Design Against Crime: a research and curriculum development project

Design Against Crime: a Research and Curriculum Development Project

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Abstract

Design Against Crime is part of an education initiative spanning schools, universities and professional practice. The project is based at Sheffield Hallam University (SHU) and the University of Salford. SHU is responsible for the school and higher education components. The project is funded by the Design Council and the Home Office.

This paper concerns the research for, and the development of, curriculum materials, for use by design and technology teachers teaching the 11–16 age phase. The project had an open brief to develop materials which would focus pupils' attention on combating crime through design and technology activities and project work. The research team's starting point was David Hargreaves' (Chief Executive of QCA) observation that ' design and technology is moving from the periphery of the school curriculum to its heart'.[1] To facilitate this, the team developed a strategy to embody the current education initiatives of numeracy, literacy and ICT into the Design Against Crime project. However, the main purpose was to add value to design and technology teaching and practice by focusing attention on how design and technology could make a significant contribution to the emergence of National Curriculum citizenship.

It was clear from the outset that the project's aims would be in relation to the values that young people should be encouraged to adopt, and the notion that this could be achieved by engaging them in evaluating and considering the extent and the affects of criminal activity. Design Against Crime was not to be about catching or punishing offenders.

To date the research has focused on the following:

- *Current, exemplar design and technology activities which, with appropriately focused further development, could provide a vehicle for Design Against Crime project work. Development has involved prototyping enhanced projects and considering and implementing new ways of presenting design and technology learning experiences to pupils.*
- *Analytical and synthesis tasks which could be used by pupils to support their design and technology activity whilst enabling them to gain an insight into specific aspects of crime and the way that crime affects society as a whole as well as individuals, including themselves. This has been met by research into implementing of numeracy, literacy and the use of ICT. The objective being to develop strategies which will embed this good practice into the identified design and technology projects, thus adding value.*

- *Searching available research data, principally through the Home Office data and publications, for statistics and information which could be used productively to add value to educational activities. This has become an in-depth research and analysis of data, particularly crime issues, which are pertinent to the targeted 11–16 age phase. The searches revealed many interesting and useful sources of information which have subsequently been adapted for use in schools.*

This work has resulted in a series of pupil workbooks which provide enhanced design and technology activities and encourage pupils to take the following steps:

1. analyse and comment upon pertinent crime statistics
2. carry out structured design and technology projects which have an aspect of combating crime as a context
3. within that context reflect upon and evaluate the effects of criminal activity.

Design Against Crime teaching and learning materials are currently being trialed, in schools, by teachers and the paper concludes with a commentary on their views of the project.

1 Speech at the London Institute of Education – 'Towards Education for Innovation' (2000)

Introduction

Brand and Price (2000) put the annual costs of crime in England and Wales at £60 billion, with the average cost of a burglary at £2,300, vehicle thefts at £4,700 and robberies £5,000. While the cost of crime may seem alarming, it does not take into account the misery experienced by victims – therefore any action to reduce crime must be worthwhile. The Design Against Crime initiative started with a preliminary research into ways designers working in a wide range of fields could build anti-crime measures into the products during the designing process. By anticipating possible criminal activities, particularly those involving artefacts, this research demonstrated that through careful design, crime could be reduced. This view is supported by Pease (2000), a leading criminologist, in his statement: 'Crime can and will be reduced by the intelligent redesign of the way things look and work.'

Pease considers that educating designers to think anti-crime can be the starting point of creating products which will play a major part in reducing crime.

The Design Against Crime education initiative covers the education continuum starting with pupils working at Key Stage 3 – Key Stage 4 and post-16 education, higher education and professional practice. As the majority of pupils in schools are engaged in design and technology activity, it is logical to start the process in schools. However, the 2000 OFSTED report emphasised that in schools '*making* continues to be better than *designing*' therefore introducing Design Against Crime into design and technology activity needed to be carefully structured to promote good designing.

Finding the starting point for Design Against Crime in schools required detailed consideration to ensure the initiative fitted in with current national curriculum thinking and several high profile education initiatives currently being implemented in schools. Citizenship is a new national curriculum subject and Design Against Crime fits into this well. Numeracy and literacy are key skills to be taught across the curriculum with all teachers making their contribution. Design Against Crime as applied in professional practice is a sophisticated concept, therefore some re-thinking of this was required before the concept could be applied at school level.

