Design Evaluation: Beyond Likes and Dislikes

Abstract

The aim of this paper is to explore the place of product evaluation within design and technology education in Scotland. It discusses the potential impact of the National Guidelines for 5-14 Environmental Studies Technology[1] framework on the pupil learning experiences. The programmes of work which meet the guidelines are those that encourage exploration of the influences and factors which a designer has to consider and the advantages and disadvantages of applications of technology on a range of user groups, environments and cultures. The place of evaluation in post-14 technology courses is also discussed.

The value of developing an informed citizen who appreciates the 'non-neutrality' of technology is the subject of many an author. However, there is at present very little literature on pedagogy and methodology that helps to interpret the rationale and concepts into classroom appropriate activities. This paper describes some early examples of teaching and learning approaches which address the issues and provide pupils and teachers a way in to delve deeper.

Susan V McLaren

Lecturer in Design and Technology, University of Strathclyde

CURRICULUM

The case for teaching evaluation of design outcomes

Bertram (1938) argues that as with every other capacity, there must be training in order to be able to judge design.

> "Without some knowledge and directed practice, it is no more likely that a man (sic) would make an accurate judgement of this matter, than he would in law or medicine."[2]

He states the case for the training of children on matters of 'good' design through a sufficient knowledge of technical processes, aesthetics, historical and cultural values as presented by 'experts'.

Is *training* an appropriate or feasible approach to achieving a society of individuals who are each aware of their own likes and dislikes of design and able to articulate the reasons for their personal response?

Who should be educating for the increased awareness of both design and media manipulation, for the greater understanding of and deeper reflection on the marketing strategies employed? What experts should be called upon? The world of design has become ever more complex and involves a wide range of parties each with specialisms that contribute to the whole. The most contentious of values can be revealed by exploring the relationship of a consumer to the market place and manufacturing industries and by delving into the cultural context of design and technology. This requires an understanding of design cultures and systems as a whole. Therefore, who can be defined as the 'experts' on 'good' design?

If we are to attempt to understand beyond 'likes' and 'dislikes' and begin to define quality in design, we must consider the ethical, historical, social, economic and political context which will in turn help us to understand the value system within which the design evolved. We cannot merely evaluate objectively, against a static, universally accepted, specification. Evaluation involves emotional response.

"We cannot merely evaluate objectively, against a static, universally accepted, specification. Evaluation involves emotional response."

Design activity and applications of technologies can reshape people's values and call new ones into play. New actions are made possible and people are given the choice to exercise the action or not. These decisions are made by value judgements. Furthermore, technological innovations have altered the circumstances in which choices are made. Papanek (1985) and Whiteley (1993) explore the social and environmental responsibility of the designer and the role of the consumer in a rapidly changing society and increasingly multi-cultural context with shifting values[3,4].

Questions rather than criteria can be posed and explored to stimulate evaluations which require value judgements to be made. Suggestions from the special interest group, Values in Design and Technology Education (VALIDATE) encourage greater depth in thinking e.g. 'To what extent does the idea meet people's need? What is a 'real' need?'[5]

Review of curricula

In Scotland, the theme of an informed consumer and user appears in the rationale of a range of current design and technology school syllabi. *Technology Education in Scottish Schools, A statement of position*, 1996, Scottish CCC, provides the basis for all development with regard to technology education and supports and enhances the existing guidelines[6].

Here, technological capability is described as comprising of four interconnected and mutually supportive aspects: technological perspective, technological confidence, technological sensitivity and technological creativity.

B.Ed. (Primary) Students engaged in product valuation.

The aspect of technological perspective is concerned with

> "ways of seeing and thinking about the world (past, present and future), of reflecting on the effects of human interaction with the environment and of thinking imaginatively about better ways of doing things. It also involves being able to appreciate the complexity of decisions which may involve the resolution of tensions between aesthetic, cultural, economic, ethical and functional aspects of product design."[7]

Technological sensitivity means

> "a caring and responsible disposition; a habit of mind which asks and reflects on questions about social, moral, aesthetic and environmental - as well as technical and economic - aspects of technological activity undertaken by oneself and others in a variety of contexts."[8]

These aspects relate directly to 5-14 Environmental Studies, Technology, 1993 'Understanding and Using Technology in Society'[9] which, for example, advises that the learning experiences should incorporate study of appropriateness of low and high tech ways of controlling resources and materials and the costs and benefits to societies. Immediately, we are in the arena of applying value judgements in our evaluation to assess 'winners/benefits' and 'losers/costs' in respect to design and technological activity.

