper, has to be placed on the desk, if some people are ready to begin using glue. Brushes have to be properly washed and put in jars.

Task Each pupil has to continue from where they left off, some have to finish the tracing paper and transfer on to the black paper. Most of the class have gone on to cutting out shapes and are ready to begin using coloured paper or plastics.

Visual aid Louis C. Tiffany. Visual aid of individual stage.

Materials Black sugar paper, wire, pencils, blades, sweet wrappers, plastics, coloured paper, tracing paper, hard board to protect table, plastic bags, plastic cups for glue.

The coloured paper was produced by painting the tracing paper with vegetable oil on both sides of the paper. This procedure makes the paper go transparent. Then the oil is wiped off the page. This is repeated two or three times until the paper is reasonably dry. Next the oiled paper is inked on one side to create a vivid transparent colour.

Evaluation

Q 'What is the difference between window frame A and window frame B?'

'How was window frame B created?'

A 'Drawing between the wire lines on the sheet in isolation.'

Q 'How was frame A created?'

A 'By overlapping the lines.'

Q 'What do you create when you overlap the lines?'

A 'New design of line and shapes.

Point out that there is nothing wrong with using different methods and emphasise that it is good for them to have their own ideas.

Q 'Why do you think the wire drawing helped to create this design?'

Q 'When you are drawing on either side of the line, what were you making in between?'

A 'Shapes'

Illustration and analysis of pupils' work

My second year class is a mixed ability class, their ability ranges from very high to very low. I will discuss work by two of these, henceforth referred to as pupils A and B, or Susan and Gary respectively.

Their work is the product of my lesson plans. My main objective was to deepen the pupil's awareness of basic design process, from a given source, where each pupil had to interpret the given problem on an individual basis. The lessons were very technical, aimed at developing their design skills and also their construction skills which are very necessary in order to achieve a successfully designed piece of artwork.

The first stage of the process involved the setting up of a still-life grouping of 'seashore objects' to inspire the pupils to use their natural environment as a source of inspiration. They began by making an observational line drawing of this still-life. They had to examine the wide variety of lines that could be drawn from a still life. This initial stage was important in helping the pupils to gather information through drawing and in deepening their awareness of environment as a source for design.

Stage 1 – observational drawing of still-life group

Pupil A

Susan is a conscientious worker, possessing good observational ability. Her drawing is both free and lively. A self-assured girl, she has confidence in her ability which shows in her work. Her drawing suggests that she is prepared to take risks and shows no fear in experimenting with the various lines on the page.

Fig. 3. Observational drawing of still-life group (Pupil A)

Pupil B

Gary is an overactive child, constantly messing and being disruptive but always getting his work done. He knows exactly how much time it will take him to finish his appointed task. He is an analytical thinker whose drawing shows a sensitivity in perceiving things and distinguishes between the qualities of various lines. He is a very careful worker who has developed a very

definite style at an early stage of his development. His drawing displays an element of caution, in contrast to his character.

Fig. 4. Observational drawing of still-life group (Pupil B)

Stage 2: a. enlarged drawing of shell; b. wire drawing

From the still-life drawing, the pupils were required to draw part of it on to an A3 size sheet to create a working drawing or template for the wire drawing. It was very important to show them a wire drawing at this stage so that they be able to relate the drawing to the wire drawing. This gave them a clearer understanding of their objective. Careful analytical thought and skill were required in the process.

As I am concerning myself with design process through craft, I was greatly concerned with experimentation in a range of unusual possibilities with ideas and materials, in order to stretch the pupil's imagination to create a more balanced design piece. The pupils enjoyed working with wire and it developed their competence in handling craft and two-dimensional media.

Pupil A

Susan shows a strong conceptual ability to carry through the work. Her manipulation skills are good, showing her competency in handling one or more art media. Pupils at this stage knew where each stage led, Susan being one of the few who could visualise her actual design and worked steadily with good concentration and flexibility. Working with wire being new to the class, constant instruction was needed to help them understand and manipulate the material. She with the class in general showed interest in other artist's work such as Louis Comfort Tiffany's glass work. Reference to craftspeople and designers are very important in setting standards for them and in assisting them to develop their own style. A quiet girl during class evaluation, Susan nevertheless showed an ability to evaluate and discuss the design process involved in the work.

