

This item was submitted to Loughborough's Institutional Repository by the author and is made available under the following Creative Commons Licence conditions.



creative commons
COMMONS DEED

Attribution-NonCommercial-NoDerivs 2.5

You are free:

- to copy, distribute, display, and perform the work

Under the following conditions:

 **Attribution.** You must attribute the work in the manner specified by the author or licensor.

 **Noncommercial.** You may not use this work for commercial purposes.

 **No Derivative Works.** You may not alter, transform, or build upon this work.

- For any reuse or distribution, you must make clear to others the license terms of this work.
- Any of these conditions can be waived if you get permission from the copyright holder.

Your fair use and other rights are in no way affected by the above.

This is a human-readable summary of the [Legal Code \(the full license\)](#).

[Disclaimer](#) 

For the full text of this licence, please go to:
<http://creativecommons.org/licenses/by-nc-nd/2.5/>

Engagement as the Key Feature of the Successful Use of the Internet for Information.

Alan Pritchard Centre for New Technologies Research and Education (CeNTRE)

Warwick Institute of Education

University of Warwick

Coventry CV4 7AL

UK

a.m.pritchard@warwick.ac.uk

Introduction

For some time now the use of the Internet has been promoted extensively to teachers by a number of different organisations and bodies. Not least of these in England is the Department for Education and Skills (DfES), through the medium of the National Curriculum. “Finding Things Out” is one of the strands of the National Curriculum programmes of study for Information and Communications Technology (ICT). The schemes of work for Key Stage Two (children aged 7 to 11) give suggestions for pursuing points from the Programme of Study, that involve using the internet to search large databases and to interpret information (Unit Ref 6D Year 6) (DfEE/QCA 2000). The use of the Internet is also promoted in the context of other subjects of the National Curriculum. In particular it is recommended when a topic can be researched and the findings used in a way which will lead to children achieving learning objectives concerned with knowledge and understanding in the subject area in question.

In the regulations which govern the ICT element of initial teacher education programmes in the United Kingdom (DfEE 1998, DfES 2002 ...4/98) another clear direction is given. “Trainees” must demonstrate that they “...know how to use ICT effectively, both in their subject and to support their wider professional

role.” (DfEE 2002b) The most recent guidelines for teacher training provided defines ICT as including “internet-aware computers” (Teacher Training Agency, 2003). Though the explicit mention of the use of the Internet is limited in the Qualifying to Teach Handbook (ibid.), the implication is that the Internet must be considered as an important resource, and used effectively for the attainment of subject based learning objectives.

Both teachers and learners always face difficulties when using information sources. It is often hard for an inexperienced Internet researcher to select relevant and appropriate items of information from the wealth with which they are presented. This problem is exacerbated significantly when access to vast amounts of information is so simple. The Internet gives speedy access to more information in one search than many children of the previous generation might have expected to come across in the course of their entire education. This can be seen as a great step forward, also if not dealt with effectively, as an enormous problem .

Copying large sections of text from paper sources has often been a problem in the past, and continues to feature in the non-fiction writing of many children in many classrooms (Lewis, Wray and Rospigliosi, 1995). Over many years teachers have encouraged children to “...write it in your own words.”, but, without the appropriate help to enable this, the problem persists.

The user-friendly nature of the technology exacerbates the situation. Lifting sections of text wholesale from web sites, and relocating them in a piece of project work is a simple process. However, doing this does not imply the effective use, in terms of increasing knowledge and understanding, of information which has been relocated.

This particular danger has the potential to drive teachers away from Internet use.: One teacher reported ... “That is precisely why I won’t use the Internet... there’s

too much (information) and they (the children) don't know what to do with it.” (See, for example, Pritchard (1998, 2000) for short treatments.)

To make effective use of the Internet for learning, children need both technical level skills and other skills which could be classified as cognitive. It is possible to teach certain strategies which allow for more effective use of information the skills of research and information handling. This should be promoted in two ways: Firstly, internet sites should be designed with effective information use in mind. Secondly, the ways in which children are encouraged to use large information sources should reflect what is known about learning, most notably, the principles of constructivist learning, in particular that:

- new knowledge and understanding is built upon existing knowledge and understanding;
- active exploration of information and ideas is the most likely way for learning to develop effectively;
- dialogue, in one of its many guises, is fundamental to the learning process.