The theme of evaluation continues with explorations of 'appropriateness of products and built environments to different communities' and the influence that 'the existence and promotion of certain technologies' may have on lifestyle and expectations (Primary 7 to Secondary 2)[10]. The pupils are to investigate, in P4-P6, the 'ways in which the 'image' of technology, advertisements and access to information about other people and places through media, influence ideas about what makes products attractive'[11]. In practise, this not only involves making value judgements, exploring a variety of personal perceptions and evaluating the 'power' of the marketeers, but examining the question of attractiveness.

Existing provision for progression

Hesitations are apparent in the approach to evaluation and appraisal work due to the perceived difficulties in assessment. However, product evaluation is acknowledged as an aspect within the Scottish Qualification Authority courses for Craft and Design, Intermediate 2 and Higher Grade (1999) and to a certain extent in Technological Studies Standard Grade (1991), through, for example, 'Product Analysis'[12,13,14]. McLaren (1997) discusses the issues and implications of curriculum arrangement documents in relation to the 5-14 guidelines more fully[15]. Suffice to say, the curricula documents tend to give priority to the consideration of the main functional requirement of the product, with additional consideration being given to the cost effectiveness and marketability of the product. Reflective, emotional response to the social implications, environmental consequences etc. seem to be of less importance.

Higher Craft and Design, Unit 1, entitled Product Evaluation and Graphic Techniques, states that the students must select design

Critical appraisal at the Design Museum (Year 7).

factors for evaluation which are 'sufficient, appropriate and justified in relation to the product under scrutiny'. It is also required that 'the evaluations of the factors are thorough and objective'.[16]

Martin and Riggs (1999) have articulated their concern over the possible decontextualisation of products in product evaluation type activities which may lead to pupils having little awareness of the product in terms of how it meets a need or is fit for purpose[17]. In the Higher Craft and Design Course it is expected that pupils are taught various strategies for conducting evaluation tests and trials of the product with selected and justified sample groups of users. However, whether this will led to scrutiny of what Burn-Davies calls the 'ethicacy of the solution' remains unclear[18].

Another example taken from Higher Still curriculum arrangements, Craft and Design Higher, Unit 2, Designing for People, attempts to encourage greater exploration of factors from the view point of the designer. Environmental and social concerns, influences of fashion, consumer demand, aesthetics and ergonomics are specified for further investigation[19]. The content specified means, however, that the larger issues of appropriateness and possible ethical and moral issues, economics and such could be circumnavigated.

The onus is on a discerning teacher to extract the central issue of 'social implications of design and manufacture'[20] from the course aims and develop approaches that will encourage a deeper evaluation and transferral to be conducted. Unless the addressing of values is stated more explicitly it may be possible for teachers to teach pupils to progress through the curriculum with a perception that design and technology is 'value free'[21].

Effective teaching and learning

The teaching of design evaluation and product appraisal is often over simplified and seen as a final 'stage' within a 'process'. The curriculum guidance has the potential to help us move away from the teacher devised proforma which is sometimes used to lead pupils through a series of undemanding questions which are intended to help them to evaluate their design outcome. Many examples of these seem preoccupied with evaluating products in terms of finish, the accuracy of manufacture and aesthetic 'appeal'.

The question of for whom is the product aesthetically pleasing and the issue of for who is the product acceptable is rarely evaluated. The consequences and potential impact, in a wider economic, societal or environmental sense, of what the pupil has designed or proposed are rarely examined. The results of the pupil's labours become the object for his/her own criticism. The pupil answers the questions posed, knowing that this part of 'the process' must be completed before s/he is permitted to move on to the next project. If the experience of evaluation is to be meaningful, there must be a strategy to ensure more contemplation is required. Rarely does a pupil evaluate their own outcome in the same way that they may have evaluated a product using the approaches, and potential depth, required for a pass mark in the 'product evaluation part' of the course!

This demands extended time. Time is required for reflective thinking, for discussion and sharing of individual value judgements on the work of others as well as the pupil's own. To facilitate the process the teacher could provide key questions which enable pupils to explore and reflect on the consequences of the actions of other designers, as illustrated by case studies or product autopsies, and of their own. For example, encouraging personal opinion and speculation by prompts such as:

- How necessary is this product? Who has decided it is needed?
- What is the need that is being addressed? How was it addressed in the past?
- Who would want to own or buy this product? Who do you think it is intended for?
- How is it to be used? What alternative uses could it be put to?