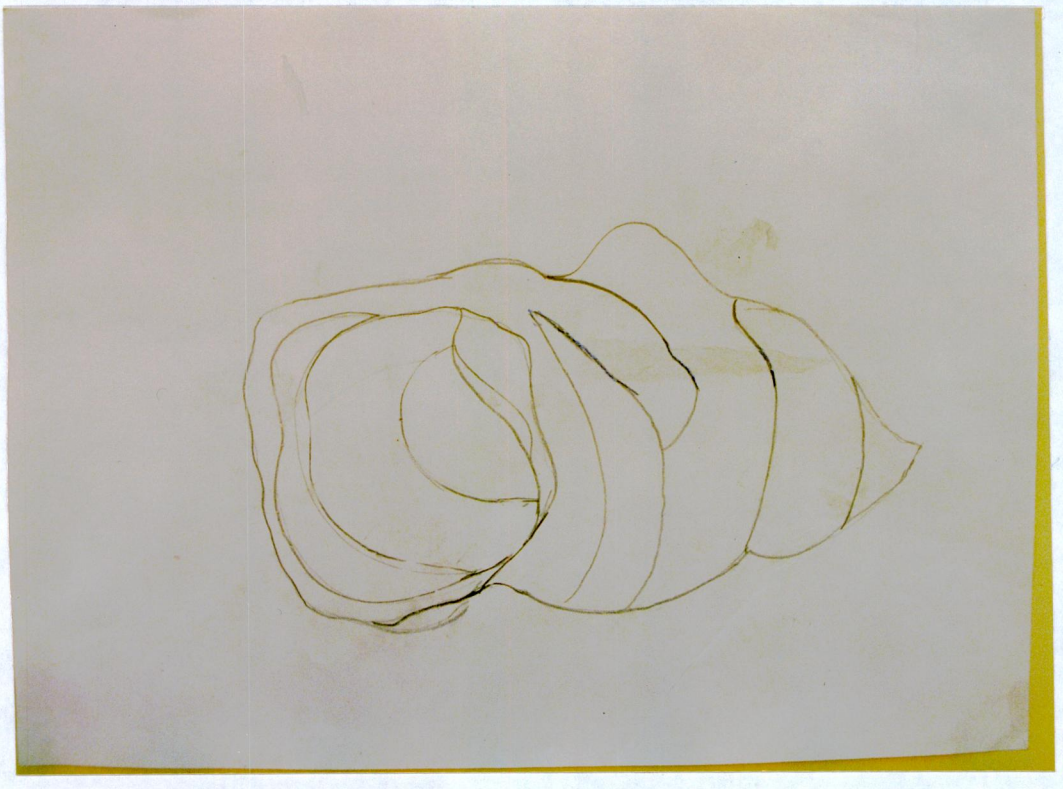

Fig. 5a. Enlarged drawing of isolated section of still-life group or of an actual object (Pupil A).

Fig. 5b. Wire drawing (Pupil A).

Pupil B

Gary showed very good technical and expressive use of the material. He is very talented but has a short concentration span. He has very good powers of observation and is outspoken at evaluation with good analytical thinking and is good with dealing with conceptual options. He possesses a good cross over of skills between drawing and making. As a student he has to be constantly motivated, but once he becomes interested in the process he is well inclined to work.