Initial research

Coinciding with the start of the project, David Hargreaves (then Chief Executive of QCA), commented that 'design and technology is moving from the periphery of the school curriculum to its heart.' Design Against Crime provided an opportunity to demonstrate this was possible. At the start of the Design Against Crime project, planning for delivering citizenship in schools from September 2002 had just started. Design Against Crime offered considerable opportunities for design to make a significant contribution to this emerging new subject. The DfES Standards site contains a wealth of material about delivering citizenship in school with Citizenship Unit 2 (Years 7–9) focusing on crime. The introduction to this unit starts with: 'This unit explores crime and how it affects young people, victims of crime and their communities.'

Design Against Crime builds on this statement by providing opportunities for pupils to explore the issues but in the context of designing and making products, which can bring about a reduction in crime.

Further research of QCA and DfES documentation and discussions with senior managers in schools showed that three models of delivering citizenship were being considered. These are:

- a conferencing model with specific days set aside as citizenship teaching and learning events
- specialist teachers appointed to deliver the new subject
- an integrated model with a number of subject teachers making contributions guided by a co-ordinator.

The conclusion reached was that with suitably designed projects, design and technology could make a valuable contribution to the delivery of citizenship, particularly if schools adopt the integrated model. This research was to develop Design Against Crime projects, trial them in schools and assess teacher reaction.

Key skills of numeracy and literacy were being introduced into the secondary curriculum at the time the Design Against Crime project started. These provided further opportunities to add value to design and technology. DfEE publications dealing with implementing these key skills across the curriculum are specific in stating:

'Besides the subject developments in English and mathematics, the Strategy promotes literacy and numeracy across the curriculum. This cross-curricular work involves all staff, and its management is a key responsibility of senior managers.'

The final aspect of the initial research was to consider exemplar design and technology activities which represented current good design and technology practice. This research revealed that many projects were not set in realistic contexts but devised to deliver a

predetermined set of skills. Current trends in design and technology focus on product design often incorporating the use of specific technologies. The conclusion reached was to provide design and make projects covering the fields of electronic product design, graphic products, CAD/CAM and systems and control.

Developing the Key Stage 3 Design Against Crime strategy

The strategy adopted was to provide project workbooks to be used by pupils both as a record of their Design Against Crime work but integrated with textbook type material which would support their learning. The first project workbook with Design Against Crime enhanced design and technology activity was developed for the trials in schools. The enhancement was by adding a front end to the project providing analytical and synthesis tasks based on recent crime data. The objective is to raise pupils' awareness of the nature and level of current crime. Ideally, data analysis and representation of the results is an information and communication technology (ICT) activity, therefore this was built into the tasks. Additionally, numerically skills can be addressed, providing further added value. Providing questions, particularly in the reflective sections which require group discussion, can also develop literacy skills. Introduction of new words such as 'alliteration', in the context of developing a slogan, in the Poster workbook add to the literacy element. These activities provide both class and homework learning opportunities which lead into the design and technology design and making activity. This is supported by textbook style information and tasks to both support and encourage pupils, particularly when they are engaged in designing. On completion of the design and technology tasks, which include manufacturing their product, the focus returns to crime issues. These are reflective and designed to promote group discussions dealing with such issues as how crime affects both individuals and the community. Literacy is embedded into some of these tasks. The following series of workbooks have been planned to provide teachers with a selection of projects to fit into their schemes of work:

- Alarm Systems
- Poster design
- Bag-tags: a CAD/CAM project.
- Diorama design: a systems and control project.

The intention is that at Key Stage 3, a design and technology scheme of work could include two Design Against Crime projects.

Examples to illustrate the strategy
Figure 1 shows an example of an analysis and synthesis task used in the Poster project workbook.

This task includes elements of numeracy as the scales for each of the charts are different, pupils are required to resolve this. The data is from a 1999 survey of youth crime. The task could be done using ICT or manually.

Figure 2 shows a 'note pad' incorporated into the Alarm Systems book and used by pupils to record information as they work on the designing activity.

Figure 3 shows the alarm circuit layout and illustrates the how the technological aspect of the Alarm Systems project is supported in the workbook.

