Architecture and the Built Environment within the Design and Technology Curriculum

(The Importance of Experiencing 'Real' Design Strategies)

RESEARCH

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Abstract

This paper has evolved from research funded by the Arts Council of England and undertaken by the Design Museum and the Centre for Design and Technology at the University of Greenwich.

The initial research was partly prompted by reports from Schools of Architecture of a recently perceived fall in the quality and scope of architectural and design understanding shown in portfolio work of A' Level students being seen at interview. Our findings not only confirm this view but also reflect recent OFSTED concerns about the overall quality of pupils' designing capabilities. We believe that the built environment has much to offer as a focus for design and technology and can help to address these issues by providing a stimulating learning context where pupils are encouraged to develop a range of design strategies and skills within real projects.

Introduction

In 1998, the Architectural Unit of the Arts Council of England made funding available for a one year research project in order to provide some objective data which might explain and address an apparent decline in interest for, or involvement with, the Built Environment in our schools.

The aims of our research were to:

- find out why and how this situation has arisen
- conduct an audit of current good practice
- suggest methods of highlighting and disseminating good practice
- develop a strategic education policy for architecture
- suggest possible ways of re-establishing the built environment in the school curriculum at all key stages
- establish a pilot scheme for the development of ITT and Architecture modules.

Our initial thoughts, based on regular visits to a wide range of schools over the past few years, were that, the current incidence of B.E. (Built Environment) being the focus for project work at Key Stage 3 and Key Stage 4 is small and diminishing year by year. This contrasts dramatically with the situation prior to the 1995 orders for National Curriculum design and technology, when numerous, mainly interior design projects, were regularly undertaken by many schools, particularly as a specified study area for coursework at both GCSE and A' Level.

Nevertheless, our questionnaire responses indicated that 75% of secondary school art and design and design and technology departments do still use B.E. but in a more limited way.

This, together with written responses from Advisory teachers that identified and located a national picture of outstanding Built Environment work in both primary and secondary schools is encouraging. However, follow-up visits to many respondent schools clearly show that the focus of the majority of their Built Environment work is predominantly on developing making skills. Where this is not the case, pupils usually undertake a standard structures project.

Surprisingly, very few teachers expressed any concern that such activities contain little or no reference to architecture, or the learning opportunities offered by the built environment such as how the designer/client relationship affects the:

- style
- aesthetics
- function
- space relationship
- fitness of Purpose
- usage

of buildings. Or, how children might develop increased awareness and understanding of:

- architectural literacy
- visual and sensory literacy
- how the built environment impacts on their lives
- modern design and contemporary architecture
- the concept of change and future design
- the process of planning/designing/building
- the role of architects

through 'good practice' Built Environment project work.

Perhaps the shift in emphasis prompted by the 1995 design and technology orders, giving more attention to raising the quality of manufactured products within the design and make continuum (at the expense of design and model) has indeed had an effect. Our evidence suggests that teachers are unwilling to risk any kind of realisation with softer materials which employ the time consuming analysis and investigation of real architectural sites.

It seems as though this curriculum change may have been achieved at the unwitting expense of a measurable reduction in pupils' ability to be confidently involved with the full range of activities associated with high level, quality designing. Indeed, our research into Built Environment activities in schools not only seems to bear this out, but also highlights some possible, future implications in relation to the general scope and quality of pupils' designing activities.

Design educators have, for many years, promoted the idea of the need for schools to use the Built Environment as a stimulating context for children's learning, e.g.

- Ken Baynes and Eileen Adams, 'The Front Door Project' 1974-76
- Schools Council, 'Art and the Built Environment Project' 1976-82
- RIBA, Architecture Workshops, 1977-present
- RIBA's Architects in Schools Initiative 1985-88
- Learning Through Landscapes 1987-present
- Nigel Frost, Building Experiences Trust, 1989-present
- ARCHED – 1996-present.

However, despite this rolling programme of seemingly successful initiatives, our research findings suggest that few have established any lasting presence in either primary or secondary schools. In fact, our questionnaire indicates that 90% of schools are unaware of the activities or even the existence of these carefully structured externally *funded* and *resourced* initiatives. This, together with a worrying lack of usage of the resources, expertise and facilities offered by both museums and galleries gives us much cause for concern.

