

Tools for Ethical Decision Making

Mikael Laaksoharju — Iordanis Kavathatzopoulos

*Uppsala University
Department of IT-HCI
Box 337
S-751 05 Uppsala
mikael.laaksoharju@it.uu.se
iordanis@it.uu.se*

ABSTRACT. Ethical competence, the ability to handle a moral issue in an optimal way, is necessary to promote in both analysts and decision makers stressing the process of decision making. This presupposes analysts to create a foundation so that decision makers can treat the ethical issues in a self-critical, systematic and holistic manner. Decision makers, on the other hand, should be supported and trained to access this foundation and to successfully make use of it in the decision making. For that purpose we have designed different tools. One of them, EthXpert, is a support tool for structuring and systematization of the ethical analysis. This tool also makes the acquiring of a holistic view easier. These ethical support tools are intended for both analysts and decision makers. Analysts can use EthXpert to create the foundation and structure the process to different solutions. Decision makers can use EthXpert for a systematic view and review of the ethical issue but also to get a holistic perspective of the issue at hand.

KEY WORDS: ethics, ethical competence, support system, simulation, decision making.

Introduction

The focus of OR is on finding the best possible solutions to complex problems. The main tool to achieve this is often applied mathematics, which also is the foundation for the research field. What is not always as fundamental is the insight, that to arrive at a solution it is necessary to make decisions. Sometimes it might appear like there is only one way to solve a problem. The path towards the solution could in such cases be metaphorically modelled as a graceful race of hurdles, where the hurdles are mathematical and algorithmic problems that require solution. When decision making can be regarded as a strictly computational process, with measurable facts and comparable features, these techniques are very useful and important. When non-quantifiable parameters like ethics are involved, matters are becoming a bit more complicated. This kind of criteria is impossible, or at least very difficult, to measure and control, and will therefore require a slightly different approach. We will try to show that the aim should probably not be to find a solution for how to make calculable the volatile character of principles, but instead accept ethics as an inducing parameter for helping include in the calculations the effect from and on all imaginable stakeholders. To continue using sports as a weak metaphor: in orienteering it is equally important to have a map as it is to have fitness, none of them being optimal without the other. In our research we are working towards means to present a map over all preconditions; a map intended to give a picture, as complete as possible, of a real life situation, so that research that is more fit to solve the resulting equations will have a better chance to reach an optimal solution.

The most common conception of morality and ethics is that there exists a set of principles that are guiding the right course of action in decisions. What is the right thing to do can be defined by either actions or results, depending on the theory of ethics that is applied. Instead of trying to decide what a nice decision is, we focus on the mental process of decision making, which implies that we to a great extent can liberate the analysis part of decision making from normative ethics. This is desirable since locking the mind on one set of untouchable principles will only lead to the neglecting of other important aspects. The analysis should not be constrained by preconceptions. It should be stressed that this approach does not imply that the decisions will automatically become non-normative. Normative ethics is a necessary and inevitable foundation for human co-existence, and will therefore implicitly be present in any process regarding human interests. It might appear like blasphemy, but we believe that true ethical competence requires a liberated view on ethical principles; a view that will allow for the state of reflective equilibrium that is required when weighing ethical considerations.

Autonomy and Heteronomy

Autonomy as a practice has a long and noble history. It finds origins already in the Socratic argumentation technique to establish uncertainty about the constraints for a problem. Despite being the basis for all critical thinking people do almost anything to avoid thinking autonomously. This is an understandable attitude. Systematic, holistic and self-critical thinking takes a lot of effort and causes stress. Even in laboratory experiments it has been proven that heteronomy serves well in almost any situation (see Sunstein 2005). Moral heuristics help us make reasonable decisions without deeper weighing of benefits and detriments. However, the type of questions that require the aid of an OR analyst are often multi-criteria problems where stakes are high and stakeholders are many and hard to distinguish. The meticulous care that is put on cost calculation call for equal care in determining the conditions for the equation. Here ethics is an important aspect to promote further, since it is not always apparent what ethical implications there are in a choice situation. The analyst would therefore benefit from tools that stimulate and structure the mental process of involving ethics.