B.Ed. Design and Technology 2 Students engaged in product evaluation.

- What effect will it have on people's lives and relationships?
- What effect will it have on the built and natural environment?
- What will happen to it after its use? What factors lengthen/limit its life-span?
- Is there an alternative method of achieving the same function?

Some of these demand greater investigation and stimulate research activity after initial hypothesis has been made.

Technology Education in Scottish Schools provides a framework for teaching and learning which integrates case studies, creative practical tasks and proficiency (skill, knowledge, procedure input) tasks and demands that pupils explore the non-neutrality of design and applications of technology[22]. An illustration of this framework in action: evaluation, analysis, research, case study and product design follows. *Design for Play* was initially a project for 11-12 year-old students and has now been adopted as an assessed project for PGCE students of Technology Education and B.Ed. Design and Technology at the University of Strathclyde.

Design for play

The project began by introducing the students to product evaluation and autopsy strategies using a selection of toys designed for pre-school children in the 'developed' world. These included battery operated sit up and beg barking dogs, plastic machine guns, electronic story books, shape sorters, construction kits, 3-D jigsaw puzzles, music makers, buggies, etc.

Personal emotional responses were encouraged, ergonomics were appraised through shape, form, colour, applied graphics, buttons, switches, sounds, texture, materials; durability and hygiene was considered in the context of the user, the environment it would be used in, and the consumer. Students considered their evaluation against retail value, child development potential, types of play possible, attention time, adult involvement/supervision, lifestyles of purchaser, alternative, contemporary and historical, designs for the same purpose, British and International Standards, potential social influences and implications and so on.

The process of evaluation allowed the students to explore their understanding of judgement of quality and effectiveness in personal terms. It also pushed them to consider the influences and factors which others may have responded to whilst designing, or bring with them as consumers making decisions to purchase, or as the end user.

Technological perspective is developed by exploring factors which contribute to the success of a well-designed product. Personal technological confidence begins to grow as students question ideas, designs and products; perhaps identifying opportunities or problems that the product itself creates through its manufacture, disposal or use. The activity of appraisal leads them to apply considered moral and ethical issues in their judgements. Subjective responses are encouraged and deep thinking is directed to the consequences of such a design outcome for others, for societies, for local and global environment. In addition the product autopsy or disassembly helps the students to see the industrial manifestation of workshop practices; the application of the integrated technologies that they recognise from their experiments with motors and switches, Lego gears, Fischer Technic cams, for example. Students identified what they felt were good, bad and ugly examples of 'play' products against a range of identified criteria.

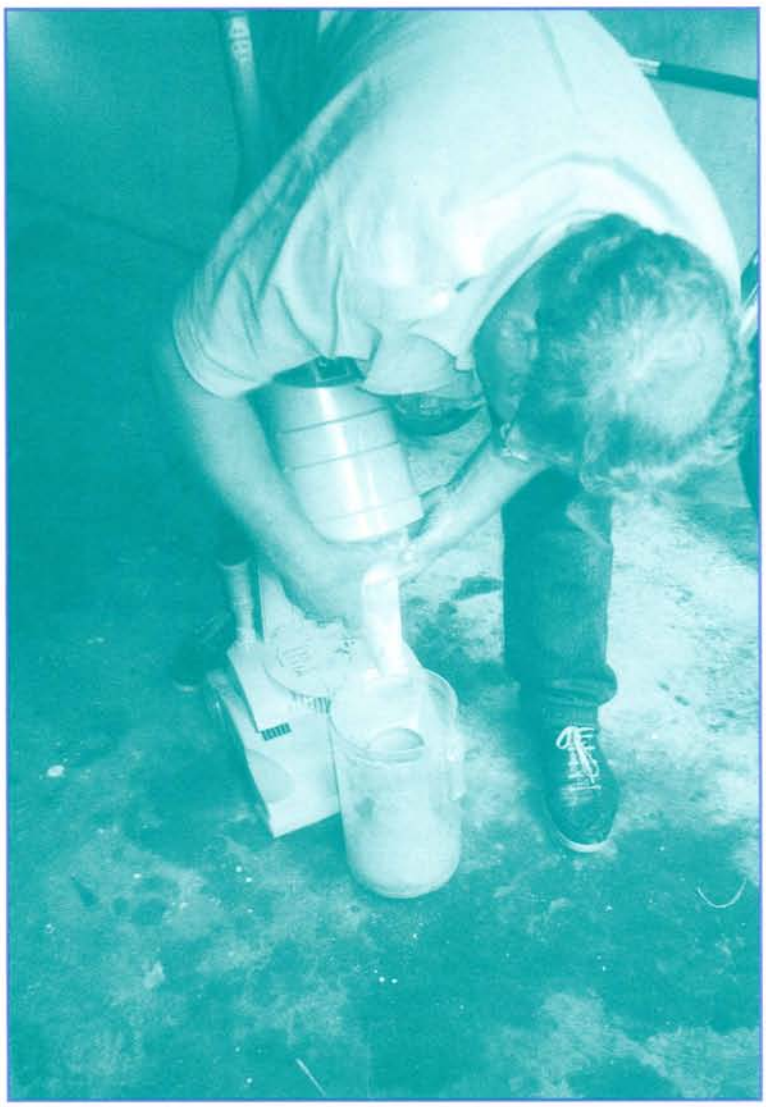
Additional research involved visiting a pre-school playgroup. The students were asked to observe and classify the types of play, rank popularity, record the type of social interaction between children, note any gender differences in approach to play and toys and appraise the environment in which the children played.