Where good practice does exist, it invariably depends upon the individual teacher having the confidence and expertise of an architectural or built environment background.

Not surprisingly it seems as though even effective, well planned and delivered Built Environment training courses are no different to any other INSET, in that they tend to have an immediate, dramatic impact, which gradually fades away unless given access to regular, long term, structured support. Eileen Adams (1982) also found this a hindrance to developing use of the built environment in the curriculum, and says:

> "...we cannot regard the curriculum and the problems it poses as something that can be dealt with on a once and for all basis. It is a living, growing and developing organism. It must seek continually to adapt to and serve the needs of pupils to adjust to and recreate the society in which they live." (p. 60)

This seems to be a major recurring problem which urgently needs addressing in any future INSET programmes aiming to attract and keep more teachers involved with all areas of design and technology, but in particular, architecture and the built environment. There is a real need for teachers to be able to network with each other, sharing ideas and approaches together, in a regular celebration of achievement through peer recognition.

The Built Environment surrounds us. Through our personal interaction with housing, schools, the workplace, public spaces and buildings it represents the major, first hand experience we all have of human influence on our locality, community and by extension, wider aspects of our environment.

However, unless teachers are provided with the means and motivation to successfully utilise it, year on year, it seems as though most of today's schoolchildren will grow up with little understanding of the way this designed world, with which they have to interact, has evolved.

Our audit of references to the Built Environment within the current National Curriculum gives little comfort. The findings are, not surprisingly, accurately reflected in teaching priorities and thus directly contribute to this negative scenario. We found only a very limited reference to the Built Environment within all key stages. Similarly, GCSE design and technology documentation fails to make any obvious links to the Built Environment as a creative teaching and learning resource, which might provide our children with a more informed historical perspective about their own developing architectural community.

This contrasts sharply with previous syllabi for design communication and graphic products where the Built Environment was, for many years, a specified coursework option choice. What is left, particularly at Key Stage 3 and Key Stage 4 seems to carry little weight. It requires no more than book or Information Communication Technology (ICT) references to illustrate a specific period of time, and set particular, classical buildings or architectural styles into a social context.

Unfortunately, this approach to the built environment leaves little scope, and provides no encouragement for children or teachers to explore the inherent learning possibilities presented. We all need to be able to constructively analyse the dynamic relationship between local, or historical, environmental issues of design, use of space and building construction. One could argue that in our schooling, we have relegated this highly creative and stimulating subject matter to an academic exercise.

How then has this situation come about? In our research, both Primary and Secondary teachers identified a number of inter-linked, contributory causes, the most important of which are related directly to National Curriculum, namely:

- pressure to deliver the National Curriculum (NC) 84%
- timetable restrictions 60%
- lack of appropriate support materials 84%
- lack of personal skill or expertise in the area

Teachers at Key Stage 4 were also faced with the fact that all GCSE design and technology syllabi were required to reflect a 40%/60% weighting for designing and making respectively.

Thus, secondary schools had little choice but to react pragmatically to these external pressures. Our research findings indicate that in effect the Built Environment has all but been abandoned at Key Stage 4 and is almost ignored at other key stages.

Within the same context we have noted from teacher colleagues the recent widespread concern being expressed about the future viability of the remaining suite of "softer material, cleaner" GCSE design and technology: graphic products syllabi.

Interestingly, despite these externally imposed pressures, 52% of primary schools indicated that they do utilise the B.E. to some degree in their teaching, in history, art and as a cross curricular topic focus. A further 40% would wish to do so if they could access appropriate:

- training
- resourcing
- cross curricular schemes of work
- support.

In summary, our research has shown that most teachers do recognise the benefits of using the Built Environment as a stimulus for design and cross curricular project work in the curriculum. However, most are unwilling or feel unable to use it successfully.

Developing design strategies through the Built Environment

Most would agree there was a need to pay greater attention to detail in manufacturing finished products and that more time should be given to actually realising solutions of quality.

We would suggest that to a certain extent this shift in emphasis has, in the intervening years, had the unwelcome effect of reducing pupil ability to design.