Ethical Competence

The common conception of an ethical dilemma is one where two principles are heads up with equal strength. This is true for most theoretical examples of dilemmas. In practice the validity of such an image can be questioned. Most problems with seeming ethical conflicts are more likely results from lack of information. Therefore the most important ability when making ethical decisions is the ability to elaborate on the details of a problem. All relevant information should be gathered in order to reach a state when a decision can be made with enough certainty of it being well-founded.

When judging ethical competence it is tempting to compare and relate to an ideal behaviour; a code of conduct or a philosophy of morality. We want to avoid this assertion. It is not of interest to know how many philosophies are considered. The actual judgment of morality should be left to the decision maker facing the problem. In the process of decision making, ethical competence can instead be regarded as the ability to process available information in an optimal way. This motivates a focus on autonomy. We believe autonomy to be the necessary foundation to achieve complete ethical competence. We are operationalizing the concept of ethics through defining this competence: Not as the ability to always act according to guidelines or predefined principles; not as the ability to act in a manner that is consistent with the most number of philosophies; but as the ability to use the right ethical problem solving and decision making method when handling moral problems.

Can Ethical Aspects Be Quantified?

An OR analyst might want to refrain from involving ethics in the foundation of problem solving, since the unsuitability for quantification would inevitably distort calculations. In this paper we will put extra care in showing how the computation of maxima can still benefit from ethical competence. In fact the dependence is mutual - ethical analysis of financial and political dilemmas require in most cases economical calculations in order to reach a realistic final decision. Ethics in practice is not just a matter for philosophers. It comes along with gains and losses, all depending on how a situation is handled. It is however important to remember that economical constraints should not come in question, before the ethical analysis is satisfactorily prepared. Involving profits and debits in an early stage will block the ability to rational reasoning (Sunstein 2005).

In "Ethics and decision" Brans (2002) is suggesting an adaptation of PROMETHEE-GAIA as a way to incorporate subjective and ethical aspects into maxima calculations. In short the idea builds on assigning a linear distribution of weight to vectors, representing different options, in a k-dimensional space (where k is the number of criteria) and then projecting these vectors onto the particular two-dimensional plane that is "preserving the highest percentage of global information" (p. 349). This is called the GAIA plane. The distributions of weight will result in elliptical projections on the plane, centred on the mean value of the distribution. This kind of blunt description is probably not fair enough to give the reader a chance to judge the numerical method as such, but it is not really necessary. The reason why we bring up this approach towards incorporating ethics into multi-criteria calculation is to create a shared understanding of what ethics really implies in OR. We will try to argue against the usefulness in applying mathematics on ethics, and for the usefulness in letting ethical considerations contribute to the choosing of criteria for calculations.

The first concern that comes into mind, when considering PROMETHEE-GAIA, is whether it is possible and realistic to assign weights, i.e. ranks of importance, to ethical principles and values. Brans tries to tackle the uncertainty about an absolute value by introducing into the calculus a distribution, within which the weight is considered to vary. If we for a moment accept such a concept, then we immediately stumble over the next question mark. How do we compare different ethical considerations? Can different principles really be pitted against each other? In common practice, the PROMETHEE-GAIA method is used to analyse multivariable decision problems where criteria naturally become conflicting due to incompatible assertions of numerical values inserted into the calculus (e.g. manufacturing cost could become conflicted with quality). These conflicts are exploited to determine a course of action. The numerical or at least comparable character of criteria allows for this type of seeming incompatibility to occur, but for ethical values and principles we can not credibly assign e.g. investment and maintenance costs to create this basis for comparison. An ethical principle is a nature of itself, unrelated

to other principles, and as such it refuses to become subject to ranking of importance.