Following these structured proficiency tasks and analysing their evaluations, students identified a detailed design specification which set out client/user needs and constraints for their individual, negotiated design brief. Students collected further information on a 'need to know' basis, such as anthropometric data and return visits to the pre-school group were made when required. Ideas were explored and continually evaluated using a range of approaches: sketches, soft modelling, kits through to the production of a prototype suitable for evaluation.

Throughout the design activity the students discussed how the children might play with their toy. They began to explore deviant approaches and tertiary uses, the potential intellectual or behavioural influence a specific design may have and demonstrated the ability to reflect critically on their own work and that of others. In turn the outcomes of their design activity were evaluated by their peers and also by pre-schoolers i.e. the user group. This revealed to some of them the inappropriateness of their concept for the age range they were designing for, or that the more complicated and over engineered designs did not necessarily attract the interest of the young child when faced with a streamlined block of wood on wheels.

The students demonstrated sustained motivation throughout. They had a clear understanding of their role and the purpose of the task overall. The task was *authentic* in the sense that it was personally meaningful to them and purposeful within a social framework[23]. They had users, personal values and a cultural context to consider. They recognised that user group had needs, the consumers and parents had an agenda, the manufacturers and marketeers too. They could appreciate that as designers they had to work within some externally set constraints and that they set others for themselves. Consequently they persevered in the face of difficulties and overcame emergent problems, making significant decisions with a degree of autonomy. They became more aware of the social responsibility of the designer.

User tests to inform Product Evaluation.



Evaluation as an educational experience – can it be taught?

Observations of children involved in evaluating artefacts and environments illustrate the immediate obstacles they face. Students may be frustrated, initially, by their lack of vocabulary through which they can satisfactorily express their opinions and communicate their value judgements. Teaching can enhance their language skills to better equip them for discussions of this nature through sensory and emotional awareness raising techniques. These include strategies such as blindfold description 'games', 'best-fit' word prompts, analogies, mood and lifestyle-boarding and creative writing activities.

Students may also feel inhibited. Therefore, the climate for a value-based critique needs to be comfortable and unthreatening in order to encourage the communication of personal value judgements. Peer group pressure will inevitably have an adverse effect on any critique that demands individual and independent thinking.

I suggest that in order for teachers to be in a position to develop approaches to teaching evaluation they require the confidence to explore their own values, to question the beliefs and perceptions they hold. As an introduction to a case study task which leads to creative practical design brief to redesign/modify a domestic appliance, design and technology student teachers at the University of Strathclyde are engaged in a task which asks them to select and evaluate a coffee maker from a range supplied. This includes models such as Philips Alessi, Krups and the Grand Gaggi. It is apparent that the students enjoy the opportunity to stereotype the possible target user/consumer group through compiling lifestyle boards and discussions which often begin to explore the possible influences and inspirations for the product semantics, styling and marketing. The students then begin to conduct autopsies and user tests which either compound or contradict their initial response. The plenary that follows initiates great debate, much humour, and students seem more comfortable to voice individual opinions than when discussing and evaluating student based projects at critiques where they are face to face with the designer.

