

# Chapter IV

## The Social Derivation of Technical Systems

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### ABSTRACT

*This chapter analyses the effect that social values have on the design of technical systems. Beginning with an examination of the role technology and accountability play in maintaining social order, it introduces the term “technology creep” to describe situations where conflicting viewpoints produce a technological arms race. Technology functioning in a social-order role inevitably supports one or other of the opposing views, so each side naturally uses it in an attempt to gain the advantage. Peace can be restored only by understanding the social dimensions of the conflict and finding a way of resolving them that is fair to all. The hotly debated issues of anonymity and copyright on the Internet are explored to illustrate this analysis, which, if correct, suggests that designers should consider not only a product’s functionality, safety, its effect on the environment and users, but also non-users, especially those with different values. Awareness of the interplay between the social and technical realms will help optimize future socio-technical systems.*

### INTRODUCTION

This chapter examines the interaction between social values and technology, especially networked information systems. The basic idea is that technical products are always designed within a social context and so naturally embody the values, beliefs or viewpoints of the community that creates them. One is usually unaware of this, simply because most people share the same values. But, in cases where there are conflicting views, technology is often used by each

side to “uphold” or promote their particular values. This can lead to a technological arms race in which the opposing camps continually create and improve their technologies in order to gain the advantage and so establish their views. Such conflicts are resolved only if: groups negotiate a peace deal that is fair and acceptable to everyone, a new technology is developed that diffuses the conflict, or one side “wins” outright (even though this may not be the optimal solution for everyone). Understanding such situations is only possible through consideration of

the broader socio-technical perspective, with the emphasis primarily on the social aspects, rather than the technological ones.

As an admittedly over-simplified example of this, consider the case of codes used to represent textual information in digital systems. The initial (commercial) development of computers was done almost exclusively in the UK & the US; a social context where the predominant language was English. It should come as no surprise, then, that the first standard code, ASCII (the American Standard Code for Information Interchange), only encoded characters in the English alphabet. Obviously, this caused difficulties in non-English speaking countries, forcing them to extend/modify the code to make it suitable for their languages, with the result that communicating documents between countries then became problematic. The difficulties were only resolved by countries/companies working together and defining a new universal code, the UNICODE, which satisfied everyone's needs. (Torsen, 2005) The situation still persists, however, in the use of English-only characters for Internet URLs.

The following sections look at why, in the case of opposing social values, technology tends to support a particular viewpoint, leading to a technical arms race, and explains why this is especially significant in the case of information systems. This qualitative analysis is then illustrated by two in-depth examples related to anonymity and copyright issues on the Internet. The paper concludes with some general recommendations for socio-technical system design and discusses the impact new Internet technologies may have on these.

### **ON THE ROLES OF TECHNOLOGY IN SOCIETY**

If science is about understanding the functioning of the physical and social worlds, then technology is the application of this scientific knowledge to ease and enrich our lives. While it is well known that technology can sometimes have unexpected and undesirable consequences, and that its progress is

difficult to predict, here the focus is specifically on cases involving technologies developed by groups with opposing values. To make sense of such situations, it is necessary to have some understanding of how society itself functions and manages the causes of conflict.

For the purposes of this chapter, take society to be a collection of individuals with a set of "rules" that govern their interactions. The individuals that comprise a society may change over time (as people are born and die, or as people join and leave the group); the rules, however, are founded on fundamental cultural values and while these will inevitably change, the change is likely to be much slower, perhaps almost imperceptible.

Societies survive because they afford benefits to individual members: food, shelter and security in the real world, interaction with people having common interests and goals in virtual worlds. In return, the individual members are expected to contribute to the society's well-being. The role and tasks an individual performs may be assigned by the group (especially in families and dictatorships) or may be left up to personal preference (as in most democracies.) Provided everyone plays a part, such social groupings can flourish. However, if one group or an individual benefits significantly more than other members of the community, problems can arise, especially if the imbalance is thought to have been gained unfairly. Injustice, whether real or perceived, breeds discontent and so threatens the well-being of the whole. How does a society maintain order in the face of often fickle human nature? One way is by force, but this is hardly a desirable option (except perhaps for the rulers) and, besides, given the inherent imbalance, maintaining control in this way can be very difficult. Better and potentially more stable, then, is a (free, democratic) form of society in which everyone is "equal" and generally "controls" themselves.

The rules that "control," govern or constrain, individual behaviour within a social group are of three forms: (1) personal ethics/norms, (2) physical & technological restrictions, and (3) a legal framework. (c.f. Lessig, 1999) Normally, individuals internalise

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