Whilst we would concur that quality outcome should be central to any curriculum, this drive for 'quality manufacture' in design and technology seems, at least to a certain extent, to have led teachers away from targeting essential aspects of how pupils best learn to successfully communicate their ideas development and design methodology to a 'third-party'. Precisely those areas which are 'up-front' in any quality, built environment project.

In our opinion, the opportunity to work through mock-up designs and models in soft materials and share ideas/approaches is where much of the thinking, product testing and problem solving which underpins quality making is most easily evidenced, *whatever the project focus*. However, there appears to be an increasing tendency for these elements of pupils' work to lack either depth or quality. This is, we believe, a direct result of projects adopting a narrower manufacturing focus to reflect National Curriculum and GCSE criteria.

Design is central to the study of Built Environment and architecture and at its best it provides secure pathways for teachers to integrate the development of pupils' knowledge, skills and understanding across all aspects of design and technology. A recent OFSTED review (1998) identified that pupils' design ability was not as developed as their making skills.

The review suggested:

> "...this is because pupils are either not introduced to a sufficiently wide range of designing strategies in Key Stage 3 or are not taught to use them effectively".

It goes on to say how the lack of design skills then inhibits development in later years and that:

> "...pupils are not sure how to develop a specification or how to generate possible solutions and optimise their choices".

Many would recognise this last comment as a common weakness in design and technology curriculum and practice. It is especially evident in the 'research' and 'ideas-development' aspects of GCSE coursework portfolios. The ability to design, model thinking and communicate ideas are central platforms of our subject area. As such, pupils require considerable personal and *shared* experience of this design phase (at all key stages), if they are to produce appropriate quality outcomes. Equally, for pupils to be so empowered to consistently add value to the depth and quality of their designing, the level of thought, planning and experience required of the teacher *at all key stages* is substantial.

The overriding premise must be that pupils' experiences of designing are not only both successful and meaningful, but also sequential and overlapping. Sometimes a narrow, *isolated* approach to project work does not allow or even encourage pupils to develop their design ability. Invariably, when too many of the possible problems have already been solved the designers are left scope for only decoration, or at best a very superficial level of creative thinking.

OFSTED (1995) highlighted that where much of the decision making has already taken place pupils don't really experience or understand the whole design process. The classic example is, "give me three ideas on...?"

Whilst this restriction can be beneficial in terms of focusing on a very specific task or skill, this does need to be acknowledged, honestly. Pupils need to be made aware of the limitations presented by such a brief. When this reality is not clearly stated to pupils, then the majority of their outcomes often evidence a lack of both understanding and skill in planning and designing for manufacture. They are, therefore, greatly disadvantaged and penalised when responding to a more open brief at GCSE level and beyond.

We feel that there needs to be a greater emphasis placed on varying design strategies to reflect the demands of different projects, rather than emphasising one particular model.

Obviously, it can take time for pupils to understand how they might approach identifying and solving 'design-based' problems but, if they are always shown the same design method, where projects only ever require a limited amount of usually school based investigation, then stunted capability will inevitably be the result.

Our work shows that Built Environment projects do allow and encourage this wider approach to be adopted in a safe, manageable learning situation.

These projects often focus attention on developing and recognising design strategies, methods of thinking and communicating possible solutions to the problem through both 2-D and 3-D modelling. A way of learning that presents a more balanced, holistic approach to design and technology rather than one which always prioritises the finished artefact.

What other benefits does the Built Environment offer us?

We are concerned that the successful GCSE and A' Level syllabi, where the Built Environment was an integral component of design and technology, have been so readily dismantled.

In our experience, the format of these syllabi encouraged candidates to involve themselves, as individuals and in groups, in a creative approach to a wide range of problem solving tasks. At its best, research and investigation of 'real', contextualised problems were the stimulus for the production of a comprehensive project portfolio in support of a high quality, modelled, three-dimensional outcome. David Kolb (1984) recognised the importance of real situations and said that:

> "Learning, the creation of knowledge and meaning, occurs through the active extension and grounding of ideas and experiences in the external world and through internal reflection about the attributes of these experiences and ideas." (p. 52)

This approach provides children with the experience, expertise and opportunity to develop an innovative approach to learning through a series of developmental, syllabus specific projects.

