Craft and Reform in Moral Exemplars in Computing

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This is a revision of a paper by Huff & Rogerson presented earlier at ETHICOMP2005, Sept, 2005, Linköping, Sweden. It is beginning to become two papers: (1) an empirical report of an interview study and (2) a theoretical paper on the psychological foundations of virtue in a profession. As a revision, (2) is still in early draft format with (ref) in many places where I intend to place references to current literature (and with much left out). I include this section primarily to get your comments on the structure of the argument rather than the detail of the numerous empirical claims I make.

Abstract
This is a progress report of a project to identify and interview moral exemplars in computing. Initial analyses of the interviews suggests that there are at least two types of moral exemplars, craftspersons (who use the values extant in computing to produce products that help clients) and reformers (who try to change the culture of computing based on external values). We explore the differences in these approaches and propose a first sketch of a positive model of the skills/virtues needed to be an effective ethical computing professional.

1. Introduction
Much has been made of the difficulties facing computer professionals who would be ethical. We have little evidence of success stories. This is a progress report of a project to identify moral exemplars in computing and to use life-story interviews (McAdams, et al. 2001) to document their developmental histories and values.

This research is the first step in a larger project to build a positive model of professional responsibility in the computing professions. Much research in computing ethics has been problem focused (e.g. threats to privacy, unsafe and unreliable systems, etc.). And thus courses in computer ethics occasionally seem like a litany of what’s wrong or frightening about computing (what Harris, Pritchard, & Rabins (1999) call “bad news” cases). Certainly awareness of the bad news that can result if things go wrong with computing systems is an important educational goal. But even better would be to teach students how to avoid these difficulties. And to do this, we need to understand how ethical computer professionals do good work in real organizations with real deadlines, budgets, and organizational politics. One place to begin is with computer professionals who are known for having taken a thoughtful, responsible approach to the work they do: thus, moral exemplars.

Others have looked at moral exemplars in social service (Colby & Damon, 1992) and dentistry (Rule & Bebeau, in press), and this is the first systematic attempt to identify and describe moral exemplars in the computing professions. We present our methods and some initial findings and then a first sketch of a positive model of the skills and virtues needed to be an effective ethical computing professional.

2. Method
We followed a method taken from one of the classic moral exemplars studies (Colby & Damon, 1992). We recruited a panel of experts in computer ethics to help establish the criteria for the selection of exemplars in computing, to provide initial nominations for the sampling, and to approve any additions to the sample. The panel consisted of:

- Simon Rogerson, Software Eng., DeMontfort University, UK
- Prof. Don Gotterbarn, Computer Science, East Tennessee State University US
- Dr. Alison Adams, Computer Science, University of Salford, UK
- Prof. Goran Collste, Philosophy, Linköping University, Sweden
- Dr. Barbara Begier, Computer Engineering, Polytechnic University, Poland
- Prof. Barrie Thompson, Computer Engineering, University of Sunderland, UK
- Prof. Jeroen van den Hoven, Philosophy, Erasmus University, The Netherlands.

The panel convened at the November, 2002 meeting of ETHICOMP in Lisbon. Several months before, we circulated a white paper among the panel members to propose and explain the criteria for selection, and moderated an email discussion of those criteria. The final criteria were similar to those used by Colby and Damon (1992), but the final criterion requiring “a sense of realistic humility” was dropped given the panel’s sense of the necessity for self-promotion in many areas of industry and academia. Thus the final criteria were:

1. Either a) a sustained commitment to moral ideals or ethical principles in computing that include a generalized respect for humanity, or b) sustained evidence of moral virtue in the practice of computing.
2. A disposition to make computing decisions in accord with one's moral ideals or ethical principles, implying also a consistency between one's actions and intentions and between the means and ends of one's actions.
3. A willingness to risk one's self-interest for the sake of one's moral values.
4. A tendency to be inspiring to other computing professionals and thereby to move them to moral action.

