

There are also serious problems associated with the lack of support available to technologists who have ethical concerns about the systems they are developing, the methodologies employed or other aspects of their work. For example, it is very hard for engineers to 'blow the whistle' on projects, and 'heresies' (new paradigms) and 'dissidence' (challenges to existing paradigms and/or engineering power structures) are often actively discouraged, both in higher education and the work place (Stapleton and Hersh (2004); Hersh and Moss (2004); Hersh (2002)). Bitay, Brandt & Savelberg (2005) emphasise the importance of an ethical approach as a key success factor and argues that, if we do not address these issues, engineering systems are likely to fail.

Whilst some researchers have turned their attention towards the ethics of science and technology development and deployment this has primarily focussed upon the development of professional codes of ethics. Consequently, one ethical approach which has received little attention in science and technology studies is 'the ethics of care'. The ethics of care emphasises solidarity, community, and caring about one's special relationships and can be contrasted with the more dominant ethics of justice and rights which emphasises universal standards, professional codes of conduct, moral rules, and impartiality. The ethics of care has been particularly associated with women's studies as it was developed primarily from an appreciation of how female moral development progresses. Gilligan (1982) found that female moral development goes through three general stages: *selfish, care and universal care*. In each case the circle of care expands and egocentrism declines, with each circle of care being subsumed into the next as the girl grows into a woman, and the woman matures. It has since been noted that males also go through a similar moral development process, although they usually emphasise rights and justice more than care and relationship.

Given that intelligent information technologies, robotics and other technologies are so ubiquitous and directly impact upon the everyday lives of people, and given the well documented importance of end-user participation in the design of large scale information systems, it is clear that care-giving should be a central concern of technology developers, across the individual, the community and the universal contexts. There are few studies which have looked at this in large-scale, integrated information systems development, and so we have little evidence to support or otherwise claims that ethics generally and ethics of care in particular are important for science and technology development activities. This paper attempts to demonstrate the importance of an ethical analysis in large-scale advanced systems development and tries to reframe debates around ethics in terms of an ethics of care, rather than an ethics of rights and rules.

This research asks if it is possible that the lack of emphasis upon ethical considerations in development methodologies can result in the failure of advanced technology development projects? The research objective of this paper is therefore to evaluate ethical decision making processes which accompany large-scale information development projects. In order to achieve this objective, it investigates important ethical dimensions of mainstream ISD methodologies and presents a case study which explores research propositions in this context. In particular the following research questions are addressed and explored through a case study:

Research Question 1: Do ethical issues emerge during large scale advanced systems development projects?

Research Question 2: Can the absence of ethical considerations in systems development methodologies influence the outcomes of large scale advanced systems development projects?