ICT in the context of Design and Technology has been described as being used in one of three modes, namely ICT as a source of information, ICT as a tool, and ICT as a component. (DATA, 1995, 1996a, 1996b)

Source of Knowledge:

The notion of ICT as a source of knowledge encompasses CD-ROM encyclopaedias, but more impressively, the Internet. It is this aspect of ICT supporting work in Design and Technology which will be expanded later.

Tool:

ICT can be used as a tool to support Design and Technology at any stage in the process of designing and making. The separate stages could be set out as: researching, analysing and presenting information; modelling; and

manufacturing. Under the first heading ICT use can lead to more thorough planning, the development of organisational and information handling skills, the speeding up of the research process and the enhancement of language and graphical skills in the presentation of information. The idea of modelling can be divided into three. Firstly the group of programs which simulate specific situations - room layout, or nutritional values in particular combinations of food, for example. Secondly are the content free modelling programs such as spreadsheets which can be used to construct a more mathematical model of a situation, costs of raw materials and energy, for example. Lastly, the drawing and design programs which allow for such things as the design of patterns to be considered and tried out. All of these modelling programs add to the process of designing and making by allowing for pupils to ask, and in many cases answer, questions in the form of "What will happen if...?" Manufacturing includes, especially at Key Stages One and Two, the production of posters, adverts, templates, nets for models and patterns for printing. All of these can be done with drawing, painting and design programs. The use of computer applications can lead to: the possibility of a more professional finish; accurate reproduction of shapes for patterns; and the removal of human error and inaccuracy being removed from the process.

Component:

This notion of a computer as an integral element of the finished product, rather than as a means to the end or as a tool for making the end more easily achievable, refers to the use of a computer to control, and sometimes computer sensing as a part of a control system. This notion fits in well with the idea that a great many artefacts in everyday life are designed to include, and rely upon, the use of computers of one sort or another.

In a small scale classroom based research project investigating the use of the Internet for information gathering, two groups of children were given an identical task, but one group offered and expected to use a set of three simple rules.

Though not directly related to work in Design and Technology, the principles involved remain the same, and stay the same irrespective of the subject context. In any research situation the very thing that is not wanted is the wholesale cutting and pasting of large (or even small) extracts which have not contributed to the child's learning.

The Rules

The rules given to one of the groups were:

- i Keep any extract from the Internet short;
- ii Make a comment about any extract that you include;
- iii Say where the information came from.

The reasoning behind this guidance was as follows:

i *Keep any extract from the Internet short:*

By keeping the quote from a website short, the end product would be less likely to be made up of passages taken directly from the source. Being obliged to make a selection from a longer passage necessitates reading and the making of decisions about which part to select. Reading the information, instead of finding a "chunk" dealing with say, the Penny Farthing, and using the whole piece, means that the children will engage at some level with the text.

ii *Make a comment about any extract that you include:*

This rule can be followed in at least two different ways. The comment could be the child's reason for including the quote, for example: "*This sentence tells us that James Starley lived locally and started a bike factory close to our school. It was the first bike factory in the country.*" or "*I included this because it tells us about the first blow up tyres.*" An alternative style of comment could be concerned with something more personal: "*My dad says that his first bike was a Penny Farthing, but I don't believe that because he was born in 1968.*"

The purpose of this rule was similar to the purpose of the first. It was an attempt to encourage children to engage with the text. This rule also encourages the child to think more broadly about the extract and to give it a context.

iii *Say where the information came from:*

This rule was to encourage honesty about where ideas and information came from, and to encourage clarity about the difference between their work and the work of somebody else. It was hoped that applying this rule would lead to good habits, and help to avoid unintentional plagiarism.

The End Products

The children's comments made it clear that the Internet could be a highly motivating resource. When the children were told that they were going to be using the Internet there were cries of delight and excitement. During all of the lessons, the children were interested, involved and generally well motivated. Apart from the general atmosphere detected in the room, it was also clear from speaking with some of the children at a later date, that the work had been enjoyable:

Child A: It was a fun lesson. It was a good challenge.