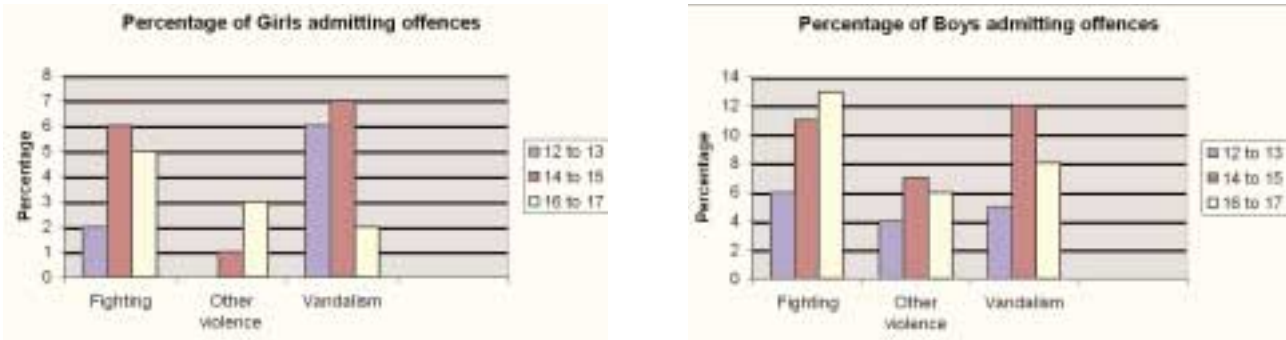Figure 4 shows an example of reflective tasks in the Alarm Systems workbook

Additional reflective tasks include word searches, crosswords, ripple diagrams and evaluation exercises. When designing the layout of the workbooks, particular attention has been given to illustration to support the text using a bold cartoon style. Figure 5 is an example.

Searching for suitable crime data
Preliminary searches of Home Office sources for suitable data to use in the analytical section of each project, revealed little useful information. Police statistical records are available but these tend to deal with arrests and prosecutions and therefore do not give a true picture of the extent of criminal activity. Also some of the categories, for example those dealing with theft, are stated in complex subdivisions such as tax and commercial fraud. This information was of little value for use in Design Against Crime projects. This research did, however, focus attention on searching for data about crimes which are likely to affect young people in the age phase doing the projects. More in-depth searches produced two sources of more useful data. The first is the *British Crime Survey*, published annually, giving details of offences committed and reported. The data is presented in recognisable categories and in a form which can be analysed easily. Additionally, the survey includes and presents information about trends in crime and the way crime affects people's lives. This latter aspect has been adopted in the reflective sections of the Design Against Crime projects as it provides opportunities for pupils to engage in discussion about crime issues which is a strong feature of the citizenship national curriculum. This publication is ideal resource material for citizenship activities in school, therefore several data sets from this source have been used in the projects. The second source is the list of Home Office research papers, most of which deal with specific crimes or trends in criminal activity. For example the data about fighting, vandalism and other violence shown in Figure 1 and

There are two sets of data on this page in the form of **bar charts**. Bar charts are another visual way of representing data.

Use these charts to compile a bar chart of your own that brings together both the boys' and girls' data to show the percentage of young people admitting **one** of the offences. Use colour to show clearly which are boys and which are girls.

Think about the offence you have chosen to represent and:
Analyse the data on your chart and write down your conclusions.

....

....

Make a list of the offences you think are in the category 'other violence'

....

Figure 1.

used in the Posters project is taken from *Research Findings No.126: Youth Crime: Findings from the 1998/99 Youth Lifestyle Survey*. The data selected from this publication is inline with the Key Stage 3 age phase the Posters project is designed for. Similarly, the data in the British Crime Survey had to be carefully selected to ensure relevance to both the project and age phase of pupils. The thief's shopping list data shown in Fig 6, and used in the Bag-tags CAD/CAM project, is from the *Home Office Statistical Bulletin 18/00 (2000), The 2000 British Crime Survey*.

The items selected from the considerable number given are likely to be owned by pupils.

Refining the design and make projects
The Design Against Crime theme is about designing and making products to combat crime, therefore an essential feature of the project workbooks is to teach pupils designing methods. While each project has a specific outcome, the designing method in each workbook is appropriate to that project and focuses on pupils developing their own ideas within that project

Notebook example fits here

Figure 2.

