Good Computing:

A model of virtuous performance in the profession of computing

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“...we are inquiring not in order to know what virtue is, but in order to become good, since otherwise our inquiry would have been of no use.”

Aristotle, Nicomachean Ethics, Book II, Chap 2
Collaborators and Supporters

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Supporters:

• National Science Foundation
  • Curriculum Based Resources DUE-9980786 and DUE-9972280
  • Life Stories of Moral Exemplars in Computing SES-0217298 & SVS-0822640
• Centre for Computing and Social Responsibility, Demontfort University, UK
• St. Olaf College (sabbatical funding and CILA funding)

Professions Study Group

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Overview

- The puzzle: What is required *to be* ethical?
- An inadequate approach: Decision Centered Models
- Moral integrity in the field: Moral exemplars in computing
- The PRIMES model
Decision-Based Moral Advice

- **recognize** situations needing moral judgment
- be able to **analyze** the issues the situation presents
- **adopt** moral values
- **make decisions** in a context of ambiguity and disagreement.

The decision maker is trapped between two alternatives, one good, the other bad, both persuasive. He needs to use reason based on principle to make a choice.

Shortcomings of the Decision Model

- It tends to get trapped in *quandary ethics* -- unsolvable dilemmas or cultural conflicts.
- It provides no help in:
  - How to avoid the need for decision.
  - How to create circumstances to support good behavior.
  - What to do after the decision.
- It is abstract: without the context of a real person’s life, commitments, and projects.
- It treats decisions as individual events rather than as part of a larger project or context.
- It ignores a large social science literature on decision biases and situational influence.
- It is based more on experience in the classroom than in the field.

Constructing a Performance-Based Approach:

1. Virtue theoretical approaches focus on performance over time, across the life story.
2. The study of moral exemplars in professions connects this approach with real lives.
3. This and other psychological work allows us to analyze character into multiple components.

Instead of criteria for a correct decision, we ask:

What is required to support the performance of the virtues?
(in a profession, e.g. computing)
Which Virtues?

Pritchard* did interviews with exemplars in engineering.

- Responsibility
- Honesty
- Justice (fairness)
- Articulateness
- Perseverance
- Loyalty
- Cooperativeness
- Creative Imagination
- Habit of Documenting Work
- Civic-Mindedness
- Courage
- Openness to Correction
- Commitment to Quality
- Integrity

But the list is likely to be different for different moral ecologies, professions, & cultures. There may be no canonical list: (What do all saints have in common?) So we cannot look for people based on a list.

Virtue in the field

• Identify moral exemplars
• Interview them (with a personality test added)
• Code the interviews
• Look for patterns in the stories and codings
Identifying Moral Exemplars

I recruited a panel of computing ethics experts to ground the selection of exemplars.
The panel then agreed on criteria for selection.

Prof. Simon Rogerson, DeMontfort University, UK
Prof. Don Gotterbarn, East Tennessee State University, US
Dr. Alison Adams, University of Salford, UK
Prof. Göran Collste, Linköping University, Sweden
Dr. Barbara Begier, Gdansk Polytechnic University, Poland
Prof. Barrie Thompson, University of Sunderland, UK
Prof. Jeroen van den Hoven, Erasmus University, The Netherlands.
Defining Moral Exemplars in Computing

The classic moral exemplars study was Colby & Damon’s (1992) study of exemplars in social service. These were activists in human rights, hunger, poverty, child abuse etc.

We began with their criteria, but modified them to suit the domain of computing. The final criteria were:

- Either a) a sustained commitment to moral ideals or ethical principles in computing, or b) sustained evidence of moral virtue in the practice of computing.
- A disposition to make computing decisions in accord with one's moral ideals or ethical principles.
- A willingness to risk one's self-interest for the sake of one's moral values.
- A tendency to be inspiring to other computing professionals and thereby to move them to moral action.
Recruiting Moral Exemplars in Computing

Each panel member nominated 3-5 potential exemplars in the UK and in Scandinavia (Denmark, The Netherlands, Norway, Sweden). The unanimous panel approved those selected for contact. The sample was expanded by snowball from the interviewees.