Within a month after the meeting of the panel, panel members had sent in their initial nominations of exemplars. As these accumulated, we circulated them to the entire panel for approval. The panel received the names and a short biographical summary of the reasons for that person’s nomination. Significant concern about any nominee from any panel member was cause for removal of the name. Only one nominee was removed for this reason. Most panel members knew at least some of the nominees of others, providing some validation of their exemplar status. By the end of December 2002, we had a list of 27 UK nominees and 17 Scandinavian nominees.

We selected exemplars from this set with an eye to representation in important categories. Half the sample was to be from the UK and half from Scandinavia. We included this distinction because of work by Hofstede (2001) that suggested these cultures had significantly different workplace environments, with the UK stressing reward-for-excellence in advancement and pay, mutual competition among workers, individual performance, and the resolution of workplace conflict by winning in competition and Scandinavian workplaces stressing equality among workers, solidarity with the work group, quality of work life, and the resolution of workplace conflict by negotiation and compromise. We tried to recruit as many women as possible, ending
up with 7 in the UK sample and 2 in the Scandinavian sample. We also wanted to interview exemplars with experience in academia and industry, and to get perspective from a few government policy exemplars. These categories overlapped, with seven exemplars having significant experience in more than one area. In the end, 13 exemplars had significant experience in academia, 15 had significant experience in industry, and 3 had significant experience in government policy. Given the nature of the criteria, it is not surprising that 11 of the 24 exemplars were in the final decades of their careers and 4 were retired. But we were able to find 4 exemplars in the first decade of their career and 5 exemplars in the middle of their careers.

These final numbers in a reasonably representative sample were achieved after we asked for additional nominations from panel members and asked some exemplars for additional nominations. In the end, a total of 36 exemplars were nominated in the UK, and 27 in Scandinavia. 35 of these were contacted to request an interview, and 3 refused after some conversation. Seven never responded to initial contacts, and one responded affirmatively, but too late to be included in the sample. Thus we conducted interviews with 24 exemplars out of 35 contacted, a response rate of 71.43%. This is a reasonable response rate for interviewing what Odendahl & Shaw (2002) have called “elites,” and it is substantially higher than the 27% rate obtained by Colby & Damon (1992).

As of the end of January, 2006, all 24 of the interviews have been initially transcribed. After the transcripts are corrected, they are then sent back to the exemplar for approval or revision. The transcripts are divided into between 20 - 24 sections, depending upon the number of stories the exemplar told in the interview. Each section has a cover sheet that allows the exemplar to choose a level of confidentiality for that section. These levels are:

- **Withdrawal**: the story will be deleted from the transcriptions, digital audio files, and all backups.
- **Full confidentiality**: the story will be included in the coding scheme, but will otherwise be kept in strict confidentiality by the research team.
- **Anonymous Publication**: Transcriptions or details of the story may be published as a part of reports from the project in the form of public data archives, web sites, articles, or books. We will check with you for permission on each instance of publication. All identifying details will be removed from the story. No identifying details will be included in any directly associated text.
- **Identified Publication**: Transcriptions or details of the story may be published as a part of reports from the project in the form of public data archives, web sites, articles, or books. We will check with you for permission on each instance of publication. Identifying details will remain in the story, and identifying information may be included in directly associated text.

Fifteen transcripts have now been returned by exemplars with comments for revision and a selection of a level of confidentiality. Most have chosen one of the last two levels for most of their stories.
A St. Olaf student, Cassie Seningen (2004), produced a senior thesis based on 6 transcripts that were available at the time. The primary purpose of that paper was to determine if the selection criteria established by the panel were actually represented in the life stories of those exemplars. Seningen concluded that “Each moral exemplar cited all five themes (including the alternate humility theme) as significant in decision-making processes, as well as an additional factor. The proposed sixth criterion recognizes confidence as an important facet in the lives of moral exemplars, gained through either recognized accomplishment or empowerment and encouragement from others.” Once all the interviews are available for analysis, we will do a similar analysis to validate the selection criteria.