context. A feature adopted is to provide workspaces in the form of 'sketch pads' for recording ideas and 'note pads' (Fig.2) for recording information about their design decisions. This approach to encourage creativity is demonstrated by the Alarm Systems project. An alarm has no pre-determined form, therefore pupils are engaged in designing activity which promotes an individual outcome. Sufficient information is given to support each activity but leaving plenty of scope for creative work. In the Alarm Systems project, as there is no pre-determined form for the product, pupils can explore forms which indicate ' -hands off this -', or adopt a form which belies the fact that the product is an alarm. By adopting this approach, the product 'casing' can be designed and manufactured using textile or soft plastic foam materials as an alternative to resistant materials. Initial teacher education (ITE) students took part in developing this aspect of the research by exploring the range of possibilities but maintaining a clear objective that any proposals had to be feasible for use in school. They paid particular attention to

forming and joining materials in innovative ways. For example, using stitching to join vacuum formed casings together as well as using combinations of plastic and fabric materials. A further innovation is a printed circuit board, with its components, used as a structural element in electronic products. This eases manufacture.

The thread of encouraging innovative designing permeates each project. For example, mechanisms are included in the Posters Project and textiles, computer embroidery and materials such as plastazote and polypropylene in the Bag-tags project.

Trialing the alarm systems project
The pilot project, Alarm Systems, formed the basis of trials in schools. The trials were designed to inform the development of further Design Against Crime projects. The strategy adopted was:

- INSET courses to introduce teachers to the workbooks and projects
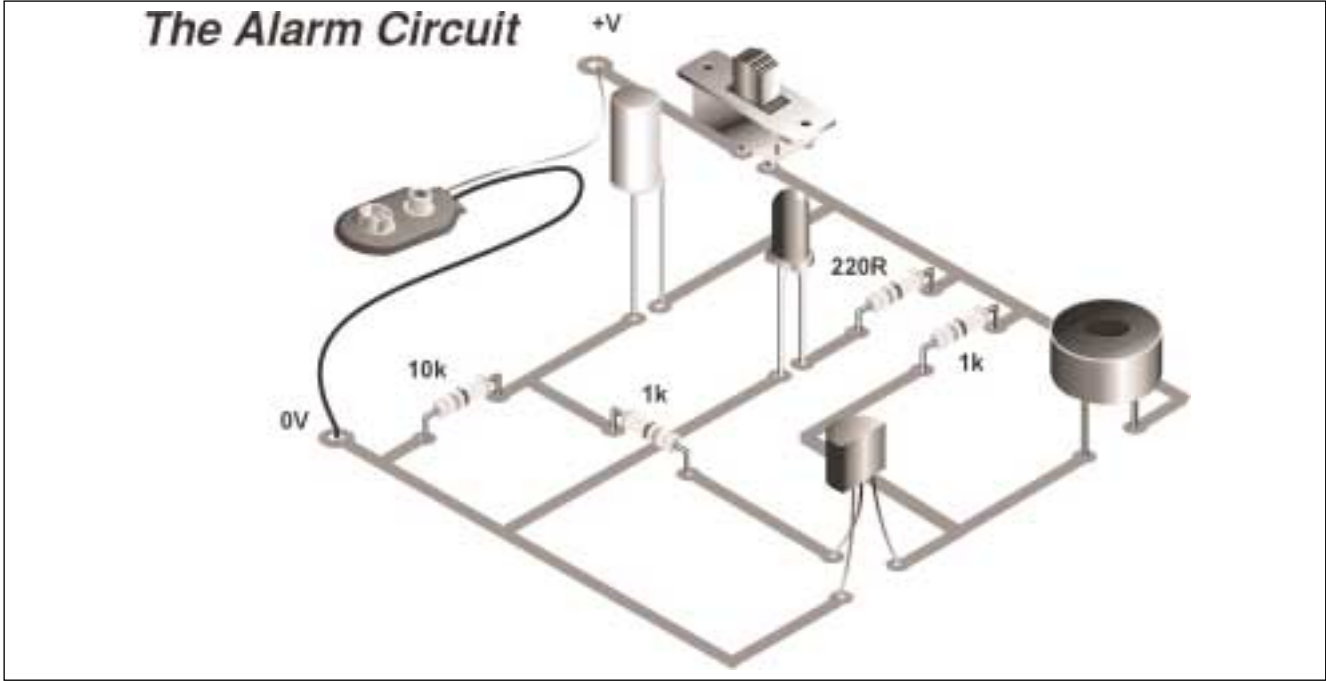
135

The Alarm Circuit +V

Figure 3.

Some questions to answer

Suggest three reasons why some people steal things from other people

1...

2...

3...

What is most likely to deter you stealing from somebody at school?

....

....

....

....

