International Journal of Technoethics
Volume 15 • Issue 1

Intentional and Responsible:
Incorporating Social Values Into the Design Process

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ABSTRACT

Unintended consequences of technology are ubiquitous and often negative. Certain communities, the Amish for example, have minimized these consequences by understanding and agreeing upon the social values they seek to preserve, and by making technology choices based on these values. Although similar strategies are not widely implemented in Western society, technology developers should be intentional and responsible about the impact of their work. Existing design strategies that deal with values (e.g., contextual design) focus on adapting to business culture rather than preserving social values. This article proposes a new process model that focuses on articulating social values during the design phase as a method by which to evaluate the attributes of the system being developed, and discusses a planned experimental design intended to measure the effectiveness of this approach. By considering the relationship between design decisions and social values, this model may result in a design strategy that is both intentional and responsible.

KEYWORDS

Amish, Design Decisions, Design Strategy, FMEA, Intentional, Responsible, Social Values, Systems Design, Technology Systems, Unintended Consequences, User-Centered Design

INTRODUCTION

In contrast with Western society, the Amish exercise high control over their communities' pace and direction of change (Wetmore, 2007). Amish elders carefully consider the potential impact of new technology systems on their way of life. They are particularly concerned with how these systems could threaten the social values they seek to protect. Based on their evaluation, the elders decide whether to accept, reject, or modify the technology systems with which they are presented (Kraybill et al., 2013).

The values-based decisions reached by elders in an Amish community are declared in a set of rules and guidelines by which the community's citizens live (Kraybill et al., 2013). Using this process, the Amish have minimized the negative unintended consequences of technology on their society.

A technology system can succeed by achieving its stated goals but still produce negative and unintended consequences. Negative unintended consequences of technology systems are undesired

DOI: 10.4018/IJT.338391 *Corresponding Author

outcomes separate from the systems' stated goals. This type of consequence suggests a lack of deliberateness by the technology system's designers (Ash et al., 2007).

Negative unintended consequences of technology systems are extensive and widespread (Alberts, 1996). In extreme cases, these consequences have included the loss of human life, as in the case of the 2018 and early 2019 Boeing 737 MAX crashes in Indonesia and Ethiopia, when the flight control software system to prevent stalls malfunctioned (Herkert et al., 2020). Researchers have identified negative unintended consequences in medical informatics (Ash et al., 2007) and the use of instant messaging in business settings (Rennecker & Godwin, 2003). There are reports of negative unintended consequences of technology systems in other fields, including cyber-crime (Reyns et al., 2013), military and defense (Lin et al., 2012), computer-mediated communication (Debatin et al., 2009), and forestry (Thomson & Schmoldt, 2001). An extensive interdisciplinary list of incidents demonstrating the risks of computer and information technology to the public has been compiled by P.G. Neumann (2015). Several categories of the risks included in Neumann's list fall under the umbrella of "negative unintended consequences" (Neumann, 2015).

Many negative unintended consequences of technology systems are subtle and do not receive the same prioritization as those that implicate survival (Jonas, 1979). However, even subtle unintended consequences can contribute to significant societal changes in the long term. For example, a subtle negative unintended consequence of smartphones is the way these devices entice users with virtual activities that replace interpersonal interaction. A familiar observation is the phenomenon of families and friends out together in public where each person is transfixed on their smartphones (Al-Saggaf & O'Donnell, 2019).

DEFINITIONS

Defining technology as a general concept includes nearly all human endeavors (Beniger, 1986), but MacKenzie and Wajcman (1985) offer further clarification. They identify three layers of meaning in "technology":

· physical objects (such as the personal computer);
· activities and processes (such as computer programming); and
· what people know and do (such as navigating a website) (MacKenzie & Wajcman, 1985).

This paper's use of the terms *technology* and *system* emphasizes the second and third layers of meaning: activities, processes, and what people know and do. The limited definition facilitates a focus on the impact of a given technology system upon the values of the society that adopts it and on technology systems developed by organizations using design strategies.

Values are trans-situational goals or principles that motivate the behavior and beliefs of individuals and groups (Schwartz et al., 2012). In this paper, the term *social values* denotes the motivating principles of a society to distinguish it from the motivating principles of other groups such as businesses or political parties.

Technology systems designers who strive to be intentional and responsible have an implicit goal similar to that of the Amish—minimization of a technology's negative unintended consequences on the social values of their society—but may lack a corresponding decision-making process or design strategy.

A design strategy is how an organization manages and utilizes its design resources (Garcia, 2012). Included in these resources are the designers themselves: the humans within an organization responsible for making design decisions during the development of a system. Sometimes, a design strategy is emulated by multiple organizations, as in the example of agile software development (State of Agile Report, 2022).