3. Findings

An initial outcome of the study is based on the fact that we were successful in getting a panel of experts to agree on criteria for moral exemplar status in computing and were then able to identify people who matched those criteria. The panel was determined in its questioning of the criteria, and questioned almost all the criteria before dropping one and accepting the others with some revision. It also seems significant that we were able to identify people fitting this profile in both academia and industry in about equal numbers, suggesting that situational pressure in each of these sectors does not drive out or constrict those who want to be principled in their profession. Seningen’s (2004) initial analysis of 6 exemplars to verify that themes from the criteria show up in their interviews provides additional support for the existence of moral exemplars in computing. Further support will have to await the completion of the transcripts and their analysis.

Comments that follow stem from our close reading of the interviews in their raw form, Support for these tentative conclusions will need to wait for the completion of the transcripts and their analysis.

The self-presentation of these moral exemplars in computing parallels that seen in much of the other, non-technical exemplar literature (see Colby & Damon (1992)). Particularly, they appear to have two different orientations to their principled approaches to computing. In the exemplar literature focused on non-technical, social service exemplars, the two approaches are called that of helper vs. reformer. Because of the ways our “helpers” have integrated their ethical values into their technical craft, we call this orientation the “craftsperson” approach, but keep the name of “reformer” for the other approach. The following list lays out the differences between these two approaches:

Craftspeople tended to:

- **Focus on users**: Their involvement in computing tended to focus on helping users or customers. They had a principled way of doing this, but used many of the standard values already accepted in the computing community (e.g. user focus, customer need, software quality).
- **Viewed users/customers as having a need**: Their primary focus was on using computing systems to address the need of customers or users.
- **Viewed barriers as inert obstacles**: They viewed difficulties as puzzles to be solved, or negotiations among values to be worked out among customers and users.
- **Took the role of providers of service/product**: They were primarily focused on developing technology to address needs.
• **Believed in the efficacy of helping users:** They believed that their efforts in fact did help users and customers and kept their focus mostly on this level of work.
• **Were most positive in emotional tone:** Because they felt they were effective in designing technology to help solve problems for others, they were the most positive in emotional tone among the exemplars.
• **Were designing computing technology towards ethical ends:** Craftspeople were computer professionals who saw their computing work and their computing skills as their way to address the needs of users or customers. Their ethical principles were deeply intertwined with the way they approached their work of design.

Reformers tended to:
• **Focus on the social system:** Reformers saw the social system as needing basic reform before the values they championed could really take hold in computing. Usually “social system” meant the computing industry generally, though some felt that larger societal change would be required to produce industry-wide change.
• **Viewed individuals as victims of injustice:** The people they were trying to help were seen as people who needed justice or some other public good. Thus they saw the system as lacking the values they wanted to bring to it.
• **Viewed barriers as active opposition.** They viewed barriers to reform as active resistance to reform by those who had different interests.
• **Took the role of moral crusader:** Their approach to the ethical aspect of their work was that of the crusader out to reform the system.
• **Believed in the necessity of systemic reform:** They did not think that individual help to users was the most helpful thing they could do. Instead, they saw systemic reform as necessary.
• **Were most negative in emotional tone:** Partly because systemic reform is difficult, and partly because they saw themselves as a minority trying to inculcate values in a resistant system, reformers often felt less effective in their efforts and had a more negative emotional tone about their work.

We found more “pure” craftspeople than “pure” reformers in our sample, though many exemplars were mixtures of the two approaches. But there were several reasonably pure reform exemplars. These often saw their reform efforts as independent of the technical work they did on computing. Thus the types are more an ideal characterization of differences in approach, rather than a clear dichotomy.

There was one more similarity of our exemplars to those found in other work: they were embedded in, and committed to, social networks of support. Almost all of the exemplars cited a long string of people who influenced them in their ethical development. Those few who did not were also the most negative in emotional tone. Almost all of the exemplars cultivated a social support network for their work. The role of mentors and social support in adult ethical development has been addressed in much other work (Colby & Damon, 1992; Fischman, et al., 2004) and it is no surprise that it finds a parallel here.