36 in UK and 27 in Scandinavia were nominated (total, 63). 35 were contacted. 24 interviews conducted (a 74% response).

Profile of the Sample

• 13 had significant experience in academia
• 15 had significant experience in industry
• 3 had significant experience in government

• 11 were in the final decade of career and 4 were retired
• 4 were in first decade of career
• 9 were female
The Interviews

Life story interviews (McAdams, 2001) lasting 3 hours in which they told a series of stories (from 19 to 30) about their professional life.

- Life chapters (and overview)
- Peak experience, Nadir experience, Turning point, Earliest memory, Childhood scene, Early career scene, Recent career scene, One other scene
- Positive and negative influences
- Influential stories about others (four of these)
- Positive and negative futures
- Value questions (e.g. 3 most important values in system design)
Who Are They?

• *Simon Rogerson*: Founder of EthiCOMP, first Professor of Computer Ethics
• *Elizabeth France*: First Data Protection Registrar in the UK
• *James Towell*: Cambridge Grad, Private Consulting
• *Steve Shirley*: Early pioneer in business computing
• *Enid Mumford*: Early pioneer in socio-technical systems
• *Francis Grundy*: Pioneer in encouraging women in computing
• *Alan Newell*: Pioneer in developing systems for the handicapped
• *Alan Cox*: LINUX Pioneer,
• *Jan Holvast*: Pioneer privacy advocate
• *Ove Ivarsen*: Developer of the USER Award from LO
Common Themes

- Most maintained a positive focus
- Most cultivated a network of social support
- Most cited multiple people as positive influences
- None saw themselves as morally extraordinary
- All were active problem solvers; problems were often framed as moral/social/technical
- All practiced a set of social/technical skills to create solutions to problems
- Craftspersons focused on users, reformers focused on systems
Craftspersons

Designing computing technology towards ethical ends

• Drew on pre-existing values in computing
• Focused on users or customers who had needs
• Took the role of providers of service/product
• Viewed barriers as inert obstacles, puzzles to be solved
• Believed they were effective in their role

Example: Prof. Alan Newell; James Towell
Reformers

Changing social systems

- Attempted to change organizations and their values
- Took the role of moral crusader.
- Viewed individuals as victims of injustice.
- Viewed barriers as active opposition.
- Believed in the necessity of systemic reform.

Examples: *Francis Grundy; Ove Ivarsen*
Making Your Analysis

First, make a listing of the stories told, plot summaries and any interesting detail

For each story, ask:
• What role do they play in each story (reformer, craftsperson, helper, social engineer, educator, other?)
• What skills do they use?
• How do they use or go against their environment?
• How do they use or go against their personality?
• What values do they state or assume? How are they motivated by them?
• What other themes, useful observations, or interesting stories do you find?

What does all this tell you about:
• What this person thinks about virtue in this profession?
• How this person practices virtue in this profession?
• Add your own insight here from reading or experience…
Rating the stories

- Use of technical expertise
- Designing for users or clients

- Perceiving harm to victims
- Noticing a need for reform
- Taking action for reform

- Social Support
- Social Antagonism
- Effectiveness & Ineffectiveness
- Negative and Positive Emotion
- Use of social expertise

Form Craftsperson
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Form Reformer
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From Exemplars to Virtues

- There are likely multiple kinds of moral exemplars and moral careers.
- Four components interact to influence the shape of moral careers and the expression of virtue over time.
- Character is distributed among the different components.
- Virtue is expressed in the coordination of these components in the projects the person undertakes.
PRIMES: A Four Component Model of Virtue
(see Huff, Barnard, & Frey, 2008a & b)

- **Personality**
- **Moral Ecologies**
- **Moral Skill Sets**
- **Integration of Morality into the Self System**

- **External**
- **Internal**

- **Low**
- **High**

**Control**

**Mutability**
Personality Grounds Performance (1)

- Exemplars were more extraverted, agreeable, and open to experience, and less neurotic than national norms (all p’s <= .01)

- Those who were extraverted were more likely to be reformers (r = .45, p = .026)

- Those scoring high on Openness to Experience were more likely to score high on craft (r = .39, p = .059)

But personality does not determine performance.
Moral Commitment Guides Performance (2)
Integration of Morality in the Self System

Moral commitment takes many different, complex forms in different persons and moral careers

But moral commitment does not guarantee performance.