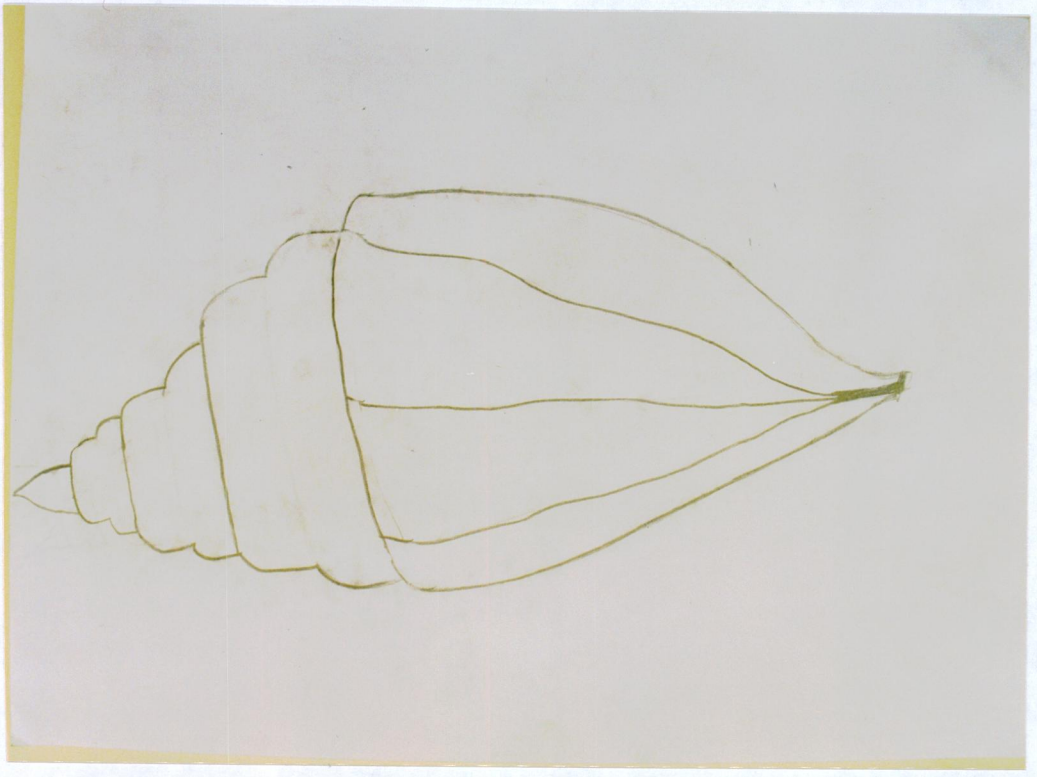

Fig. 6a. Enlarged drawing of isolated section of still-life group or of an actual object (Pupil B).

Fig. 6b. Wire drawing (Pupil B).

Stage 3: a. layout sheet or working drawing of design; b. tracing drawing of design

Stage 3 is the most difficult stage of the design process. It is at this point that the pupils have to lay out their design for the final stained glass window. They must be able to visualise what the actual design will look like. The wire drawing acts as an intermediate tool providing the pupils with the ability to create the double lines needed to make the window and the shapes that have to be cut out of the black frame.

It is at this point that decisions have to be made and solutions to problems evaluated. The most difficult concept for the pupils is the concept of creating a continuous line when the line drawings overlap each other on the page. Most pupils were slow to produce this working drawing or layout sheet

which they found difficult to visualise. Once understanding is achieved, development of personal approaches to the layout sheet is accomplished. It is important for the pupils at this stage to experiment, try trial and error, in both ideas and media to encourage a continued interaction between the pupil and the designed craftwork. Now the modified information is transferred on to the black paper. At this stage of the design process the child has gained a vast knowledge of skills and materials and the flexibility to express their design in an organised and analytical way.

Pupil A

Susan's work suggests a very good grasp of the process, she has used the wire drawing to create some very beautiful abstract shapes. She has filled the entire frame and has overlapped the lines correctly to create a very sensitive design. She quickly did the drawing and transferred this on to her black sheet. It is apparent looking at her actual window that the shell or sea life was its source, but there are also unidentifiable elements in the layout, also deriving from the same source. It is this combination of identifiable and unidentifiable shapes which make for good design.

Fig. 7a. Layout sheet or working drawing of design (Pupil A).

Fig. 7b. Tracing of finished design (Pupil A).

Pupil B

Gary's layout sheet is more simple than Susan's yet this does not mean that it is not a good design. Gary has approached his design in an analytical way, being an analytical thinker he sees what he wants to do and does it exactly. Susan on the other hand is inclined to take more risks and uses the medium to express her ideas. Gary's work however is successful, basically because he is sure of what he wants and has the ability to achieve it. Like Susan he has good manipulative skills and the transferring of information was treated competently.

