

Introduction

The growing use of Information and Communication Technology (ICT) in further and higher education brings clear benefits of administrative efficiency and increased effectiveness in teaching and research. However, it is accompanied by an environmental and monetary cost. This cost is increasing considerably as new activities and applications are added to existing ones. For example:

- e-Learning, and especially versions with rich media content, are increasing the storage and processing of information within data centres, which are very energy-intensive
- Ever larger volumes of data, from research records to email archives, are being stored
- Many areas of research are becoming more computing-intensive

There is increasing pressure on universities and colleges to adopt more sustainable approaches to ICT use. This pressure comes from government, from regulatory sources and from external stakeholders and the public, who are increasingly aware of the environmental cost.

Facts and Figures

- It is estimated that ICT accounts for **2%** of global carbon dioxide emissions, and that its use in UK further and higher education generates over 500,000 tonnes of carbon dioxide emissions per year
- The UK government has a target to reduce carbon dioxide emissions by **26%** from 1990 levels by 2020
- Personal computing (PCs, laptops, monitors) is the main area of ICT-related energy consumption in UK universities and colleges, at **40–50%** of the total, and digital printing is a further **10–16%**

Benefits of Sustainable ICT

Actions to minimise the environmental impacts of ICT use, and increase social benefits from it, can help institutions through:

Cost efficiency gains

High ICT usage is accompanied by hefty electricity bills: the University of Sheffield, for example, expects to pay £1 million for electricity used for its ICT equipment in 2009. Well proven



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measures can reduce such energy costs substantially in most universities and colleges.

Improved reputation

Increasingly, organisations are publishing comparisons of institutions' environmental and social performance, and there is evidence that staff and students take this into account when making decisions about where to work or study.

New opportunities for teaching and research

Sustainable ICT is an area of growing concern to both suppliers and major users, and so they need employees and advisers who understand the issues. This provides an opportunity for new vocational and academic courses, and creates a new research agenda, and accompanying funding.

Possibilities for new ways of working

Flexible working and technologies such as conferencing can reduce travel, and enable better use of space, which in turn reduces the environmental impact of building use. Evidence suggests that the opportunity to work flexibly is valued highly by staff.

Drivers for Sustainable ICT

The environmental and corporate social responsibility drivers are compelling:

- The extraction of materials used to make ICT equipment consumes energy and creates both hazardous and non-hazardous waste
- Running ICT equipment consumes large amounts of energy – both directly and through the cooling and power supply requirements of data centres

- Manufacture and disposal of ICT equipment releases heavy metals, acid rain precursors and other air and water pollutants that are harmful to the environment and can damage people's health

ICT is also expensive to purchase and run: ICT use will cost UK further and higher education institutions an estimated £121 million in 2009, a figure that will continue to rise. Many sustainable ICT measures, such as software to switch off PCs automatically at the end of each day, or virtualisation of servers, can have a payback of less than two years.

Finally, pressure is increasing from government and regulatory bodies to reduce energy use and environmental impact:

- The Climate Change Act (2008) sets a legally binding target for reducing UK carbon dioxide emissions by 80% from 1990 levels by 2050. It also sets up the Carbon Reduction Commitment (CRC), which requires many universities and large colleges to monitor their electricity consumption and purchase carbon credits. There will be penalties for poor performance, and rewards for good performance
- Several directives require institutions to implement policies relating to the purchase, use and disposal of ICT equipment. These include the Waste Electrical and Electronic Equipment (WEEE) directive; the Reduction of Hazardous Substances (RoHS) directive; and the Energy Using Products (EUP) directive
- Stakeholders such as the government, higher education funding councils and the Learning and Skills Council (LSC) are increasingly demanding action on sustainable ICT

Barriers to Sustainability

There are, however, several obstacles to developing, and implementing, a sustainable ICT strategy:

- Staff often lack the time to deal with its challenges, which can seem complex and time-consuming
- IT departments and users have little knowledge of, and rarely have responsibility for, electricity bills, and therefore have little incentive to reduce them
- Effective action often requires cooperation between IT departments and others, such as Estates, but this is difficult to achieve because of different cultures and priorities
- Lack of capital budget means there is not enough money to spend on sustainable ICT activities
- Staff may not know where to turn for information and guidance on how to reduce the environmental and social impacts

Call to Action

Institutions can take the following actions to promote sustainable ICT within their organisations:

- Ensure that the topic is given prominence within institution-wide environmental sustainability policies and systems, and **set measurable targets**, eg for ICT-related energy consumption
- **Purchase energy efficient hardware** – which is compliant with the Energy Star standard as a minimum – and assess and require suppliers' commitments to long-term sustainability in other areas
- **Reduce energy consumption** associated with ICT equipment through power-down when not in use; switching off equipment; improving the efficiency of data centre cooling and power supply; and other means
- Examine the potential for **alternative computing approaches** such as thin client and virtualisation, and implement where appropriate
- **Use IT equipment for longer** wherever possible, through measures such as avoidance of software-induced replacement and cascading to other uses
- **Reduce print-related energy and paper consumption** through consolidation of print devices; print management software; easier online access to documents; greater use of recycled paper; and other means
- **Examine the potential for staff to work remotely** or use audio and video conferencing to conduct more meetings or teaching sessions, as these can reduce travel, enable more effective use of space and staff time, and result in new opportunities

Further Information

GeSI and The Climate Group (2008) SMART 2020: Enabling the Low Carbon Economy in the Information Age
www.gesi.org

HEFCE (2008) Sustainable Development in Higher Education
www.hefce.ac.uk/pubs/hefce/2008/08_18

JISC Green ICT blog
<http://greenict.jiscinvolve.org>

Susteit project
www.susteit.org.uk

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