However, presented and taught as a stand-alone component, the potential of evaluation is undermined. As educational tools, critical thinking and the exploration of value judgements have enormous potential within a holistic process. If the pupils are to develop their design understanding and capability it is crucial that they are given the opportunity to reflect on their explorations of a value based appraisal of technology in society and allow their reflections to influence their approach to design. We must avoid perpetuating the myth, created by existing teaching approaches, that there is a separation of evaluation tasks and case studies with design activity.

It is not the intention, as Horrocks (1969) cautioned, that we study endless examples of design which have been classed as good or bad by some external body, but rather to 'defend and encourage the individual's freedom of choice and criticism based on reasoned understanding'[24].

Curriculum development

It is through the connections of design, scientific concepts, technological applications, the impact on the global environment and the effect on society as a whole that pupils can be encouraged to engage in constructive action thinking. This develops an appreciation of the complexities of decisions, interests, values and influences that contribute to the world in which the pupils live from a people-centred perspective.

Through Scottish CCC's Technology Education Development Programme, many schools over Scotland were involved in the second UK-wide evaluation of a Design Council initiative called Design Decisions. A broad range of activities and projects were stimulated by the large eye-catching and thought provoking posters that encouraged reflection on aspects of design such as materials, safety, display, lighting, signage. Commentaries and illustrations of the various approaches to teaching and learning are currently being collated for dissemination as exemplification of technological capability and the core skills which design activity can develop.

Many teachers who 'signed' up for the posters and teaching 'tools' had not previously been involved in developing design awareness nor approaches to design and technology evaluation, nor aspects of technological capability activities to any great extent. The resource was seen therefore as the impetus for something new.

When speaking with both teachers and children who have been involved in looking at everyday artefacts, familiar and unfamiliar environments, it became evident that not only had they explored their emotional responses and made personal value judgements, but they had moved their questioning to another level and initiated action which involved industrial partnerships. As a result, they gained an increased awareness of the various user

groups, the environmental context and impact, the appropriateness of the technologies, the alternatives, the acceptance of different opinions and they had greater confidence in articulating their thoughts than before the trial projects.

A pupil group of 11 year-olds was asked what difference the Design Decisions project had made to the way they looked at things. The range of responses included;

> 'I think about stuff and see that it's good or not when I didn't bother before…'

> 'I looked at a light at home which it is supposed to be able to put the light in any direction but the spring had gone slack and it wouldn't stay where you wanted it... I think that's a bad design. It's probably done on purpose so that after a while you have to buy another one and they get more money from you that way and people have still got a job.'

One child pulled over the class pencil sharpener and started to say

> ' I notice design now, like for example this sharpener ... it just grinds the pencils and wrecks them … it makes a mess 'cos the stuff goes all over…'

Another child joined in saying they thought it was better than the hand held small ones because it caught the mess for you. They discussed the cost and production methods, materials, components and functional problems of the larger sharpener against the wee hand held one. Then one child stated that it is nice to get the shavings of the wood off the pencil and out from the hand held sharpener in as long a piece as possible and that

> 'it had a nice 'feel' when doing it ... you can't get that feeling with a grip and grind design.....'

Articulation of a satisfying emotional response to the interface between product and user!

It was of interest to note that their teacher had been concerned by the focus he had taken i.e. one of evaluation and judgement with little emphasis on making and creating products. He was confident that the children had had worthwhile experiences, but he had felt the pressure to be 'making' was great. The perception that designing and design and technology activity is one of modelling, constructing and graphics had led him to believe that he had been indulgent in his approach. When audited against the National Curriculum guidelines for 5-14 his approach can be fully justified. Time spent on design evaluation and raising design awareness should be valued and the benefits of an integrated and balanced programme which allows for such approaches which do not in themselves have physical outcomes recognised more widely. As a result of the project, a stimulus pack with case studies and additional supporting resources has been produced to encourage more teachers to adopt such approaches[25]. The Scottish CCC is currently developing a CD-ROM resource[26] for the teacher and classroom use with students. It is intended to extend active product evaluation through critical examination of everyday products such as the tin opener, milk carton, weighing scales. Commercial manufacturers and companies have been involved in a number of the case-stories. The central question to reveal the value issues within the products is 'Why?'

Conclusion

We have the rationale and the literature to support the philosophy. Our attention must turn to the development of the methodologies, strategies and approaches to support the educators. We are slowly devising methods to help students uncover the values within technological activity through which we can review how the value conflicts have been resolved, or not, and methodologies for reflection on our response from both an informed objective view and a subjective emotional view. Acknowledgement that learning is messy, is a start.[27]

'The right answer' approach is deeply ingrained in our thinking. This might be fine for some mathematical problems, which do indeed have a right answer. The difficulty is that most of life isn't that way. Life is ambiguous.[29]

References

1 Scottish Office Education Department (1993) Curriculum and Assessment in Scotland, National Guidelines, Environmental Studies 5-14. Edinburgh: The Scottish Office Education Department.