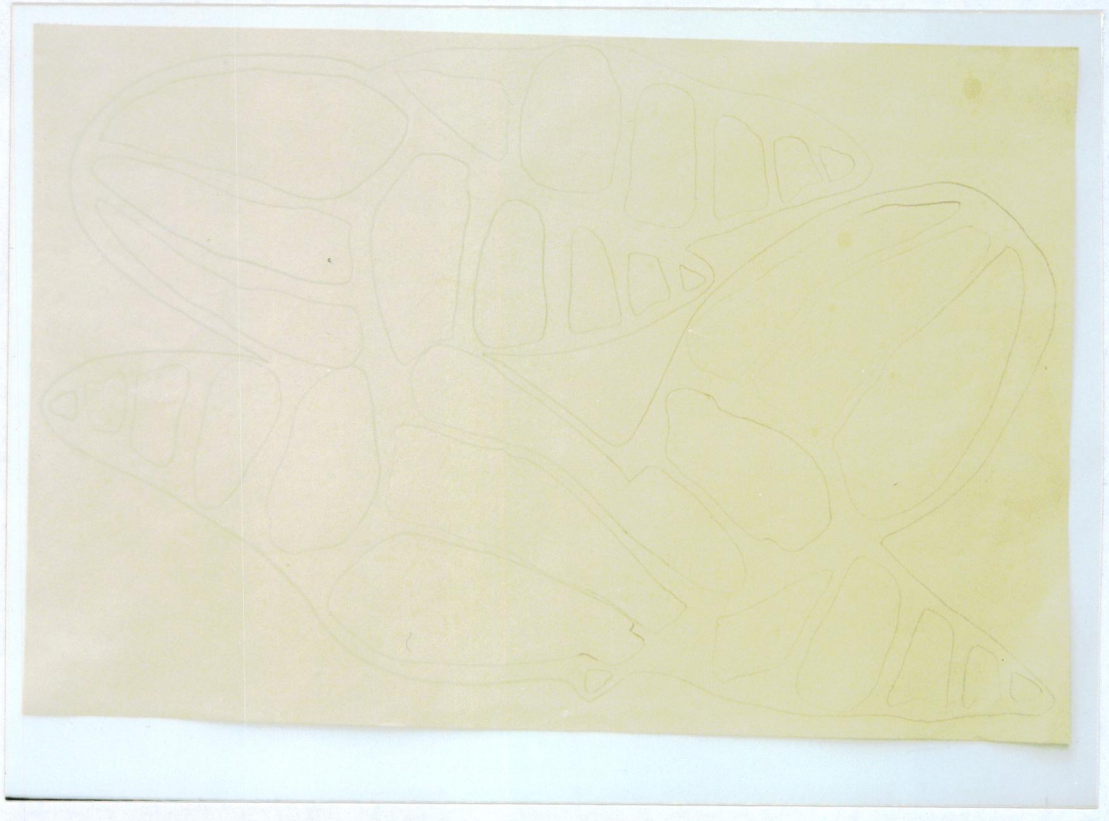

Fig. 8a. Layout sheet or working drawing of design (Pupil B).