What are your feelings if something of yours is stolen?

....

....

....

Figure 4.
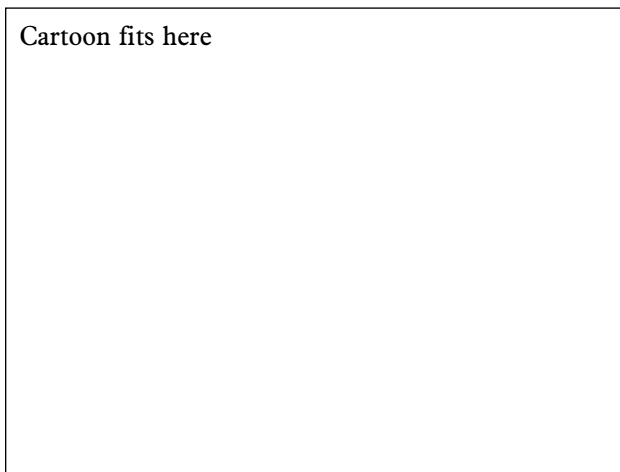
Cartoon fits here

Figure 5.

- providing sets of workbooks for teachers attending the INSET so they could use the project workbooks in school
- using a questionnaire to collect teachers' views about the project, particularly successful aspects as well as aspects needing further development
- collecting and recording the views of teachers during presentations about the Design Against Crime project
- using a structured interviews with pupils to get their views about Design Against Crime projects.

Initially eight schools agreed to trial the Alarm Systems project with a further two joining as the project progressed. Teachers were then asked to complete a four-part questionnaire in which they were asked to comment and make suggestions. The parts were:

- the analytical tasks at the start of the project
- the project and quality of the support materials
- the reflective tasks at the end of the project
- suggestions about improving and developing Design Against Crime projects.

Additional views about the projects have been obtained during presentation and seminar sessions used to introduce Design Against Crime projects.

The Burglars' Shopping List

Bicycle	4
Briefcase/bag	6
Mobile phone	8
Creditcards/cheque books	9
Purse/Wallet	11
Camera	11
Computer equipment	14
Jewellery	28
Cash	36

0 5 10 15 20 25 30 35 40

Figure 6.

Results of the alarm systems trial

Design Against Crime projects have been well received by design and technology teachers attending presentations and particularly those involved in the Alarm Systems trial. One deputy head commented that: 'The opportunity to incorporate aspects of citizenship within a foundation subject is to be welcomed at every level.'

Teachers were unanimous in their view that 'the workbooks are very good quality at a cost which is very reasonable'. (Packs of 25 workbooks cost £15 including teachers notes and an A2 poster). This is encapsulated in the comment: 'Aspects I particularly liked about the workbooks were the visual materials and tasks; I think the books are visually appealing and well laid out. The tasks on crime statistics are a useful introduction to the project.'

They liked the realistic nature of the project and considered the crime related tasks to be interesting and ideal homework material. One teacher said that: 'The children liked the idea of an alarm they can put in their bags. They liked thinking about what they could use it for, how they could personalise it.'

Three teachers considered that it was necessary to re-think their organisation to fit in the extra tasks but particularly liked the reflective tasks at the end of the project. Two respondents considered that both the analytical and reflective tasks were difficult for less able pupils, but they could see the value for middle and to more able pupils. The majority of teachers commented positively about the ICT elements, however, in discussion sessions with teachers, the problem of booking ICT provision within their schools was raised as they had no specific design and technology ICT facility. All teachers consulted liked the idea of being able to contribute to citizenship particularly within their subject.

All teachers commented that they liked the idea of the 'note book' and 'sketch pads' within the workbook. However, several commented that insufficient space had been provided and this had proved to be a limiting factor for pupils good at developing their ideas. One teacher suggested that:

> 'The workspaces are good, but it would be useful to have more spaces. It would have been nice to present the space for making design decisions as a Design Specification. This would be a good way of introducing design specs. and leading into GCSE.'

However, there was strong support from teachers that the way the electronics material was presented had helped pupils get their circuits quickly. One teacher

commented: 'I like this structured approach to teaching electronics. It seems to suit our children well.'

A re-occurring theme during presentations to teachers was the cost of running such projects. All agreed that while the cost of the workbooks was reasonable, the cost of components for the electronics made it difficult to justify using Design Against Crime Alarm Systems as a Key Stage 3 project. Several heads of design and technology departments expressed concerns about fitting this type of project into the timetable carousels they operate in their schools. Some felt that the project would take too many weeks and they only had time to concentrate on the electronics part.