Our moral exemplars, particularly the craftspeople, are unique in research on exemplars, because the values they hold are already intrinsic to computing and their skills are intertwined with, and depend upon, technical expertise. Values such as user focus, customer need, and software
quality mean specific things in the computing community. And though the particular implications of these values are the subject of debate in the community, there is general consent that the values are important. A significant portion of our moral exemplars built their careers by incorporating these values into their work in a way that gave interesting dual meaning to the phrase “good computing.” If this profession-intrinsic value base for ethical computing finds support in our further analysis of the interviews, it suggests there is fertile ground for research on the value structure of the computing profession, and the developmental course of those values over individuals’ careers.

The second uniqueness of our moral exemplars in computing was the way that, for many of them, their values were inseparable from their technical expertise. This is not surprising given that we were looking at moral exemplars in a technical profession, but it requires that we recognize (and investigate) how value commitments are learned as a part of technical expertise (Collins & Pinch, 2002).

4. Toward a Virtue Ethic Model of Computing
An initial conclusion for the teaching of computer ethics is that it seems feasible to construct a skill-based virtue ethics of computing that identifies the ethical commitments already central to the computing profession and provides direct training for students in how to integrate concern for those values as they design technology. Thus the model would be descriptive of the empirical realities of the expression of virtue in the profession, and prescriptive with regard to which virtues/skills ought to be taught and the preferred method for teaching them.

Virtue ethics has often been mischaracterized as an ethic of valued character traits embedded in a community. But a close reading of Aristotle and the subsequent revival of the virtue ethics literature (Aristotle, 1941; Crisp & Slote, 1997) reveals that though character traits are involved, these moral habits can be thought of as well-practiced skills, based in knowledge about life, and learnable by practice and coaching. This characterization of virtues corresponds with recent literature in moral psychology that views moral judgment and action as learned skill that becomes routinized in “experts” often, though not always, to the point of automaticity (Narvaez & Lapsley, 2005). The moral psychology literature suggests that moral judgment and action in a domain can be learned by intense practice in a setting that provides immediate feedback, much like coaching an athlete or other expert (Narvaez & Lapsley, 2005). Finally, emerging approaches in software development have suggested that more successful and effective software is produced when development processes take into account the organizational and larger social setting of the likely implementation of the software. Many of these approaches advocate active engagement with the ethical and value issues that software systems raise (e.g., Friedman (1997)).

In an investigation of the virtues that moral exemplars in engineering sought in their colleagues, Pritchard (1998) found an interesting mix of characterological and skill based desirable characteristics. They include the classic virtues honesty and loyalty, but also things like articulateness and a habit of documenting work. Huff & Frey (2005) propose that there are skill sets that can be taught that underlie these virtues. It seems clearly the case that technical, social, and organizational skills were core to the competency of the moral exemplars we interviewed in this project.
So what are the sources of virtuous conduct in our moral exemplars? We propose that the expression of virtues is influenced by three factors: enduring personal characteristics, the skills, knowledge, and habits of the individual, and the surrounding environment.

4.1 Personal Characteristics
Personal characteristics include things that are relatively difficult to change, such as personality traits, but also the individual’s commitments to long-term life projects (e.g. family, profession, hobbies) and the values and attitudes the person holds. Our exemplars often spoke of the personality traits that influenced their approach to life projects. And they recognized the changes in life projects over their life stories, and the defining influence that many aspects of their self-commitment had for their conception of their action in the world and of who they were.

Personality Traits. There are a range of basic personality traits that have been shown to influence the extent to which virtues, variously understood, might be expressed by an individual. In this case, I will be talking about the extent to which particular broadly accepted personality traits might effect the ability to enact a set of moral skills I outline in a section below. There is no systematic research in this area, and so coverage of various virtues and even the “big 5” personality traits (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism) is spotty.

Optimism has been shown to reliably influence the extent to which individuals will persevere in a task, and also the extent to which they will be flexible in response to obstacles they might find blocking their progress toward a goal (ref). This is clearly relevant to the skill of perseverance listed below. A balance of humility (ref) and self-efficacy (confidence in action in a domain) is also associated with perseverance. Openness to experience (ref) has been shown to be associated with skill related to reasonableness (e.g. constructing and evaluating arguments) and moral creativity (seeking and appreciating alternatives to known solutions) (see ref).