The above example is illustrative for the difference between a psychological and a mathematical approach towards decision making. From a psychological perspective it is a process of obtaining information, from a mathematical a matter of computing available criteria. To join the approaches, attention should be focussed on the assertion that ethical solutions in fact are comparable while ethical principles are not.

As it has been argued above ethical considerations as such can generally not be quantified. For the validity of this paper we need just to conclude that it might not even be necessary to put figures to ethics. In order to incorporate this important aspect into OR we propose the use of an ethical analysis to induce the following analysis of choice situations. The ethical aspects of decision making should not as much be the concern about which of two conflicting principles to offend, as it should be the awareness of specific humanitarian and ecological values in the accounting. This will allow OR analysts to continue making well proved maxima calculations, only with the addition of parameters to represent stakeholders that earlier have been neglected. Ethics do not need to be quantifiable in order to quantify ethically. For this reason an ethical procedure can in fact prove to be more useful than an ethical computation.

EthXpert

EthXpert is a tool intended to help decision makers in the process of establishing a conception, as complete as possible, about a problem with ethical implications. Originating from the decision matrix of Kavathatzopoulos (2003, 2004; Erlandsson & Kavatahtzopoulos 2005) we can conclude that the matrix representation, with stakeholders and interests on one axis and alternative solutions on the other, serves well for promoting a systematic assembly of available information about a problem. Once the options and the interests of each imaginable stakeholder are identified, the work consists of filling in the blanks. This promotes a holistic view. However, this systematization could benefit even more from a less limited and more associative process of inputting the data, as well as from a more configurable representation of the same. These features, for which computerisation is necessary, are what we approach in EthXpert.

The Ethical Procedure

To give a brief overview of the work that has been done in operationalizing ethical competence, we will revisit the key note paper for AICE99 International

Computer Ethics Conference: "Heuristic Methods for Computer Ethics" (Maner 2002). For this paper Maner has done very ambitious and extensive research on trying out and classifying 60 different procedures for ethical decision making. In the paper he presents a twelve-piece selection that he considers to be representative for the different approaches and finally makes an attempt to synthesize these different strategies into a twelve-stage process that more or less is to be seen as a checklist for benchmarking ethical decision methods. However, in his analysis he concludes that almost all at the time existing methods fail to fulfil all of the criteria. These are however not to be seen as requirements, but more as reminders to focus attention on possible neglects.

- 1) *The Preparing Stage* – Cultivation of moral awareness
- 2) *The Inspecting Stage* – Definition of the problem, facts, stakeholders, relationships, etc.
- 3) *The Elucidating Stage* – Classifying and identification of facts and presumptions
- 4) *The Ascribing Stage* – Specification of the values, interests, principles, etc., that are the driving forces for a possible conflict
- 5) *The Optioning Stage* – Brainstorming to develop alternative solutions
- 6) *The Predicting Stage* – Prediction of potential consequences and considerations
- 7) *The Focusing Stage* – Choosing a set of stakeholders to consider more in detail
- 8) *The Calculating Stage* – Quantification of risks, costs, likelihoods, etc.
- 9) *The Applying Stage* – Application of theories, weighing of values and argumentations for and against options
- 10) *The Selecting Stage* – The choice and common-sense verification of an option
- 11) *The Acting Stage* – Planning and carrying through with the decision
- 12) *The Reflecting Stage* – Monitoring the implementation of the decision and learning from errors if any, possibly restarting the process.

As a checklist over general considerations for an ethical problem solving process this works well, although it can be questioned if the stage division is necessarily healthy for achieving an optimal result. It seems like the stage thinking has been influential on many "computer ethicists", probably deriving from methods for project management. E.g. Paramedic Ethics is stated to bear "both a superficial and a deeper resemblance to the waterfall model for the software life cycle." (Collins & Miller 1992, p 25) In EthXpert parts of the above procedure will be regarded as state descriptions.