Moral Ecology Shapes Performance (3)

The somewhat stable, but constantly negotiated set of values, procedures, etc. that are
- Held by the members of the ecology or cross-cutting ecologies, and
- Embedded in the socio-technical system of a culture, profession, organization or work group
- Have a trajectory of change, influenced most by those with power
- There are multiple intersecting ecologies ranging from country-level to local work groups and mentorship networks

- They constrain and support people’s projects
- People can enter, leave, influence, construct and maintain them (and so Moral Ecology does not determine performance)
Moral skill sets undergird the work of our moral exemplars. Both social and technical skills predict effectiveness in our exemplar’s stories (p < .05).

- Moral Imagination
- Moral Creativity
- Reasonableness
- Perseverance

But skills do not guarantee moral effectiveness.
Moral Imagination for Software Design

projecting oneself into the perspective of others

- *Skills*: constructing the relevant stakeholders in a socio-technical system; data collection about stakeholders; understanding stakeholder perspectives
- *Knowledge*: specific knowledge about the domain (e.g. privacy, safety, equity); knowledge of socio-technical systems; knowledge of methods
Moral Creativity for Software Design

*generating solutions to moral challenges while responding to multiple constraints*

- **Skills**: identifying value conflicts in a socio-technical system; constructing and evaluating solutions under constraint
- **Knowledge**: specific knowledge about domain (e.g. privacy, safety, equity); technical knowledge of constraints and opportunities; knowledge of socio-technical systems
Reasonableness for Software Design

Gathering relevant evidence, listening to others, and giving reasons

• *Skills*: constructing data-based and reasoned arguments; engaging in reasoned dialogue
• *Knowledge*: specific knowledge about domain (e.g. privacy, safety, equity); technical knowledge of constraints and opportunities; knowledge of ethical argumentation
Perseverance for Software Design

planning moral action and responding to unforeseen circumstances while keeping moral goals intact

• **Skills**: constructing and revising implementation plans based on organizational constraints

• **Knowledge**: specific knowledge about domain (e.g. privacy, safety, equity); knowledge of socio-technical systems; knowledge of ethical dissent and whistleblowing
How to acquire skill sets?

• Narvaez & Lapsley (2005) draw on the work in expertise to suggest that practical wisdom should be learned in structured environments that
  • Reward correct solutions
  • Match explicit theory and strategy with practice and coaching
  • Provide extensive, focused practice

We learn a craft by producing [its] product; … we become builders by building. Aristotle, Nicomachaen Ethics, Book II
Teaching the Virtues in the Computing Professions

Moral Ecologies

Moral Skill Sets

Integration of Morality into the Self System

Personality

Prepare for these

Teach these

Influence this

Be aware of this

External

Internal

Control

Low

Mutability

High
Measurement

• Personality
  • Embarrassment of riches here, but Big 5 is a good beginning (McCrae & Costa, 1999).
  • Others might be added as evidence indicates (e.g. impulsivity and responsibility denial).
• Integration of morality into the self system
  • Personal projects analysis (Little & Gee, 2007) allows tracing of integration in projects.
  • Various values scales (e.g. Schwartz, 1994) provide models for values measurement.
• Skills and knowledge
  • Benchmarking of novice and expert skills by Keefer & Ashley (2001) provides a model of skills measurement.
  • Bebeau & Toma (1999) provide a model of intermediate concepts measurement.
• Moral Ecology
  • Organizational Ethical Climate scales provide categorization of perceived moral ecologies (Cullen, Victor, & Stephens, 1989).
• **What the model does**
  - Helps to focuses effort in teaching: what can be taught, and how can it best be learned?
  - Provides a path to measurement of what is learned and the interactions of what is learned with other components (e.g. moral ecology).
  - Likely generalizes to other professions, but with emphasis on different skills, etc.

• **What the model does not do**
  - Provides no guidance in the analysis of particular ethical duties, issues, or proposed solutions.
  - Lacks a developmental element (how do the components interact over time to describe moral careers? What drives this development?). See Lent, Brown, & Hackett (1994) for some suggestions.
References