Researcher: Did you enjoy the work?

Child B: I definitely enjoyed it. It wasn't easy, but it wasn't the hardest thing ...

Researcher: Did you enjoy the work that we did on the computer?

Child C: Yes I did, I thought it was fun, I enjoyed it. ... I enjoyed doing it ... So it was fun yes.

Researcher: Was it enjoyable?

Child D: Yes ...fun. It was fun, but complicated.

This confirms the findings of other research (Hammond and Mumtaz 2001, BECTa, 2001) which links the use of the internet and ICT in general to high levels of pupil motivation.

There was evidence that some of the children had 'personalised' their information and composed their own text, which suggests that they had some understanding of what they were writing about:

“Around 1790 a French craftsman named de Sivrac developed a “Celerifere” running machine, which had two in-line wheels connected by a beam. The rider straddled the beam and propelled the Celerifere by pushing his feet on the ground, scooter fashion. [Direct quote.]

I think that this bike is not very comfy and will break down very easily. The bikes were very uncomfortable the saddles were very hard not like modern day bikes like my mountain bike which has got suspension. [Personalised comment.]

And:

There weren't any human powered bikes before the 19th century they weren't considered sensible. We all know now that bikes are sensible and can go really fast. I've been to see speedway bikes, they go very fast and don't have brakes. [Personalised comment related to an idea taken from a website.]

However, the overall quality of the end products was disappointing. Even having fulfilled the requirements of the three rules there was no clear evidence of work of the quality that might be expected. Some children took extracts directly from a website and gave the impression of not having read the words which they were using:

“Below are some photos of typical bicycle club uniforms.” [There were no pictures to be seen.]

“Announcing the launch of a totally new range within the Falcon Cycles structure”

“This link will return you to the Broadgate Cycles homepage.”

This copying is obviously not a new phenomenon but the technology makes it much more likely.

There was only limited recall of the facts when a selection of the children were questioned a few weeks after the work had been completed.

Researcher: What did you learn about the history of bikes in that work, can you remember?

Child E: Umm

Researcher: It's a long time ago, isn't it.

Child E: It was but err, I can't think. Oh I can remember the Penny Farthing.

Researcher: ... What's that like?

Child E: Umm it has a small wheel at the back and big wheel at the front.

Researcher: Good. ...Anything else you remember about bikes from the work and the information?

Child E: I think I can remember who made the thing but umm

Researcher: Do you remember his name? Was it a "he"?

Child E: I think it was a "he" but I can't remember.

Researcher: Did bikes make much difference to people's lives?

Child E: I don't know.

A good deal of time seemed to be spent on "distraction activities", such as following links, writing elaborate titles and so on. It is clear that other teaching approaches are needed if we expect children to engage with information in a meaningful way, and to learn something from it.

This project highlights many of the problems that concern teachers in using the Internet. Even though the children were given websites to use, some still chose to 'wander off', accessing sites that had little to do with the activity. Hammond and Mumtaz (2001) point out the dilemmas faced by teachers in trying to address this problem - at one end of the spectrum is the scenario of over-controlled pupil activity in which pupils are given highly directed worksheets with the addresses of sites which teachers have chosen; at the other is unsupervised use in which pupils jump from site to site with little or no engagement. Hammond and Mumtaz (ibid) also acknowledge that a balance needs to be struck which can only be accomplished by careful scaffolding by the teacher.

Some of the children spent a proportion of their time focusing on technical problems such as navigating between windows and losing information during the cut and paste process. It can only be speculation when the extent to which these technical issues detracted from the main purpose of the lesson and how they

might have led to differences in the end products. In cases like this children are concentrating on what has been called “the mechanical rather than cognitive”. (Hartmann undated) The “cognitive” being those aspects which involve engagement with the content of the information.