To create the optimal conditions for a well-founded decision it is important to allow the user to input any imaginable data, without having to worry about whether the extent of data will muddle the lucidity when the time comes to make a decision. It is often stated that brainstorming is a good technique to develop solutions to problems, and in the procedure all ideas are initially accepted, even the obviously stupid ones. The purpose is of course to encourage and stimulate associations. Collins and Miller agree with the benefits from expanding the problem through an associative process (*ibid.*). Paramedic Ethics is in many theoretical aspects similar to EthXpert. The main difference is that in Paramedic, stress is on normative obligations, vulnerabilities and opportunities while we in EthXpert focus on how the interests of different stakeholders relate. This makes the analysis procedures differ. Where Collins and Miller urge normative valuing of pros and cons, we aim only to support a thorough autonomous analysis. We believe that a more moralising approach would decrease the chance to create a complete foundation for making an unbiased decision.

Besides the requirement to allow rich amounts of data, the wish list on an ethical decision support tool consists of the following desirables.

- Regarding the decision maker
 - Decision maker should not have to know a lot of different ethical theories
 - Decision maker should not have to be skilled in causal and consequential reasoning
- Regarding the stakeholders that are taken into account
 - Stakeholders should not have to share ethical principles, codes or policies
 - Stakeholders should not have to share values
 - Stakeholders should not have to share laws
- General desirables regarding the tool (adapted from Rick (Kavathatzopoulos, Laaksoharju & Rick 2007))
 - Should not require or derive from a predefined set of moral principles and values
 - Should encourage the decision maker to motivate his or her decisions in regard to relevant interests and values
 - Should help the decision maker to systematically solve the moral problem at hand
 - Should help the decision maker to be unconstrained by moral fixations and authorities
 - Should help the decision maker to organize and analyse the facts
 - Should help the user to weigh the relevant values and principles against each other

What EthXpert Does Not Do

The first and most important feature that we require from EthXpert is that it should not be making any decisions and not even suggesting any solutions. It might appear provoking that an ethical tool does not help the user to regard the tough questions of normative ethics. As has been argued, it is actually not desirable. By using the tool the user will get help to organise and structure the problem at hand, but instead of narrowing it down, thus risking oversimplification, the problem will be expanded and widened. At a first thought this might appear as an uncalled-for disservice, but in fact it is exactly the invaluable help that a scrupulous decision maker requires – help to get the fullest possible picture of a problem. The refusal to give any directions about the correctness of any consideration will force the decision maker to consider very carefully.

What EthXpert Does Do

In ethical dilemmas it is very hard to weigh pros and cons. It is a matter of course since otherwise there would not be any dilemma. All considered principles will seem equally just and the outcome of each option will appear to have undesired features. Most of the time, the ethical implication is not as apparent as in theoretical examples. A part of the actual stakeholders are initially often neglected or having a vague role – even stakeholders whose impact will prove important to the outcome. Therefore it is important to allow the decision maker to freely add stakeholders to the analysis whenever there seems to be a reason for it.

It is crucial that the inputting of data does not become a ceremonious procedure. Any bit of information that might affect the decision process should be gathered. Any relationship between stakeholders should be considered and also tried on other pairs of stakeholders. What is valid for one pair might also be valid for other pairs. The uniqueness of a particular relationship must be carefully questioned and the reasons for it should be noted. EthXpert is designed to trigger further considerations, through association and questioning.

To make a well-founded decision, it is desirable to gather as much data as possible. The problem with massive amounts data is however apparent; the chance to make use of it decreases with the amount. Many of the approaches presented by Maner suggest different strategies to eliminate matters that are not relevant for the problem. The impending risk with this is to lose important aspects. A better approach is to let the decision maker be selective when analysing the data. With EthXpert we promote configurable representations, where only the data associated to a specific part of the problem is viewed.

