

Consider the unique role of ict to a child's education and to a child's learning

[Technology](#)



ICT is more than just another teaching tool. Its potential for improving the quality and standards of pupils' education is significant (NCC, 1999). ICT (Information and Communication Technology) has a distinctive contribution to play in all children's primary education in that it prepares children to engage in a rapidly changing world in which work and other activities are increasingly changing. This is due to children's ability to access varied and developing technology. Children can learn how to use ICT to gain access to ideas and experiences from a wide range of people, communities and cultures. They are also increasingly able to think about its implications for use at home, school and in their future careers. I believe that ICT has a unique contribution to make to a child's primary education and to their learning in that it can easily be taught across all of the primary subjects. Whilst still teaching children about ICT this does not interfere with the learning of the other subject.

There are four features of ICT which help us see how important it is in the curriculum, they also show how it is distinctive from other subjects. These are Interactivity, Speed and Automatic functions, Capacity and Range, and Provisionality.

Interactivity is the way ICT can give immediate and vivid feedback, and can respond to decisions and actions made by the user. This aspect of ICT helps children to make decisions, see the consequences and then be able to act on the feedback given. The way information is stored and processed allows teachers and children to be able to explore models and simulations (I shall talk more about this later). ICT also makes it possible to present information in ways, which are accessible in different forms and for different audiences.

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

Children can now search for and compare information from different sources, for example by looking at different web sites or CD-ROMs. They can easily learn how different people, communities or those from different eras can have very different opinions. The nature of the interactivity of ICT lets children easily communicate with other people, locally and or at a distance meaning that they can learn and understand about others much more easily than before the use of ICT.

Speed and Automatic functions enable routine tasks to be completed and repeated quickly, allowing children to concentrate on thinking and on tasks such as analysing and looking for patterns within data. This gives them more time to ask questions and look for answers, meaning that they are more able to present and explain their findings. The functions of speed and automation enable teachers to demonstrate, explore and explain aspects of their teaching more effectively. One example of this is where ICT is used to measure events at long or short time intervals, in order to compress or expand events which would normally take very short or long periods of time, and to show them to children at appropriate speeds. Events can be measured and recorded which might otherwise be impossible to gather in a classroom and sequences of actions can then be examined and links can be made within those events (Byrne & Sharp 2002).

Capacity and Range are the functions of ICT, which give children, and their teachers, access to huge amounts of information. There is a wide variety, from Web sites and external databases to CD-ROMs. ICT can help users (teachers and children) handle large amounts of information, which would normally be outside their everyday experience, for example, historical,

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

recent or even immediate information (such as web-cams). ICT also allows access to expertise and knowledge from outside the classroom, the school and the local community, such as links to Universities or Industry.

The ICT function of Provisionality allows changes to be made easily to stored information. This enables work to be changed easily and for alternatives to be tried out. For example, when using the word processor, the writer can make countless changes and can save numerous versions, which can be saved and returned to again and again for amendments. The work can then be improved again after evaluation by response partners or teacher. Another example, is that of a selection of figures in a spreadsheet, one number can be altered in a table which can show implications for other numbers within the spreadsheet, to do the same using pen and paper, or even a calculator would take much longer and could change the aspect that the children are actually learning. There is a huge scope for 'trial and error' when using ICT. This is what makes electronically stored data 'provisional'. There is no 'final' version as it is so easy to make changes, however this can also be a drawback and there can be dangers in it's use, for example if the wrong version is saved or the final version is deleted by accident.

ICT can be used in all primary subjects to; find, analyse, explore, exchange and present information responsibly, creatively and with discrimination (TTA, 1999). In science however, ICT has the potential to make a significant contribution to both a child's scientific and ICT learning since it can help children to engage with ideas in ways which would not previously have been feasible. Science is often about asking questions and doing things to try and find the answer. ICT is increasingly being used in schools to support the

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

science curriculum and many schools are integrating ICT into their normal working practice. This also fits well with the ICT curriculum which tends to be about the 'doing of things' and the knowledge of how and when to do those things using ICT to improve the activity or outcome.

Science stimulates and excites children's curiosity about phenomena and events in the world around them. It also satisfies this curiosity with knowledge because it can link practical experience with ideas; it is able to captivate children at many levels. ICT can be the best way to convey or consolidate a new idea or concept; this is why as a subject it is so distinctive from all the others within the National Curriculum. It can allow children to see patterns or behaviours more clearly and can add reliability and accuracy to measurements. Children can also be employed in the selection and interpretation of information.