There was little evidence to suggest that the children had engaged with the content, facts, or ideas within the information in any meaningful way and this seems to be one of the reasons why the children seemed to have learnt so little. This is in line with the constructivist notion that it cannot be assumed that information will be learned by the simple transmission of facts from one place to another (Guile, 1998). For children to understand new information, they must become actively involved with it (Reid et al 1989). Reid and associates present a five stage model: engagement - exploration – transformation – presentation – reflection (ibid) which sets out a route to be followed with work of this nature. In this project there was a minimum of these first two stages very little transformation, some attention paid to presentation and no discernible reflection.

The children were beginning to acquire information and to explore it. It could be argued that they then went on to transform their information to present to their intended audience in the form of the information sheet. But many of the sheets were merely collections of a small sample of the information which the children had come across. The process they worked through could be likened to the initial stages of an investigation where every piece of information to do with the particular topic is collected, regardless of its worth or relevance to the purpose of the investigation.

Purpose, Structure and knowledge Transformation

What children perceive to be the purpose of the task is crucial here. It became clear when the children were interviewed that the purpose of the task was of little importance to them – they could hardly remember why they were doing the activity and did not talk at all about the intended audience for their information

sheets. Most of them referred vaguely to “finding out about the history of bikes” and so it is understandable that they lacked a clear purpose that they could use in their explorations. It is not surprising that there was a temptation to cut and paste, gathering pieces of information in an indiscriminate fashion. This indicates the need for initial support and continuing scaffolding as the work progresses.

A framework to work within can be particularly helpful; the teacher has an important role in building and being part of this framework. In order for children to learn from any information they must move from the position where they are merely ‘collecting’ and ‘recording’ it to a position where they are actively involved with it, and it is the teacher’s role to provide tasks and activities which provide a setting in which this can happen.

The experience in this project is similar that reported by Selinger (2001) “Much Internet activity consists of unstructured searches, ill-defined tasks, and children’s work which consists of text and images cut and pasted into a report. Questioning children about their reports in these situations often reveals no evidence of understanding or learning.”

We have seen then, that what results from poor preparation when using the Internet is a lack of purpose leading to little discernible learning and, even with the guidance given to one group of children, the outcomes in terms of quality of the end product and the retention of information and ideas were poor. Purpose, or focus, seems to be a very important element of being successful when working with large information sources. We will see later that there are strategies which teachers can develop for children to use which can give a focus and a well defined purpose to this sort of work.

The conclusion which can be drawn from this short study is that if the Internet is to be exploited as a resource it is imperative that sufficient effective guidance is given and that good level of monitoring is in place.

For Internet use to have as much of an impact on children's learning as it has the potential for it seems that it is necessary to provide a good deal more initial support, including the practice of strategies (which will be outlined later) for dealing efficiently with the information which the Internet can so easily supply, and for encouraging engagement.

Bereiter and Scardamalia (1987) outline a model of the writing process which they term "knowledge transformation". Knowledge transformation can be seen as knowledge, possibly from a number of different sources, being reconstructed in order to answer certain questions and to help meet particular learning objectives. This model is characterised by the writer alone accomplishing what is normally accomplished through the medium of social dialogue. Knowledge is considered and "worked upon" by the individual – engagement takes place. This dialogue, which forms an important element of the thinking underpinning social constructivism, is seen as the medium through which learning takes place. A child working alone cannot take part in an actual dialogue, with the possibility of allowing engagement with the knowledge and ideas of the topic in question, but by undertaking a process of knowledge transformation, a similar process may come into play, and effective learning may be possible.

Encouraging Engagement

It can be surmised then that an important element of the role of the teacher is to encourage engagement, since without some measure of involvement with information and ideas – Bereiter and Scardamalia's knowledge transformation - there is reduced opportunity for effective learning to take place, especially the deep learning which is normally the aim of most teaching situations.

There are many effective ways in which teachers can encourage children to engage with factual information. A starting point for this would be to encourage children to consider what it is that they already know about, or understand about

the topic in question. This notion is given prime importance in the “Extending Interactions with Text” (EXIT) model presented by Wray and Lewis (1997). The first stage of this ten stage model requires that children are encouraged to review their existing state of knowledge and sometimes, understanding, it is termed “Activating prior knowledge”. It relates very closely to the constructivist notion that new knowledge and understanding is built upon a foundation of what exists already. By focusing attention on to what is already established the process of building is given a head start.