For defining this subset of data we can immediately conclude that it is not desirable to leave the selection process to a computer. A computer could very well

be taught to choose considerations based on an algorithm for ethical analysis, but as Maner concludes before presenting and refuting an algorithmic interpretation of ethical problem solving: “Ethical problems are too complex and too fluid to solve algorithmically in human time” (Maner 2002, p 340). Automating the definition of what is relevant is a sure way of elevating heteronomy. The subsets have to be defined by humans and will be specific for each problem. The only way to solve this is to take advantage of the computer’s ability to organize data by querying for relevant information such as affected stakeholders, interests etc. The decision maker will thus be in control of choosing information, but the sorting will be performed by the computer.

The EthXpert Procedure

EthXpert is a tool to aid the analysing part of the decision process. This means that from Maner’s set of stages it will mostly likely be engaging only the steps 2)-6), not as a successive process but instead as a repeating, associative process where the order of events is not fixed. Before starting the procedure, the problem should be described in as much detail as possible, not leaving out any information but still without asserting conditions that are not proved. Assuming that the problem and the factual constraints are clear to the analyst, the states of the process are the following:

- a) *Define stakeholders.* For each stakeholder that has a direct relationship to the problem there will most likely be third-party stakeholders that might influence the outcome of the decision.
- b) *Define for each stakeholder its interests.* All interests that might relate and affect the interest of another stakeholder are important to consider.
- c) *Define how the above interests relate to the interests of other stakeholders.* A relationship can be actively affecting the other interest or passively affected by that. It can also regard a mutual relationship. Sometimes the fulfilment of an interest does not affect other interests, but that answer should be the last option.
- d) *Define main options.* Main options are to their character mutually excluding. This state should not be entered before states a-c are considered as exhaustive.
- e) *Translate considerations from interest-interest matrix to the interest-options matrix.* The considerations will not be automatically copied. Instead the interest relationships will serve as incentives for considerations about the options.
- f) *Define compromise options* to tackle with problems in the main options. If there are unacceptable negative effects in the main options, then compromise solutions might solve the issue. The compromise option will inherit considerations from the parent, but the analyst is urged to revise these.

Three things especially are interesting to note in the state machine representation of the ethical procedure in EthXpert (*Figure 1*). The first is how the flow from *a* to *c*

makes it invalid to enter state *d* without passing through *c*, the second that it from states *d* to *f* is possible to reach all other states. This is a deliberate strategy to ensure focus on elaborating considerations and stakeholder relations. The final peculiarity is the lack of a final state, which is a violation against fundamental programming practice, implying that an optimal state can never be reached. From a deterministic perspective it is unsatisfactory, but from a self-critical perspective it is highly desirable; the analyst thus will never be tricked by a false confirmation that the analysis is completed.

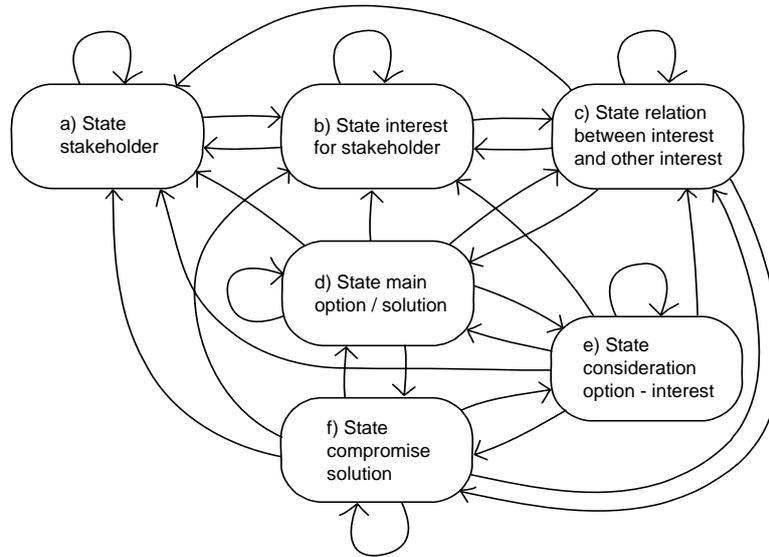


Figure 1. State machine representation of ethical procedure.