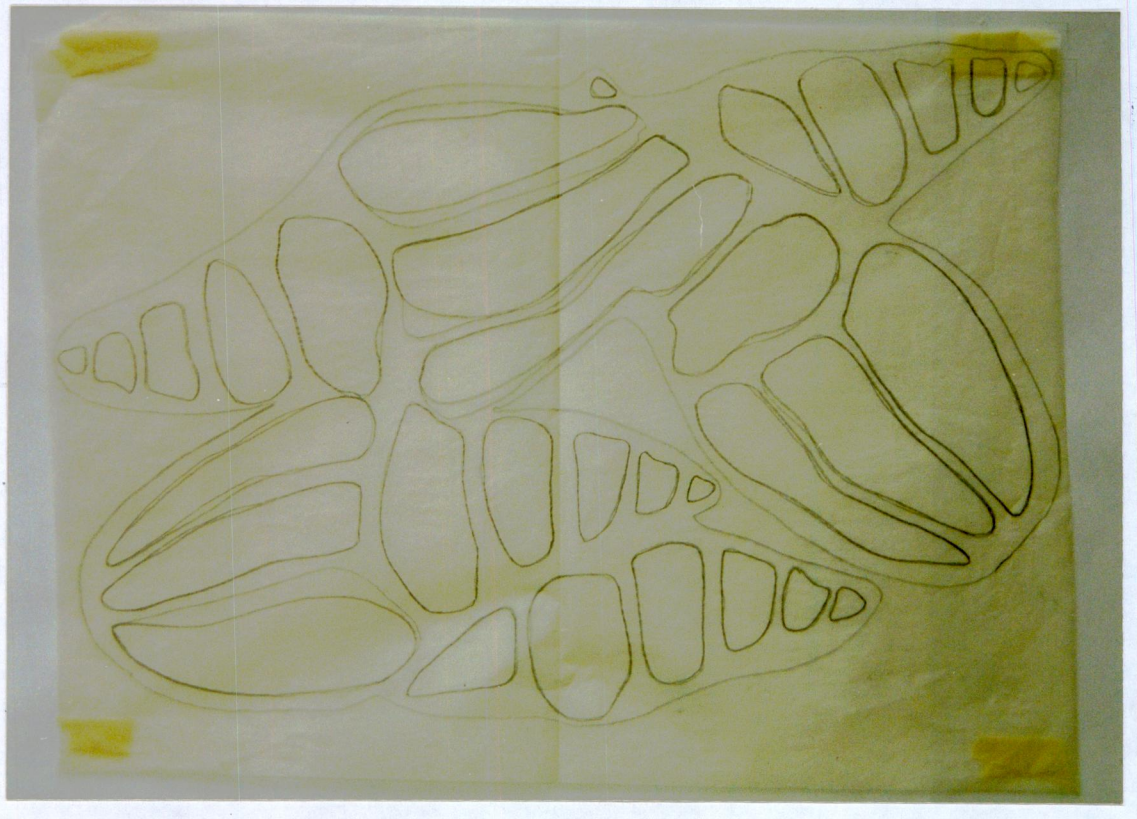

Fig. 8b. Tracing of finished design (Pupil B).

Final stages

The final stages involve a lot of actual making, constructing, shaping, jointing, fixing, gluing, cutting, etc., It is at this point that the craftskills really come into play. I found the pupils very particular about doing things correctly and I observed through regular demonstrations on methodology that they actually attained a higher standard in their work. On observation I believe that it is well to have a high estimation of their ability and to aim high. If properly shown the class will respond in a very expressive way developing not only their analytical thinking but also developing their perceptual, artistic, aesthetic and intellectual capabilities.

The final stages of the designed windows took a lot of concentration though the class were well motivated. Some students found it very hard

to achieve their desired effect and found that with good making ability especially at this level could even save a'bad' design. It was those without good making ability who found it hard or lost interest. Basically as a class some very good results were achieved.

As a simple design project the stained glass windows worked well. Some pupils were good at the designing and created some innovative images, while others were good at making and their designing weak, but it still left room for creative thinking to create a design for the window. In the final stages the pupils had to achieve a good technical standard. Once the pupils had transferred the design on to the black sheet, they had to begin cutting out the shapes on the paper. Again reference to various craft designers was very useful at this stage. An analysis of how and why such designers created such designs to achieve the unity, colour, shapes and harmony within their work proved useful. In demonstrating how to actually apply the coloured paper to the black frame, the relevance of the procedure became more apparent.

Interestingly enough some pupils who were behind in their work became frustrated and some cleverly began to use a simplified method to achieve a quicker conclusion. One or two began to cut directly on to the tracing paper and the black paper together to eliminate the transferring stage. Secondly, some actually drew and cut the shapes from the wire drawing on to the black sheet. This naturally led to a less complicated and simplified version of the overlapping process. I allowed them to continue as they were frustrated and had actually thought out these simpler methods for themselves. For this reason designing is learning according to Jones many call the way in which a problem is perceived a leap of insight, the effect of which transforms an often complicated problem into a simple one.(1) Originally I chose to use

the other process with the layout sheet, the tracing sheet and the black sheet to develop the pupils ability to plan and analyse in a structured fashion.

Stage 4: a. back and front window frames; b. finished windows

Pupil A

Susan's work, figures 9a and 9b, demonstrates a very creative expressive design piece, the actual finished design window shows her ability to make independent judgements, to analyse, synthesise and evaluate her design. She possesses a sensitivity in handling materials in imaginative ways, with a high level of understanding of good design concepts. She succeeded in creating a beautifully designed piece using harmony, balance, space, rythem to good advantage. Her making or manipulative skills are excellent combined with her haptic and analytical thinking. She is keenly observant, following a logical sequence of investigation into all the details in a creative and intelligent manner.

Fig. 9a. Back and front frames for window (Pupil A).

Fig. 9b. Finished designed window (Pupil A).