These comments have been considered during the development of the Posters and Bag-tag projects. Both Posters and Bag-tags have been developed to be completed in about 12–15 hours of time, providing some of the analytical and reflective tasks are set as homework. In addition, the costs of both these projects have been kept to a minimum but commensurate with providing opportunity for pupils to achieve a quality outcome.

Comments from pupils tended to focus on their outcomes such as: 'The triangle shape of my alarm is a warning - it's like a traffic sign' and 'I want to put my alarm in my bag so that people don't take things out of it.'

One pupil appreciated the workbook by saying: 'I can print my PCB mask and put it in my book. I like having spaces to stick my work into – it keeps it neat. Some people found the graphs hard but I didn't.'

Conclusion and future development
The Design Against Crime project has demonstrated that there are considerable educational benefits of adding value to design and technology project work by putting the work into a specific context, in this case, crime. The research into suitable material for use in teaching about crime, resulted in the location of a wealth of material, however, the most useful is buried in research papers. Care in selection and use is very important particularly if the material is to be used at Key Stage 3.

Teachers consulted and engaged in the trials found there were considerable educational benefits in approaching design and technology project work in this way. They also welcomed the good quality Design Against Crime work books, particularly the additional material which can be used as homework. Interestingly, teachers engaged in the trials did not comment about the numeracy and literacy aspects of the projects. The Design Against Crime projects fit in

well with the introduction of the citizenship national curriculum and has support of senior managers in schools where trials have been conducted. As a curriculum development project, Design Against Crime has demonstrated that design and technology projects, with 'added value' and set in contexts which are genuine current issues, can motivate pupils. Design Against Crime goes some way to enabling design and technology to 'move to the heart of the curriculum'.

Diorama Design (a systems and control project) is currently being prepared and further Design Against Crime publications are planned for Key Stage 4 and post-16. The intention is to provide resource materials, such as case studies, so pupils can consider crime issues as they develop skills for more sophisticated product design activities at examination level.

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Progression in electronics and communications technology

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Abstract

The paper is based on the Marconi Electronics and Communications Technology Project. The project aims to interest and educate a significantly larger number of young people in England and Wales in Electronics and Communications technology.

The Marconi ECT Project aims to support high quality work in schools up to GCSE level. The paper describes the criteria on which the project has selected content, and how that content has been organised at the levels of 'Starter' 'Intermediate' and 'Advanced'.

In developing ideas for pupil practical activities, the approach that has been adopted is what we call a 'layered' approach. The intention is that, depending on experience and confidence, teachers need only look at ideas for pupil activities to the depth of 'layer' that they require.

A questionnaire-based survey of pupils in eight schools has been conducted to gauge their interest in a wide variety of possible projects.

Keywords

design and technology, electronics, communications, Marconi ECT Project

Introduction

This paper is based on the Marconi Electronics and Communications Technology (ECT) Project, which is supported by Marconi, DTI, DfES and TEP and managed by DATA. The project aims to interest and educate a significantly larger number of young people in England and Wales in electronics and communications technology.

The paper looks at:

- how, within the project, we have sought to systemise, in a progressive way, the knowledge, understanding and skills needed in work in ECT up to GCSE level
- our ideas for a set of progressive pupil activities at Key Stages 3 and 4 that will develop pupil capability in ECT
- surveys we have conducted into the views of pupils about possible activities

Knowledge, understanding and skills

The Marconi ECT Project aims to support high quality work in schools up to GCSE level. Given the wide scope of modern electronics, work up to GCSE level is necessarily highly selective in content.

The knowledge, understanding and skills have been organised under the following headings for the purpose of organising the web site (Marconi ECT, 2000), which forms a key part of the teacher support for the project. Of course, the organising headings are a matter of judgement. Certainly there is a great deal of overlap and interrelation between the various areas. Fortunately, in a web-based system, this can be allowed for by extensive cross-referencing hotlinks.

Systems design is used as a heading to provide a general overview of the key issues introduced at a given 'level' (see below).

Inputs and outputs introduces an increasing range of input sensors and output devices. Obviously, any electronic system must have input and output devices and so a key requirement of any ECT course that will enable young people to tackle a wide range of design issues, is to ensure that they understand the functions and can make use of a variety of input and output devices.