Neuroticism (the tendency to experience negative affect) has been shown to be reliably related to success in moral imagination and in moral creativity (ref). Those high in neuroticism often defensively shut down information search, and this can lead to short-sighted responses to situations requiring imagination or creativity. But there is some indication the high intelligence may moderate this relationship (ref), and might even turn moderately high levels of neuroticism into an asset under certain circumstances. For instance, those high in neuroticism may be adaptors in creativity (using known solutions in interesting ways) rather than innovators (developing entirely new approaches, see ref). There is also some suggestion that those high in neuroticism may be more sensitive to moral issues (ref).

Impulsiveness is what may be called a temperament difference that underlies these more specific personality differences (ref). Those high in impulsiveness tend to respond more that what is called the behavioral activation system (reward seeking) than the behavioral inhibition system (punishment avoiding). At the extremes, this can produce psychopathology such as psychopathic disregard for all social conventions (ref). But it also likely conditions a cautious or impulsive approach to all the moral skills listed below, thus influencing the way in which one approaches moral problems (ref).
Though there is a significant genetic component to almost all of these personality traits, except at the pathological extremes this is not determinitive for how the trait may be expressed in the life of the individual (ref). Aristotle (1941) recognized that individuals might have differing proclivities that would need to be taken into account in charting the moral life, and recommended taking these into account in moral planning.

The Integration of Values into the Self System. Blasi (ref), Colby & Damon (1992) and Oliner and Oliner (ref) present reasonable evidence that one driving factor in the moral life of moral exemplars is the extent to which morality is integrated into the self. This provides us with several more dimensions of personal difference that are more flexible over time than personality traits, and more influenced by personal choices of the individual and the social surround of the individual. The accompanying figure, taken from McGregor & Little (1998), shows the multiple dimensions that might be implicated in saying that morality is integrated into the self. The self in this conception is multidimensional and extends into the past (through stories, defining memories, past behavior and experience) and the future (through life tasks, personal projects, and motives and striving). It is also contextually extended into personal contexts, affiliations and relationships. All of these aspects of the self can have a moral component or even be primarily defined by moral commitment. Thus, to the extent that more aspects are morally recruited, and each aspect is more deeply integrated with morality, morality becomes more integrated in the self-system.

We need not think of this influence on virtue as deterministically controlling moral commitment. Blasi (ref), Colby & Damon (1992), and Oliner & Oliner (ref) all talk about moral exemplars’ development over time of an internalization of moral commitment. This development is often the unintended result of choosing one’s associates (ref), though it can also be influenced by strategic choice on the part of the individual. Thus, the level of integration of moral commitment into the self-system can become, at least in part, a matter of intentional control.

4.2 Skill & Intermediate Knowledge
One of the conclusions from my work with moral exemplars in computing is that there are skill and knowledge components that are necessary to the successful expression of virtue in a profession. What are these skills and habits? I propose four skill sets that underlie the moral success of our exemplars. Others (Bebeau (2002), Narvaez & Lapsley (2005)) have cut these up somewhat differently, but my focus on skills that support moral action in a project-based profession leads me to emphasize the following skill sets:
• **Moral Imagination**: projecting oneself into the perspective of others.
• **Moral Creativity**: generating solutions to moral challenges while responding to multiple constraints.
• **Reasonableness**: Gathering relevant evidence, listening to others, giving reasons, changing plans/positions based on reason.
• **Perseverance**: planning moral action and responding to unforeseen circumstances while keeping moral goals intact.

There is an extensive psychological and philosophical literature that supports these skill sets (in a variety of versions) as crucial to moral action (refs). We also see them at work in the everyday action of the exemplars we interviewed. To say that these are skill sets is to imply that, under the right conditions, they can be taught and learned. Work by Narvaez & Lapsley (2005) borrows from work in the psychology of expertise (refs) to show that skills like these can be learned under the same circumstances that one learns other skills. These circumstances include focused practice with a skilled coach, with immediate feedback of successful performance, guided by instruction in the theory that supports successful performance. In most areas of reasonably complex expertise (e.g. a musical instrument, chess, professional judgment; see ref for a review), it takes about 10,000 hours of this sort of focused practice to achieve levels of performance equivalent to expertise.