Pupil B

Gary's work, figures 10a and 10b, demonstrates a very different design method. His design pieces have less overlapping and more black paper. This works well because of the shapes he decided to select. They have a uniformity about them that suggests the actual dissected shell. Gary achieved this by selecting what he considered effective shapes to cut out. He used some overlapping with interesting effect. He works very efficiently, with very good manipulative skills and very consciously aims for a good finish to his work. A perfectionist, with him everything has to be correct, e.g. the backing frame must fit exactly to the front frame and if it does not he is inclined to get frustrated and lose interest. His work utilises a high degree of skill and consideration to create a balanced design

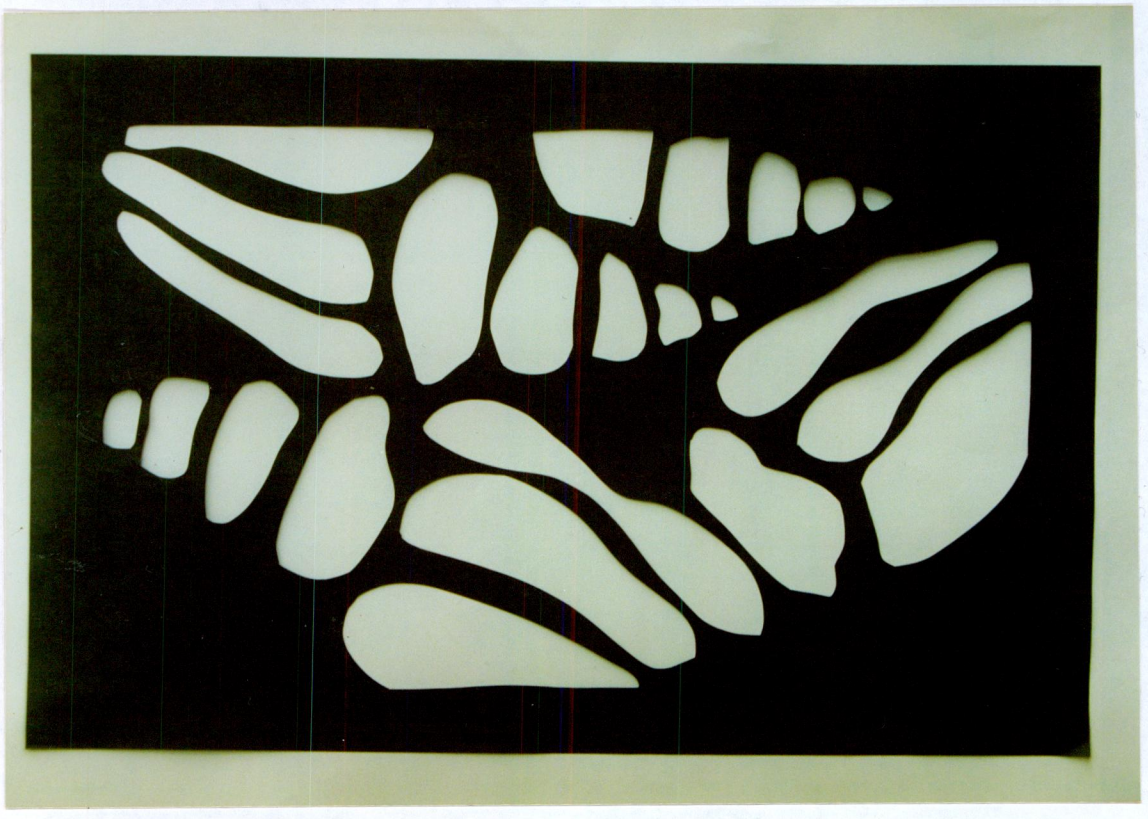

Fig. 10a. Back and front frames for window (Pupil B).

