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The GIS Ethics
The code of ethics for GIS practitioners

"...always treating others with respect
and never merely as means to an end.
It requires us to consider the impact of our actions
on other persons and to modify our actions
to reflect the respect and concern we have for them"

from Emmanuel Kant
- Geographer and Philosopher

Introduction

"*Everything we do has an impact on others. Some of those impacts are negative and some are positive. Ethics is the philosophical framework that is used to maximize the good we do and minimize the harm*"[1]

Information is a source of power and, increasingly, the key to prosperity among those with access to it. Consequently, developments in information systems also involve social and political relationships and so make important ethical considerations in how information is used.

The purpose of this paper is to focus on facts - ethical questions arise, seems more deeply with time, when using spatial information and GIS tools and applications, e.g. potential use, misuse and abuse of geographical information (GI) enabled by modern GIS technology.

[1] William J Craig: GIS Ethics: Understanding implications of action; Center for Urban and Regional Affairs, University of Minnesota, USA

GIS should be used to enhance the quality of life, promote equity in access to knowledge for all members of society, reduce socio-economic gaps between members of the social system (or at least not widen them), and other "good purposes." The limitations of such reasoning and goals become readily evident when one attempts to apply such principles in everyday practice.

Numerous gray areas exist in the use of GIS and determining what constitutes a beneficial versus a detrimental consequence is a value-laden judgment. In many instances, "fair, just, and equitable" conduct and results are not obvious. They often depend on the perspectives of those affected by use of the information system.

Explosion of access to information

New computer technologies for gathering, storing, manipulating, and communicating data are revolutionizing the use and spread of information. Electronic systems now reach into all levels from governments, into the workplace, and into private lives. New ethical and legal decisions are necessary to balance the needs and rights of everyone.

The broad issues relating to electronic information systems include control of and access to information, privacy and misuse of data, international considerations, the speed and efficiency. Such specifically systems as GIS, which include local and global networks, databases, and programs for processing information, force people to confront entirely new rights and responsibilities in their use of information and to reconsider standards of conduct of computers and information systems. Certainly, specific problems require slightly different kinds of ethical decisions.

These include moral choices made by individuals in relation to the rest of the community, standards of acceptable behavior and rules governing members of a profession, what really means ethics.

Within the processes of globalization, what occurs at a local level can have global impacts, for example terrorism, and what happens globally can have a local impact. Along the way, they are also creating ethical dilemmas.[2]

Multi-dimensional information and activity, combined with the imperative of speed, mean that ethics enter so many areas of our life and society. These also born questions include such dilemmas as:[3]

- Information integration and ‘function creep’, i.e. information collected for one purpose being used for another.

[2] Margaret Lynch: Ethical Issues in Electronic Information Systems. The Geographer's Craft Project, Department of Geography, University of Texas, Austin2000, Texas;
http://www.colorado.edu/geography/gcraft/notes/ethics/ethics_f.html
[3]Michael Blakemore, Roger Longhorn: Ethics and GIS: The Practitioner’s Dilemma. AGI 2004 Conference Workshop on “GIS Ethics”, 14 October 2004, London, England, U.K.

- New forms of information and knowledge are leading to new types of social and economic exclusion.
- What about censorship and information conditioning (data scrubbing, spin and propaganda).
- What are the ethical dilemmas and potential liability in a government agency making statements about risk and future danger?
- Suppression of information in the interests of commercial relationships, new military information warfare, i.e. the contribution of GI, GIS and converging location-based technologies to killing people
- Contests regarding the quality and integrity of official information, e.g. challenges to the Census of Population.
- Is it ethical to teach hacking techniques to IT students on the basis that they may need such 'skills' if they enter the security industry?
- Is it ethical to implant an RFID chip in an elderly relative so that we can monitor their location(s) electronically for their own safety?
- Is it ethical to monitor the movements of our children through their mobile phones, GPS, and online mapping? (Murphy, 2003)
- Is there an ethical right to 'negative liberty', e.g. where we can do things unless they are explicitly forbidden? This involves Freedom of Information and Freedom of Speech laws in the USA allowing citizens to voice and promote racism, disseminate hard-core pornography, and stop public access facilities such as libraries from censoring content or using parental filters.
- What are the ethics surrounding perceived or real monopoly exploitation of dominant data supply activity, or a dominant market position?
- What are the ethics surrounding the unfair exploitation of a privileged position within an organization (not declaring an interest, or insider trading) or within a professional association?
- What are the ethics surrounding intellectual property exploitation and appropriation in developing nations?

Ethical issues

Discussing ethical issues for spatial information, GIS systems and the GIS profession, rules of good behavior for GI and GIS associations is needed to define the term 'ethics'.

Ethics refers to principles of human conduct, or morals, and to the systematic study of such human values, or the study of theories of conduct and goodness, and of the meanings of moral terms,

which is called moral philosophy, the study of theories of conduct and goodness and of the meanings of moral terms[4].

These set of rules help to guide the human actions of an individual human being so that they are consistent with his or her values. The function of ethics is to serve coordination or cooperation of our choices and actions to mutual benefit through self-discipline. [5]

An act is considered to be **'ethical'** if it agrees with approved moral behavior or norms in a specific society. Also implies civic responsibility on the each other and to society as a whole, and responsibility by society's institutions, including governments, towards citizens and other societies. Ethics concerns itself with questions such as when is an action 'right' or 'wrong' and what standards separate 'good' from 'bad'.