Another important principle is to encourage a focus on a specific aspect of what is probably a wide field of interest. Building on Ogle’s initial work in this area (1989), Wray and Lewis (1997) set out the use of a KWL grid as a starting point for research work with non-fiction texts. KWL stands for: “What do I KNOW - What do I WANT to find out - What have I LEARNED” The grid encourages children to think more deliberately about what they already know, and what they would like to know about it and to be more aware of what they have learned. Again, this is a general approach, not restricted to use with information specifically from web based or other electronic sources. Another approach which could well be of value in work of this nature with children, is the writing frame. This notion, also explained by, Wray and Lewis (1997) is a simple scaffolding device, now widely used in English primary schools, which gives a structure for children to use when writing in a format or style new to them.

The reading of website material could benefit from being similarly structured and supported, for example, through the reading system known as SQ3R¹ (Survey – Question – Read – Recite – Review), or the approach known as PREP² (Preview – REad to understand – Process to learn). Both these systems of approaching

¹ Detail can be found at: <http://virtual.parkland.cc.il.us/studyskill/Reading&StudySystem/ClassicSQ3R.htm>

² Detail can be found at: <http://virtual.parkland.cc.il.us/studyskill/Reading&StudySystem//PreP.introduction.htm> and in many other places.

non-fiction text encourage the asking of questions, the making of notes and other activities which encourage cognitive activity.

Directed Activities Related to Texts (DARTs) provide another setting within which engagement with the facts and ideas in non-fiction texts is encouraged. DARTs were first written about by Lunzer and Gardner (1979) and later by Davies and Greene (1984). The names covers a wide range of different types of activities all of which serve to focus the attention of the reader on the important elements of the text as a way of encouraging engagement and increasing the amount of cognitive activity which takes place.

DARTS are divided into two broad categories, namely, “Reconstruction Activities” and “Analysis Activities”. Reconstruction, or completion activities, are essentially problem-solving activities and make use of a modified version of the text in question. The text or diagram is reproduced by the teacher with parts missing: words, phrases or labels are deleted, or alternatively, the text is broken into segments which have to be re-ordered or re-arranged. The activities have game-like characteristics where the game involves hunting for clues in order to complete the text. To complete these activities it is necessary to read and often re-read the text and to think about the sense and meaning of the information, sometimes in some depth. *Analysis activities* do not need the text to be modified, it is used precisely as it is. These activities seem to be more educational in nature than the game-like reconstruction activities. Their aim is to find a particular meaning or to seek for particular “information targets” in the text. Searching for the targets involves children in locating information and categorising it .

Conclusions

Learning from information sources such as the Internet is not something which can always be guaranteed. That is to say that it is not possible for some readers or learners to take advantage of exposure to information as a straightforward

learning opportunity. Simple exposure to information, or simple copying from one place to another does not imply learning. However, it is possible to do a lot to promote situations where effective learning is more likely to take place. Good habits can be encouraged from a very early stage in schools. Activities which encourage focus, and a consideration of what is already known, what is actually being sought, and what is going to happen to the information once it has been located help develop discerning users of information. Other more specific considerations, including context, interest, means of recording, style of presentation, audience and means of communication, also have an important impact on the success or otherwise of learning situations of this type. In particular the role of talk in developing such understanding should be taken into account.

The project focusing on the History of Bikes did lead to some positive findings. Some children were able to keep the “rules” in mind and to make comments which indicated that they had considered the information and had gone beyond the information given. The project does, however, highlight the need for strategies to encourage engagement. Elements of the EXIT model could well serve this purpose, as could well structured DART activities. It should be borne in mind that different children are likely, for a variety of reasons, to benefit in different ways from the same activity, and that some children might well need an approach with different emphasis, or with more or less support. This notion of individual difference is no less important in this area of work than in any other. The teacher must always have in mind that whatever the children are asked to do, for whatever purpose, the activity should be geared towards encouraging optimum and meaningful engagement.