Note: 5-14 provides non-statutory guidance for use in primary schools from Primary 1 (5 year-olds) to Secondary 2 (14 year-olds). Environmental Studies currently comprises components of Science, Social Subjects (Geography, History), Technology, Health Educational and Information Technology. Technology is described in two key features of Understanding and Using Technology in Society and Understanding and Using the Design Process.

2 Bertram, A (1938) 'de gustibus non est di sputandum (you can't argue about taste)', in S. Bayley [ed.] *In Good Shape – Style in Industrial Products 1900-1960*, Collected Essays, London: Design Council. 1979

3 Papanek, V (1985) *Design for the Real World: Human Ecology and Social Change* London: Thames and Hudson Ltd

4 Whiteley, N (1993) *Design for Society* London: Reaktion Books Ltd

5 VALIDATE (1997) *Exploring Value Judgements in Design and Technology*, Guidance Notes 3.1. Wellesbourne: DATA p.3

6 Scottish Consultative Council on the Curriculum (1996) Technology Education in Scottish Schools, A Statement of Position, Dundee: Scottish CCC

7 *Ibid.* p.8

8 *Ibid.* p.9

9 Scottish Office Education Department (1993) Curriculum and Assessment in Scotland, National Guidelines, Environmental Studies 5-14. Edinburgh: The Scottish Office Education Department.p.48-49

10 *Ibid.* p49

11 *Ibid.* p49

12 Scottish Qualifications Authority (1999) Design, Engineering and Technology: Craft and Design (Intermediate 2)

Scottish Qualifications Authority Higher Still: Opportunity for All is a restructuring and reformation of Scottish Secondary schooling for 16-18 year olds. It involves a number of new and revised courses and permits opportunities and routes through the education system that were not available previously.

13 Scottish Qualifications Authority (1999) Design, Engineering and Technology: Craft and Design (Higher)

14 Scottish Examination Board (1991) Scottish Certificate of Education, Arrangements in Standard Grade Technological Studies, Scottish Examination Board, Edinburgh (currently under review)

15 McLaren, S V (1997) 'Value Judgements: Evaluating Design – a Scottish Perspective of a Global Issue' *International Journal of Technology and Design*, Netherlands: Kluwer Academic Publications, Vol 7, no 3, pp259-278

16 Scottish Qualifications Authority (1999) Unit 1: Product Evaluation in Design, Engineering and Technology: Craft and Design (Higher) p19

17 Martin, M and Riggs, A (1999) Lost Contexts and the Tyranny of Products in conference proceedings of the 12th International Design and Technology Education Research Conference. Loughborough University

18 from personal conversation with author Davies, J (1999) Constructing Technology Education: Question of purpose and fit.

19 Scottish Qualifications Authority (1999) Unit 2: Designing for People in Design, Engineering and Technology: Craft and Design (Higher) p.23

20 Scottish Qualifications Authority (1999) Course Specification: Rationale in Design, Engineering and Technology: Craft and Design (Higher) p.3

21 Layton, D (1992) *Values and Design and Technology* Loughborough: Loughborough University of Technology.p.9

22 Scottish Consultative Council on the Curriculum (1996)Technology Education In Scottish Schools, a statement of position, Dundee: Scottish CCC pp11-13

23 Authentic in the sense that it was personally meaningful to the pupils and purposeful with in a social framework; as described in work by McCormick, R, Murphy, P.and Hennesy, S (1994) including Problem Solving in Design and Technology: a case for situated learning?

24 Horrocks, A (1969) 'Art Rooms' in Baynes, K (ed) Attitudes in Design Education, London: Lund Humphries p.36

25 Scottish Consultative Council on the Curriculum (1999) Looking at Design; some ideas for reflection and Action Dundee: Scottish CCC

26 Scottish Consultative Council on the Curriculum (1999) Design Technology and Heritage: Product Evaluation, CD-ROM work in process

27 Scottish Consultative Council on the Curriculum (1996) Teaching for Effective Learning Dundee: Scottish CCC p.9

28 Von Oech R (1983) A Whack on the Side of the Head London: HarperCollins