Not only that, but it forcefully demonstrates and supports a design and technology subject philosophy, encompassing a broad vision of design education. Creative problem solving tasks are, as far as possible, based in the real world and deal with recognisable building design situations, which have the potential to be educationally related to the school context.

Furthermore, the demands made of children in approaching 'real life' contexts; of working together in design groups and conducting research with people, decision makers and actual locations, empowers them for later life. It brings design education, society and environment together in a meaningful way. Often the link between National Curriculum technology and the real world of work is a tenuous one. (Medway 1992)

> "... it is necessary to consider the goals of the educational program. In curriculum design three classes of learning objectives must be considered: content objectives, learning style objectives and growth and creativity objectives. Very often in the design of curricula, it is only the content objectives that are explicitly considered." (Kolb, D.A. p. 202 1984)

So, in design and technology terms, what are we losing by not providing overt encouragement for Built Environment options at GCSE and A' Level? What learning styles, objectives, content and outcomes can our notion of a Built Environment approach to design and technology provide to enhance those that currently drive our subject?

The more obvious elements are easily recognisable. Children learning to:

- research the opinions and needs of local community groups
- communicate their design ideas to 'lay people', other children, non teachers
- use high order model making with appropriate scales, construction and materials
- develop real outcomes which improve the local environment.

These elements are important to most design and technology activities. They incorporate skills related to critical analysis of the needs of clients, products and design proposals, high level visual, oral and literal communication together with quality manufacturing or modelling in 3-D.

There are other areas that are not so easily seen by non-practitioners and much more difficult to deliver through solely workshop-based 'design and make' projects. These provide learning experiences, which help to develop children's understanding of their own and professional roles and responsibilities within the Built Environment. Issues such as what our attitudes are to:

- groupworking – allowing children to gain credit (marks) for planning and managing their work collaboratively as a design team rather than competitively.
- understanding the role of external agencies such as local government, planning officers, Health and Safety officers and managers etc.

Within these activities, more sensitive issues relating to personal responsibility in relation to buildings and spaces:

- personal and collective responsibilities
- to respect or vandalise
- understanding the power of, culture, 'class' and social standing on environmental planning
- challenging pre-conceived notions and expectations of the design/build (make) process.

"Design is about values and valuing. It is concerned with the question 'how do you want to live?' Education must, therefore, highlight the significance of values and respect their cultural and personal diversity." Baynes. K. (1990) Defining a design dimension of the curriculum. (p. 55)

Questions are raised about design in relation to function on many levels, personal and communal. How to resolve the tensions between style, taste and cost; or the contrasts between old and new; or creating effective, welcoming rather than inhibiting, restrictive spaces. These are common planning issues of change through 'real design', which are increasingly being addressed through a partnership between the community, their elected representatives, appointed planning officers and designers.

Ken Baynes (1990) recognises these issues as being important aspects of design awareness, to understand how the environment was shaped, and how you, as an individual, might have a positive involvement in its future development.

Developing interpersonal and group working skills

Built Environment focused projects are particularly well suited to group work, as it reflects the way this kind of work is approached by industry. Whilst group work does take place in school, the more common approach to project work in design and technology is an individual one. This could be due to a lack of teacher confidence to both manage and assess group projects. Working in a group situation can encourage a much more critical analysis of initial and developing ideas, as pupils share and explain their thinking, to both teacher and peers. Through this process, pupils have the chance to support each other, value alternate thinking and develop high order communication skills on many levels, as they strive to 'publicly' refine their ideas.

> "...the act of expression is a crucial part of the development of thinking ... it enables us to confront the details and consequences of the ideas in ways that are simply not possible with internal images". (Kimbell *et al* 1991)

Working in a group tends to encourage exactly this kind of expression. Although it is sometimes awkward for the pupils, it can act as a refining process where considerable design and technological insights and skills are learnt. This experiential learning is less likely to occur when students are working in isolation. They may only have to convince themselves or possibly their teacher that their idea is a good one in order to attempt the manufacture of an artefact.