The technology for processing information includes the word processor, the spreadsheet, database programs, sensors, and modelling programs. Spreadsheet programs take the struggle away from creating tables, drawing graphs and working with numbers. Database programs allow children to search for information and look for patterns within it. Sensors, for example, help children (and teachers) to measure changes and draw graphs. Modelling programs help represent scientific ideas that are maybe hard to grasp in real life and if there is a common characteristic, they allow the child to do more and go further. Children can use ICT-based models and simulations to explore patterns and relationships, and make predictions about the consequences of their decisions, without the teaching of ICT within schools this is not so straightforward.

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

Within this section of the assignment, I will be concentrating on the area of modelling and simulations, which relate primarily to the ICT function of interactivity, on of the most unique areas of ICT. Computer models are, representation of the real world, or abstract situations... pupils should use, investigate, manipulate and later design, these models (Poole, 1998).

Modelling is an activity that can be used in many curriculum subjects, in ICT children can, within a stimulating medium, learn to control pre-prepared models and then construct their own. The use of simulations and models is an important aspect of science education and is a valuable means of refining a principle or idea that may otherwise be difficult, dangerous or impossible to experience in any other way. Models are integral to thinking and working scientifically because models are science's products, methods, and its major learning and teaching tools (Gilbert, 1993). In science modelling occurs when a computer is used to represent a real life or imaginary situation. A model of something is a simplified imitation of it that we hope can help us understand it better (American Association for the Advancement of Science [AAAS] 1989).

It is important for children to have different ways of looking at a concept and modelling gives them a visual representation and is a way to see how a scientific concept works. Models are already used in this way to help children understand science. Something as simple as a tray of marbles, for example, helps to explain how molecules move. The tray is shaken and so you are giving the marbles energy or similarities could be seen in the way the marbles move and the molecules in a gas. This model is a simplification of the real thing but it is a useful tool that can allow children to investigate

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

ideas about solids, liquids and gases. Computers can offer the same opportunity for modelling. Programs can be utilised which also show the movement of molecules, the computer program however, can take the children further in their understanding. The user (either the teacher or the child) can increase the temperature, and the molecules on the screen move around faster. The software programmed to model the behaviour of molecules, lets the children speculate on the effects of temperature and see whether their expectations are correct or not.

Simulations are a subset of modelling activity. A simulation occurs when a model is used to predict the likely outcome of a real life or imaginary situation by changing certain parameters or variables (Poole, 1998). ICT has the potential to make a significant contribution to the teaching of science by helping children visualise and understand these scientific processes and systems. For example, by the use of simulations, children can investigate the effects of changing variables because situations are either difficult to observe directly and understand (such as food chains, plant growth, life cycles) or because concepts encountered in experimental work need to be reinforced.

The teacher can also model situations that would take too long to study in the classroom, for example, the long-term interdependencies of a population in a pond. Also you can do things that would be too dangerous or impossible, like playing with a nuclear reactor or putting someone into a freezer to find out how their temperature changes! Children can learn that ICT can also actually be used to go into real life situations such as the robots that actually did go into the centre of the Chernobyl nuclear power station to enable them

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

to monitor the aftermath, something that would not have been possible without ICT as it was too dangerous for humans to go into that area. This gives children an idea of the enormous potential of ICT to assist and improve our lives in ways that they might not have thought of. Computers can give us the opportunity to be able to do and see things that we would not be able to without them.

Pieces of electrical equipment can be selected and connected together by clicking and dragging wires between the terminals and when a switch is turned on the bulb lights or the buzzer buzzes. Another bulb can be added to the circuit and both bulbs light, and as in real life, they shine less brightly. In this activity the children are again learning about the variables and change (or automatic function and provisionality). They are the ones in charge of selecting the parts of the circuit to make it work correctly. If they select incorrect items (such as one battery and five bulbs) then the circuit will not work as in real life.

Computer models can represent real or imagined situations. They are governed by rules and managed by the computer. They allow teachers to ask 'What would happen if...?' and to see what happens when those modifications are made. Modelling can use specific software such as simulation or a CAD (computer-aided design) package. Or software, for example, a spreadsheet can be made to represent a situation through a set of mathematical connections, for example, when investigating the flight of a ball by changing a variable such as the angle of the throw.