The skill sets are necessarily integrated with intermediate concepts or knowledge (ref), both as the necessary theoretical background for their successful performance and also as tools to achieve the relevant goals. For instance, knowledge of privacy law, informed consent, and appropriate privacy-enhancing technologies and techniques is critical to the effective display of virtue in the design of database systems.

Work in the development of expertise and in the maintenance of good habits (e.g. habits of exercise, see ref) suggest that there are meta-cognitive strategies that allow individuals to take control of the development or maintenance of these highly routinized patterns of thought and behavior. In this domain, there is likely even more room for learning and development than in the personal domain.

### 4.3 Moral Ecologies

The exemplars in this study were acutely aware of situational influences on their ability to be virtuous. These influences included economic constraints, organizational culture, and the larger cultural climate. Those who were early in their careers felt the constraint of these things most painfully, while many of the senior exemplars mentioned the increased freedom from constraint that success had allowed them.

The exemplars often spoke of crucial social support that helped them to acquire and to practice the skills, knowledge, and habits that allowed them to do their good work. In some cases these skills were learned from mentors, but family members were also mentioned as a source of support for learning.

It may be useful to refer to these situational influences as *moral ecologies* that support or hinder virtuous behavior in the profession. One advantage of this metaphor is that it emphasizes the
diversity of moral action in computing and frees us from the constricting notion that there is one correct way to be an ethical computing professional. There are differing moral ecologies and there is a range of positive roles that one can play in these ecologies.

Moral ecology also highlights the ways in which people in the ecology interact with and influence each other. The dynamic nature of social influence was a constant theme in the exemplars’ comments. The idea of moral ecology suggests that we will find different people with different skills sets, values, and emphases would working together (and occasionally at cross purposes) to support ethical concern throughout computing and to raise standards and bring new issues to the fore as the discipline progresses.

Moral ecology as a metaphor also helps us understand how different ecologies might support the development and exercise of virtue over time. It allows for the development of micro-climates of social support that are embedded in larger organizations, much like those the moral exemplars in this research report building.

4.4 From Theory to Pedagogy
The theory then, suggests the need for some congruence among a range of characteristics of the person and the situation before virtue can be reliably expressed. This highly variable nature of the expression of virtue allows for at least our two types of moral exemplars (craftspeople and reformers), but it opens the door for a large range of expression of virtue in the computing profession. Flanagan (ref) provides a parallel analysis when talking about the range of ways that religious saints’ characteristics are expressed. All are saintly, few are saintly in the same way. Recognition of this diversity allows the model of education to move away from the attempt to impose a single standard of professional ethics through the obligatory ethics seminar. At least within professional fields, it allows the instructor to take more the role of the coach.

The three factors that support moral action in computing (personal characteristics, situational influence, and skill sets) suggests a model of education in computer ethics that is focused on learning the skills and knowledge necessary to sustain moral action over a career. This is a substantially different approach than the policy-based focus of many texts in the field. It success depends crucially upon whether the skills and knowledge can in fact be learned in the classroom. Project-based education (in which students consult with clients about the social and ethical issues inherent in a real software project) may well provide the best venue for teaching the skills, supported by learning the necessary knowledge in the classroom. This is, of course, an empirical question whose answer will require some care in measuring the relevant skills and knowledge, and then measure how their acquisition might relate to behavior in the field.

But the model suggests that the other components can also be influenced to some extent, or at least taken account of in the performance of one’s work. Thoughtful integration of ethical considerations across the curriculum may help influence the extent to which ethical issues are integrated into the professional self-concept of computer science students. Strategies to construct and maintain social support for ethical action in organizations (e.g. best practices in support systems for ethical dissent, (ref)) can be taught, as can knowledge and skill about organizational behavior. A moderate level of self-awareness may even allow for guided attempts to take account of personality characteristics in the design or choice of job parameters.
An appropriately detailed model allows for points of influence across the span of the model, and gives some idea of where effort is more likely to be fruitful.

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References