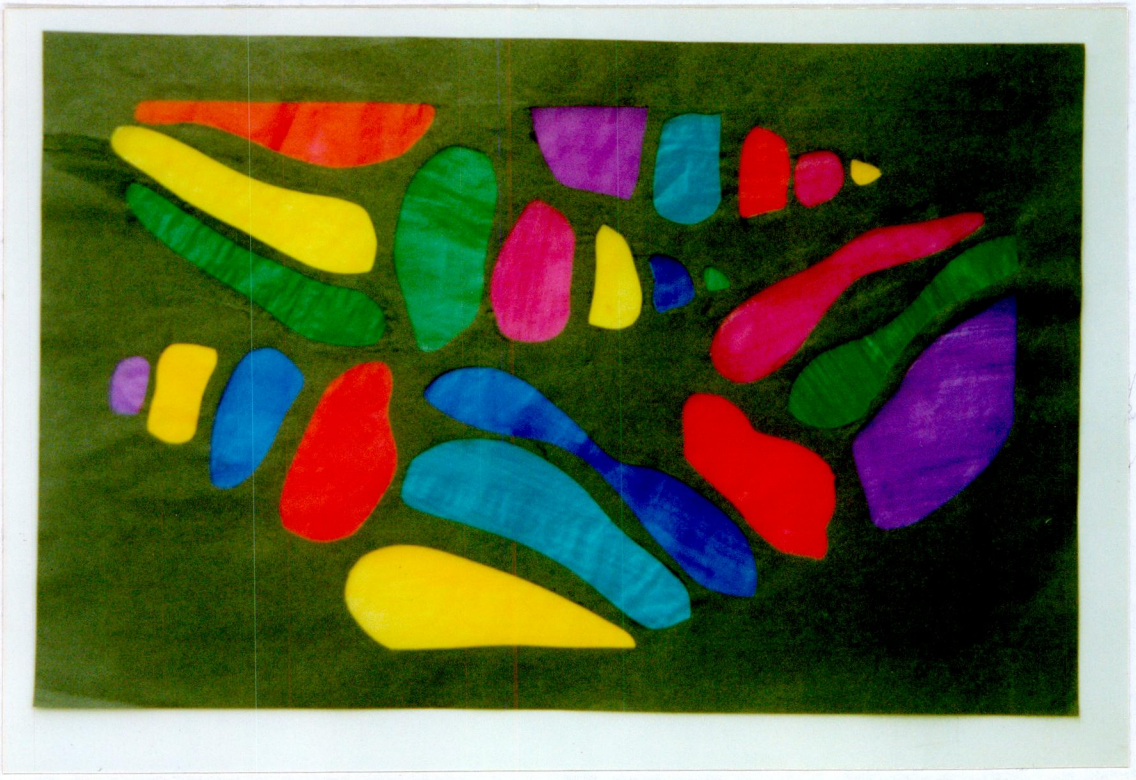

Fig. 10b. Finished designed window (Pupil B).

In the final stages of the process a backing had to be made for the windows so that it could be viewed from both sides and also to provide strength for the structure. Again different methods were used by pupils to accomplish this task, either by cutting the sheets together or by cutting the shapes from the sheet first and then laying down the frame on to the second sheet and drawing out the shapes, then cut out the shapes in the second sheet.

Basically, the pupils gained a greater understanding of a design process in the creation of their finished piece. The actual finished design followed a logical sequence of investigation, information gathering, analysing, constructing, modifying, evaluating and making. The pupils developed a high degree of manipulative skills as well as relating their ideas about design and craft to those of other designers and craftspeople. An interesting aspect of craft design is that almost any material selected by an imaginative pupil can be transferred into an aesthetic product through careful planning and designing to express effective ideas and solutions. Finally the design possibilities from shells are endless. Shells have a variety of forms and shapes which

encourage children to avoid stereotypes and to make their own carefully considered designs.

REFERENCE

(1) J.Christopher Jones, *Design Methods: seeds of human future* (New York: Wiley, 1980), p.298

Chapter IV

RESULTS OF DISSERTATION

In conclusion, the awareness and intellectual development of this class amazed me. The design process and the designed windows were pleasing. Each window showed originality and a deep understanding of the art medium and its use to express their ideas. My aim was to familiarise pupils with basing their work on a theme and incorporating this theme in a problem solving analytical approach.

The pupils were required to analyse their own work and to decide on a suitable method of achieving an expressive and individual design. I find myself in agreement with Aylward's statement that for early design work the pupil should not be primarily concerned with producing artefacts: early design work he says should be more concerned with experimenting and comparing the nature of materials, while also considering their aesthetic qualities (1). This was particularly true of my class. Through the design process the pupils were learning to make both imaginative and expressive decisions in the designed windows.

The materials and techniques became a vehicle for creativity. It helped to develop and communicate their thoughts and feelings through the design experience.

In choosing this stained glass window project was to offer the pupils visual appeal and imaginative content. It offered scope for different techniques. Technical competency in handling materials and techniques is of vital importance. Pupils need to feel that they have the practical ability to achieve their preconceived ends. The problems of both designing and making should be

within their level of ability. The task needs to be demanding but not impossible to achieve. A high standard needs to be set. Through organisation and evaluation the pupils achieved a high standard of skill and showed good ability.

It is important that the pupils become familiar through demonstrations and evaluation of the necessity for appropriate techniques to allow them to operate to the maximum advantage and with the minimum of frustration. This is particularly true of first and second year classes, where they are still learning to develop their own skills and competency. It takes time and patience to nurture the confidence of the pupil in their ability. Design skills do not mushroom overnight but need careful tending like developing the pupils confidence. Design education needs to be carefully nurtured if the pupil is to benefit fully from the experience.