The Deceit

In order to encourage the decision maker to make a decision based on facts more than on preconceptions, the decision process should partly be carried out under conditions similar to Rawls's veil of ignorance (Rawls 1971). Both the stakeholders and the specific options should be disguised in order to block any tendency to emotional or prejudiced decision making. Only the considerations for each value of each disguised stakeholder is of relevance for the analysis. This is the measures we can take to rule out biases. *Table 1* exemplifies such biases and how they may be prevented.

<i>Bias</i>	<i>Prevention</i>
Selective search for evidence, selective perception and choice-supportive bias.	Through leaving optioning to the last steps and focussing on specific relationships at a time.
Analysis terminates prematurely when first promising approach has been found.	Through leaving optioning to the last, most of the work in analysing multiple options is already done. There will be less incentive to terminate prematurely.
Unwillingness to change position despite new facts. Preconceptions and non-present information influences the attitude to options. Group pressure, source credibility bias and escalating commitment.	These are all related to biases about specific stakeholders or options. When analysing the results it is possible to obscure the identities of stakeholders as well as the options. This will leave only the considerations as basis for a decision.
Underestimating uncertainty and undue limitation of problem.	Through an expanded view of the problem, the risk for underestimation and oversimplification will probably be reduced.

Table 1. *Table over biases that are approached in EthXpert*

Conclusions

In this paper, we have presented a way to deal with ethics in OR. To operationalize ethical competence we assume it to be the ability to handle moral problems, using the most suitable problem solving and decision making methods. We believe that ethics should not be quantified as such. Instead the ethical aspects should affect which parameters are of interest in a decision process, while also remaining present throughout the whole decision process. Ethical solutions are comparable, but ethical principles are not. This means that usual methods of OR can be applied to the solutions that have been validated through ethical analysis. For such an ethical analysis we propose the use of tools that aid structuring of ethical problems. One such tool is EthXpert. It contributes through supplying both the analyst and the decision maker with a procedure for thinking ethically, as well as with features to visualize better the information that has been assembled about a problem.

It is still too early to make any final conclusions about the usefulness of the proposed tool. Studies are yet not conducted and the work with prototyping the tools, is still in progress. The conclusions that we can draw is about the theoretical

foundation for the tools and how they may benefit the incorporation of ethics into OR.

References

- Brans, J. P. (2002). Ethics and decision. *European Journal of Operational Research* 136, 340-352.
- Collins, W. R. and Miller, K. W. (1992). Paramedic ethics for computer professionals. *Journal of Systems Software* 17, 23-38.
- Erlandsson, M. and Kavathatzopoulos, I. (2005). Autonomy method: Acquiring skills for ethical analysis of computerisation in car driving [CD-ROM]. In G. Collste, S. O. Hansson, S. Rogerson & T. W. Bynum (Eds.), *ETHICOMP 2005: Looking back to the future*. Linköping: Linköping University
- Kavathatzopoulos, I. (2003). The use of information technology in the training for ethical competence in business. *Journal of Business Ethics* 48, 43-51.
- Kavathatzopoulos, I. (2004). Making ethical decisions in professional life. In H. Montgomery, R. Lipshitz & B. Brehmer (Eds.) *How professionals make decisions* (pp. 277-288). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Kavathatzopoulos, I., Laaksoharju, M. and Rick, C. (2007). Simulation and support in ethical decision making. In T. W. Bynum, K. Murata & R. Simon (Eds.) *Globalisation: Bridging the global nature of Information and Communication Technology and the local nature of human beings* (pp. 278-287). Tokyo: Meiji University.
- Maner, W. (2002). Heuristic methods for computer ethics. *Metaphilosophy* 33, 339-365.
- Rawls, J. (1971). *A theory of justice*. Oxford: Oxford University Press.
- Sunstein, C. R. (2005). Moral heuristics. *Behavioral and Brain Sciences* 28, 531-573.