Use of the spreadsheet, if used in a certain way, is a way of modelling which supports learning in handling abstract concepts. The spreadsheet is <https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>



essentially just a table with rows and columns. However, when formulae is set up to automatically calculate and then recalculate results as information is added or adjusted, this takes away the need for constant calculation and so the child is free to concentrate on the concepts they are looking at. Children learn that ICT can reduce the need for memory or calculations while increasing speed and accuracy, this allows children to be creative in adding factors or changing relationships. Replication allows patterns to be looked at and from these patterns the children can then go onto generalise and then theorise, an important and unique aspect of ICT in a child's education.

Activities based on modelling are often about sharing, investigating and then explaining their ideas with others, doing this helps children to start to analyse what they are doing and so strengthen their own understanding. Ball (1999) explored the effects of gravity on different planets using a spreadsheet. He found that using ICT promoted high-level scientific thinking by some of the children. Modelling can help children to see the relationship between cause and effect and encourages greater logical, sequential and creative thought (Byrne & Sharp 2002) and so should be a significant aspect of primary (and secondary) education for all children.

Within the curriculum there are many opportunities to enhance the teaching and learning of by using ICT, from using simulations and models when it would be impossible or too dangerous to do otherwise, to using sensors to speed up an investigation. My belief is that by using ICT learning and understanding can be achieved that could not have been done without it, or not as effectively or efficiently which is why I feel that ICT can make a distinctive contribution to a child's primary education.

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

## Bibliography

American Association for the Advancement of Science (1989), Science for all Americans. Washington, DC

BECTa Web site <http://vtc.ngfl.gov.uk/docserver.php?temid=98>

(Accessed 25/03/03)

Bristor, V., J. & Kmar, D., (1999) Integrating Science and Language Arts through Technology-based Macrocontexts, Educational Review Vol. 51, No. 1. Educational Review.

De Cicco, E., (1999) Activities for using the Internet in primary schools, London, Kogan Page Limited

Cullin, M., & Crawford, B. A. (2003). Using technology to support prospective science teachers in learning and teaching about scientific models, Contemporary Issues in Technology and Teacher Education [Online serial], 2(4). Available: <http://www.citejournal.org/vol2/iss4/science/article1.cfm>  
(Accessed 25/03/03)

Dunbar, K., (1999). How scientists build models invivo science as a window on the scientific mind, In L. Magani, N. J. Nercessian, & P. Thagard (Eds.), Model-based reasoning in scientific discovery. New York: Kluwer Academic/Plenum Publishers.

HMSO (1999) The National Curriculum: Handbook for Primary Teachers in England, Key Stages 1 and 2, London, DfEE/QCA

McComas, W. F., Clough, M. P., & Almazroa, H., (1998) The role and character of the nature of science in science education, Science & Education

<https://assignbuster.com/consider-the-unique-role-of-ict-to-a-childs-education-and-to-a-childs-learning/>

Mcfarlane, A., (2000) Information technology and authentic learning: realising the potential of computers in the primary classroom, London, Routledge

Ofsted, (2002) ICT in Schools: Effect of Government Initiatives [online] April 2002 <http://www.ofsted.gov.uk/public/docs02/ictinscholls.pdf> Accessed 29/10/02

Ofsted, (2000/01) Primary Subject Reports 2000/01- Information and Communications Technology [online] 2000/01 [http://www.ofsted.gov.uk/public/docs02/subject01/primary/ict\\_p01.pdf](http://www.ofsted.gov.uk/public/docs02/subject01/primary/ict_p01.pdf)

Accessed 29/10/02

Ofsted, (2000/01) Primary Subject Reports 2000/01 - Science, London, Ofsted

Ofsted, (April 2002) Science in Primary Initial Teacher Training, London, Ofsted

Packard, N., (2000), Crocodile Clips, MAPE Focus on Science Autumn 2000

Poole, P., (1998) Talking about Information and Communication Technology in subject teaching: a guide for student teachers, mentors and tutors, Canterbury, Canterbury Christ Church University College

Solomon, J., (Sept/Oct 1997) Is how we teach Science more important than what we teach? Primary Science Review, ASE

Somekh, B., (1998) Using information technology effectively in teaching and learning: studies in pre-service and in-service teacher education, London, Routledge

Teacher Training Agency (TTA), (1999) The ITT National Curriculum for the use of ICT in subject teaching (Science) London, TTA

Trend, R., (1999) Information and communications technology, London, Letts