Managing the Environmental Impact of Information Technology

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INTRODUCTION

This article explores a much under-researched field of ethics: the impact of information technology (IT) on the environment. Reducing the ecological impact of IT requires a holistic approach including better design of computers, the development of non-polluting manufacturing processes, and effective management strategies. The latter have received much attention in recent years. The three main areas of management focus have been the problems of hardware disposal, the energy consumed by computer technology in operation, and paper usage by printers and photocopiers.

In this article management strategies will be examined in light of theories of environmental ethics and in the context of the university. Whereas universities are not typical of all organizations, they nevertheless offer particular challenges. They frequently have large deployments of advanced technology accompanied by intensive use by diverse stakeholders such as students, academics, and support staff. Statistics from the U.S. Energy Information Administration show that educational institutions have the highest ratio of computers per square foot after office buildings (EIA, 2003). Therefore, they provide an interesting arena in which to explore these matters.

ENVIRONMENTAL ETHICS AND INFORMATION TECHNOLOGY

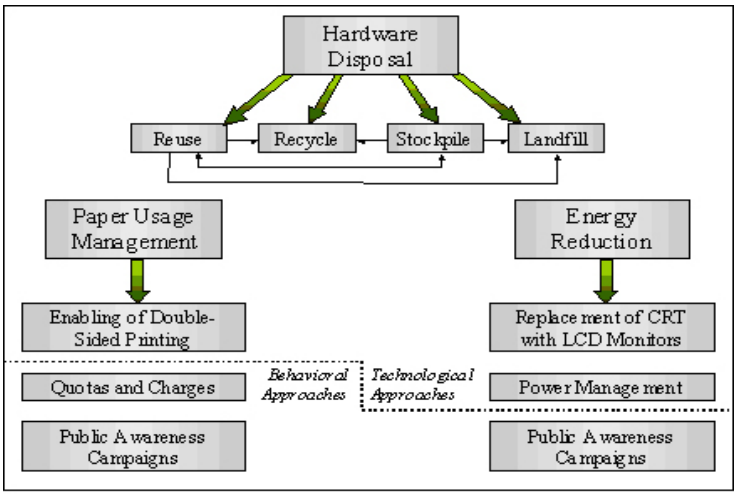
Over the last few decades, the focus has shifted from traditional ethical concerns—the right behavior of one person to another—towards an interest in how people should act with respect to the environment. No doubt this shift is the result of the stress of overpopulation on ecosystems and the fact that this stress is now global in its extent (Southgate, 2002). As concern over the environment has grown, so has discussion of how ethics can be broadened to take into account environmental issues and which approaches will be the most effective in promoting environmental protection.

Generally there is wide agreement that ethical systems must be extended to take into account intergenerational issues (Reiss, 2002). That is, actions must be assessed in the light of their consequences for future generations. Concerns over recycling of non-renewable resources, such as the precious metals found in computers, would fall into this category, as would attempts to minimize the use of fossil fuels and conserve electricity by introducing more energy-efficient computer technology.

Interspecific issues also have reasonable acceptance (Reiss, 2002). There is a general belief that it is not sufficient to consider only humans, but that other species must be taken into account. So recycling of paper may focus on saving trees, another group of organisms which have a right to a place on the planet. However, it would be true to say that many people would still place human needs over those of other species.

Broadly, environmental ethics can be divided into two main approaches: human- and life-centered (Taylor, 1996). Human-centered environmental ethics is based on the concept that the environment should be protected because our quality of life, and the quality of life of future generations, depends on it. This view has the advantage of ease of acceptance since it focuses on human concerns and can be related to traditional utilitarian approaches to ethics. It may also take into account intergenerational issues. The main limitation is that long-term environmental needs may be ignored if outweighed by short-term human needs. By contrast, the life-centered view acknowledges the intrinsic worth of living things irrespective of their value to humanity. It has the advantage that it includes both interspecific and intergenerational concerns. The main disadvantage of this approach is that it has much less acceptance in the community. Organizations, in particular, would no doubt find it easier to obtain support for environmentally friendly initiatives which

Figure 1. Management of the environmental impact of IT



give at least some benefits to the organization and the people working in it.

MANAGING HARDWARE DISPOSAL, ENERGY, AND PAPER

Managing the environmental impact of IT involves three main processes:

- the disposal of hardware (computers, printers, photocopiers, etc.)
- the reduction of energy consumption by computers
- the reduction, or at least control, of paper usage generated by computer technology, in particular by printers and photocopiers

These processes are summarized in Figure 1.

Hardware Disposal

Disposing of superseded hardware poses the greatest environmental challenge of IT. Firstly, there is the enormous volume of old hardware. More significantly, perhaps, is the potential for hazardous materials, such as lead, zinc, nickel, cadmium, and mercury, to leach from computers dumped in landfills into the environment and water table (Beatty, 2002). In addition, there are valuable metals, such as gold and copper, that are wasted unless recovered. In this section only disposal of old computers will be considered, although many of the same concerns apply to printers and other hardware that is no longer wanted.

Beatty (2002) defines the ways of dealing with old hardware as:

- **Dumping in Landfills:** Estimates of the number of computers that go directly into landfills vary widely, but ultimately all computers that are not recycled will end up there.
- **Stockpiling:** At least 50% of computers are stockpiled for varying lengths of time (Resource NSW, 2001). Occasionally, they will provide backups or spare parts, but normally most eventually go to landfill without being used again.
- **Recycling:** Recycling old computers for parts or valuable materials is not easy because of the hazardous materials they contain and the complexity of isolating the many different materials that are used in their manufacture (Beatty, 2002). Meeting health and safety standards is difficult: specialized equipment is required and profits are often marginal. Despite this, some countries, for example some states in the United States, have well-organized recycling programs.
- **Reuse:** Estimates state that about 25% of computers are resold, given or sold to employees, or given to charities for refurbishment and subsequent donation to poorer members of society or poorer countries (Beatty, 2002).