References

- Biggs, J. B. and Collis, K. F. (1982) *Evaluating the Quality of Learning – The SOLO Taxonomy* Academic Press, New York
- Biggs, J. B. and Moore, P. J. (1993) *The Process of Learning* Prentice Hall, New York

Bloom, B. S., Englehart, M.D., Furst, E.J., Hill, W.H. and Krathwohl, D.R. (eds) (1956) *Taxonomy of Educational Objectives I: Cognitive Domain* McKay, New York

Brooks, J. G. and Brooks, M. G. (1998) *The Case for Constructivist Classrooms* Alexandria, Virginia.

DATA (1995) Enhancing Design and Technology Through the use of IT DATANEWS 32 November Wellesbourne DATA

DATA (1996a) *IT as a tool to support Designing and Making* DATANEWS 1 January Wellesbourne DATA

DATA (1996b) *IT as a Component in Designing and Making* DATANEWS 2 April Wellesbourne DATA

Davies, F. and Greene, T. (1984) *Reading for Learning in the Sciences* Oliver & Boyd, London

DfEE (1998) *Initial Teacher Training National Curriculum for the Use OF Information and Communications Technology in Subject Teaching* DfEE (TTA) London

DfEE (1999) *Superhighway Safety, Children's safe use of the Internet* Department for Education and Employment, London

DfEE/QCA (2000) *A Scheme of Work for Key Stages One and Two* DfEE/QCA, London

DfEE/QCA (1999) *The National Curriculum: Handbook for Teachers in England* DfEE/QCA, London

DfES (2001) *Statistics of Education: Survey of Information and Communications Technology in Schools 2001* Department for Education and Skills, London

DfES (2002)

Guile, D. (1998) *Information and Communication Technology and Education: current concerns and energising issues*, London, Institute of Education, University of London

Hammond, M. and Mumtaz, S. (2001) How trainee teachers of ICT approach teaching their subject, *Journal of Computer Assisted Learning*, Vol. 17, No. 2, pp. 166 – 176

Hartmann, E. (undated) *Understandings of Information Literacy: The perceptions of first year undergraduate students at the University of Ballarat*
<http://www.alia.org.au/sections/ucrls/aarl/32.2/full.text/hartmann.html> (accessed 30.5.02)

Kohn, C. F. (1967) Basic Concepts of Geography and their Deployment in the Classroom. In, Fenton, E. (ed.) *The New Social Studies* Holt Reinhart and Winston Inc. New York

Lave, J. and Wenger, E. (1991) *Situated Learning* CUP, Cambridge

Lewis, M., Wray, D. and Rospigliosi, P. (1995) "No Copying Please" Helping Children Respond to Non-fiction Text *Education 3-13* vol 23 1

Lunzer, E and Gardner, K. (1979) *The Effective use of Reading* Heinemann, Oxford

Ogle, D. M. (1989) The Know, Want to Know, Learn Strategy in K.D. Muth (ed) *Children's Comprehension of Text*, Newark, Delaware. International Reading Association

Piaget, J. (1973). *The child's conception of the world*. Paladin, London

Pritchard, A. (1998) *Sensible searching* Interactive vol.1 no 19

Pritchard, A. (2000) *Forming Good Habits: using information to real advantage* Interactive vol.1 no 31

Pritchard, A. (In preparation) *Letting Children Loose on the Internet Leads to Poor Results*

Reid, J., Forrestal, P., and Cook, J. (1989) *Small Group Learning in the Classroom* Chalkface Press, Scarborough (Australia). English and Media Centre, London

Selinger, M. (2001) *Setting Authentic Tasks Using the Internet* in Leask, M. (ed) (2001) *Issues in Teaching Using ICT* Routledge Falmer, London

Teacher Training Agency (TTA) (2003) *Qualifying to Teach. Handbook of Guidance* TTA London

Vosniadou, S. and Brewer, W.F. (1987) Theories of Knowledge Restructuring and Development. *Review of Educational Research*, 57 51-67.

Wray, D, J. and Lewis, M. (1997) *Extending Literacy* Routledge, London