It is of importance to educate the pupils to look at the world with curiosity and to respond to the environment with understanding and imagination. In design education it is possible to select an environmental theme as a stimulus and focal point to enable the pupils to generate their own ideas and images. The theme should be geared towards the aesthetic rather than the functional to encourage divergent thinking, imagination and originality (2). Pupils need to become accustomed to looking at images critically and to learn to enjoy them for what they are: and for this to happen they must recognise and have an awareness of the different approaches taken by artists, craftsmen and designers in their work.

The ability to hold abstract ideas as images in the mind, depends greatly upon the pupil having experience of making images and discussing these images critically. They have to be able to recognise a variety of forms for inspiration and possess the ability to plan and effect their own work and its

subsequent evaluation. Once the theme has been chosen, the pupil through observational skills, can gather information for the development of their design by using a range of techniques such as enlarging, reduction, rearrangement of shapes, identification of positive and negative space and the juxtaposition of elements, so that the pupil will be able to achieve their final design. This encourages pupils to generate a variety of possible solutions to any given problem, communicating it through various images, ideas and materials.

The introduction of materials at an early stage of design education is vital for the development of the pupil's manipulative and creative skills. It is through discovering the properties of materials and learning to exploit these properties in the persuit of their design ideas that the pupils can learn to develop and acquire an appreciation of design.

It is during the evaluation process that the pupil actually learns to develop this appreciation, The evaluation allows the pupils to express ideas and methodology used in the development of their design. My pupils began to develop a personal approach with a sense of understanding of how they may begin to work their design and developed an appreciation of other pupils work. In the process they acquire a verbal vocabulary which allows them to talk about their work in a critical and pesonal way. it is very important for the pupils to develop the ability to hold, articulate and communicate ideas, opinions and feelings about art, craft and design.

Finally good design education needs a solid foundation to enable it to develop and grow within the school system. It is vital that pupils are made aware of design methos from the first year even at a very basic level. Design should be relevant to the age and ability of the class. It should allow technical students to feel 'at home' and non technical students to be stretched (3).

Design education should allow pupils to be open and expressive in developing their intuitive and emotional objectives as well as developing a rational means of thought and communication through a structured process.

REFERENCES

(1) Aylward, *Design Education in School.* p.32.
(2) John Eggleston, *The 20th Anniversary Vol. of Studies in Design Education, Craft and Technology.* (London, Trentham Book, 1988) p.12.
(3) Ibid., p.12.

BIBLIOGRAPHY

Anderson, Donald M., *Elements of Design.* Wisconsin: Holt, Rinehart and Winston, 1961

Art, Craft, Design, *syllabus.* Dublin: Roinn Oideachais, n.d.

Aylward, Bernard, *Design Education in Schools.* London: Tinling, 1973

Barnes, Rob, *Art, Design and Topic Work.* London: Butler and Tanner, 1989

Brochmann, Odd, *Good and Bad Design in the Primary School.* London: Routledge and Kegan Paul, 1986

Bruden, Ian, Harrison, John, Ford, John Tiny, *Design and Designing.* Essex: Longman, 1988

Clement, Robert, *The Art Teacher's Handbook* 2nd ed. London: Stanley Thomas, 1993

Design Council, *Design Education at Secondary Level.* London: Belmont Press, 1981

Eggleston, John, The 20th Anniversary Volume of Studies in Design Education, Craft, and Technology. Britain: Trentham Books, 1988

Green, Peter, *Design Education, Problem Solving and visual Experience.* London: Anchor Press, 1974

Jones, J. Christopher, *Design Methods: Seeds of Human Futures.* New York: Wiley, 1980

Junior Certificate, Art, Craft, Design: *Guidelines for Teachers.* Dublin: Roinn Oideachais, 1993

Junior Certificate, Technology: *Syllabus.* Dublin: Roinn Oideachais, 1993

Junior Certificate, Materials, Technology (wood) *Syllabus.* Dublin: Roinn Oideachais, 1993

Langdon, Richard, *Design Policy* vol. 5. London: Design Council, 1984

Taylor, Rod, and Dot, *Appraising Art and Design, a Guide for Students.* London: Longman, 1990

World Book Dictionary. Chicago, Illinois: Doubleday, 1977

Yarwood Dunn, A. & S., *Design and Craft.* London: Hodder and Stoughton, 1977