Conclusions

Whilst we would all agree that one of the main aims of schooling is to prepare all our children for future citizenship and employment, this must be tempered with an eye on the realities of our subject area. Historically, both graphic products and Built Environment have successfully provided children of all abilities and more importantly, both genders, with the inspiration and motivation to maintain an educational interest in design and technology beyond Key Stage 3.

More than that, through the quality of project outcomes achieved, these syllabi have traditionally opened doors for our students into a wide range of further and higher education deign based courses such as:

- product design
- graphic design
- fashion
- packaging design
- automotive design
- industrial design
- interior design
- landscape design
- architecture.

Our Built Environment research project has produced findings, which highlight this worrying situation by providing up to date evidence of a lack of curriculum involvement within the area at all key stages. We feel that the time has come to reappraise the so-called 'design elements' of our subject. This should be done with a framework of the strengths they offer both the subject and its consumers.

Our public face and subject profile depends largely upon both parents and their children, not only seeing but also experiencing and understanding what good practice design and technology can achieve. A natural step towards this aim is to recognise the need for project outcomes and potential to be consistently communicated through the display of pupil design work and products at all levels.

Where Built Environment projects are in place, they not only compliment this process, but also lend themselves easily to direct parental and community involvement with design and technology, thus enhancing the scope of our curriculum. Most would agree that it is on this basis that we can increase demand for and take up of our courses at Key Stage 4 and beyond.

We need to attract children of both genders and in all abilities, to create a situation where design and technology is more widely perceived to be a valuable subject for the future.

If we continue to ignore the Built Environment as a legitimate project focus, we risk further diminishing pupils' opportunities to fully develop and employ their design abilities within real, easily accessible contexts.

We need to be positive and ensure that they can experience a balanced design and technology curriculum and thus have the necessary skills to meet future examination requirements, related design courses and careers.

It is equally important that we, as subject specialists, are provided with the necessary training and resource support, to successfully adopt different approaches to project work. Only then will we be able to deliver positive Built Environment experiences tailored to develop both teacher and pupil capability.

One of our main *raison d'etre* is to provide access to design and technology for all our pupils. In our opinion, unless we address these issues, we risk reversing the gains of the last 20 years by losing contact with much of the female presence in our design studios and workshops. As a subject, we need to reaffirm the 'turn on' of design. If we do not, it is very likely that the potential GCSE A* and A' Level pupils of both sexes will look elsewhere for their creative stimulus.

In our opinion, it is crucial that a distinction is made between 'quality manufacture' and quality design'; they are not necessarily the same thing. Sometimes this perspective is lost in an attempt to meet the various assessment criteria. Quality thinking, which is often much harder and more time consuming to assess, needs to be given greater emphasis in all aspects of our subject, not least, in the design of future curricula and associated In-Service and Initial Training of our teachers.

Recommendations

The research group recommend that:

- Funding is provided to establish a national forum for the dissemination of good practice, Built Environment, design and

technology project work. This should include access to existing, subject focus journals and the creation of a dedicated WWW site.

- Clear guidance is provided to teachers as to how the National Curriculum requirements can be successfully met through such Built Environment projects. This would need to be in the form of examples of 'good practice' schemes of work, outcomes and resource materials.
- Good examples of how the Built Environment can be used in the curriculum need to be shared. Although this has been difficult in recent years because of the increased competition between schools, our research shows that there is still a desire to share 'good practice', which needs to be nurtured.
- Future In-Service and Initial Training courses to support Built Environment need to be well thought out, well resourced and networked on a local level to provide a forum for on-going support for teachers.
- Primary schools should have access to well thought out, well resourced, cross curricular projects with a Built Environment focus.
- Teachers need to be reassured that the pupils' thinking and problem solving skills will be recognised and rewarded in both National Curriculum and GCSE marking schemes and examinations.
- Quality architectural models of a building or space be recognised as being important and as valid as a well finished, overtly functional product.
- Guidance should be provided on how to manage and assess group projects at Key Stages 3, 4 and Post 16. Most projects tend to be individual and therefore easily fit the various examination assessment formats.
- Pupils need to be introduced to a wider variety of design strategies so that they are able to be more flexible when faced with different types of project. This could mean having projects which focus particularly on design and problem solving where quality thinking is the main aim, rather than a well finished product.

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