Whatever, the term of "ethics" could be used in several different ways:

- Ethics means the study of morals. It is also the name for that branch of philosophy concerned with the nature of morals and moral evaluation - e.g. what is right and wrong, virtuous or vicious, and beneficial or harmful (to others).
- The term ethics or morality is used to mean the standards for ethical or moral behavior of a particular group, such as "Roman Catholic morality" or "Buddhist ethics" or "nursing ethics" or "the professional ethics of engineers". D*escriptive ethics* gives a description of such ethical codes and standards, does not require making a judgment as to whether the code or standards of behavior have ethical justification. The examination of the adequacy of moral or ethical values, standards or judgments gives the *normative ethic.*
- Some authors use the term "ethics" or "morality" more loosely to mean any code of behavior, even one that does not claim to have moral justification, e.g. corporation's "ethics" or "morality" - and takes it to include such judgments as "What is right is what the guy above you wants from you". Such a judgment is most effective way to survive in the organization, but does not pretend to be a statement about what is morally/ethically justified.

Formally, **ethics** is the study of morals and values. **Morals** - are rules that govern behavior. When we ask what is right and what is wrong, these are questions of morality. **Values** - are states of affairs that are desired by and for people. They are goals or ends that are sought. Common goals include happiness, health, life, and wealth. While these goals may not normally be associated with ethics, the choices made in their pursuit have profound dimensions.

The essential differences between ethical symptoms, problems, dilemmas, and conditions are often ignored, but are helpful to fully grasping a situation:

[4] Roger A Longhorn Identifying ethical and unethical activities in gis; Info-Dynamics Research Associates Ltd, UK

Ethical symptoms are the evidence of fundamental conflicts within a community. Symptoms, by themselves, are not solved.

An ethical problem is a situation raising an opportunity for choice where there is a perceived gap between a vision of what is right and good and the current reality of the situation provided there is a reasonable expectation that human action will fill it.

An ethical dilemma, by way of contrast, is a situation demanding a choice between two or more options that are equally desirable or undesirable**.**

Ethical conditions are situations that are fundamentally wrong and/or bad, which cannot be changed at all, or, if they can be changed, cannot be changed ethically.

A bases for GIS Code of Ethics

Codes of ethics serve an important role. For societies or associations that do not implement formal professional qualification or certification standards for membership, a code of ethics or conduct still serves, as a valuable guide for how members of that society should act in their employment and in relation to their colleagues, clients and society generally.

The rapid development of technology in recent decades presents significant implications to society and the natural environment. The field of GIS has evolved faster than social and legal scientists' ability to evaluate the potential impacts of these new tools. Seems we have an incomplete understanding of the full implication of these spatial information technologies on society and the environment. A code of ethics both defines a professional's responsibility to the discipline of GIS and is the first step in addressing public concerns.

GIS can be used to create data mosaics and so may share some of the potential problems of other database systems and also have specific capabilities and characteristics, which come with their own ethical dilemmas[6].

Professionals working with GIS are entering a new, evolving, and multidisciplinary field. GIS has been defined as a powerful set of tools for collecting, storing, retrieving, transforming and displaying spatial data from the real world. [7] The GIS professional can perform complex spatial analyses by combining large databases that list attributes about people, their activities, and the environment. As the field continues to grow at a rapid pace, the systems are affecting operations in both the public and private sectors. Increasingly, a GIS professional is building systems that affect

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[5] Glossary for Ethics and Policy; Epic: Ethics & Policy Integration Centre; http://responsible-business.com/resources.html

[6] FGDC policy on access to public information and the protection of personal information privacy in federal geospatial databases. Federal Geographic Data Committee, 1998

[7] Burrough, P. A.: Principles of Geographical Information Systems for land resources assessment. Oxford University Press, Oxford. 1986

people's lives[8]. Also highlights problems facing the GIS community - the document initiates further discourse and explore solutions to issues of privacy, data quality, and liability.

A code establishes goals the professional can aspire to, set guidelines for professional expectations, and serve as a source of public evaluation.

Institute for Environmental Studies at the University of Wisconsin-Madison, USA, in the Environmental Monitoring Program in 2001 prepared some important issues that have should be stressed in a GIS code of ethics, as listed below:

Social Implications

- Promote procedures that protect health, safety and welfare of people and the environment and meet and institutional objectives.
- Consider the short and long-term relevancy
- Represent your organization in a socially responsible manner
- Contribute to society's well being
- Respect the privacy of others
- Avoid causing harm
- Evaluate moral and legal imperatives

Professional Integrity

- The GIS professional shall be diligent about the completion of his or her duties, and do so in such a way that it reflects well on the individual and the profession.
- Respect privacy - follow all relevant laws on privacy and disclosure.
- Be open and transparent about limitations and uncertainty in data
- Avoid misleading data presentation
- Avoid conflicts of interest
- Understand limits of competence
- Acknowledge other's contributions

Competency and Professional Development

- Continue to upgrade professional knowledge and skills.
- Maintain professional knowledge; seek information about current laws, accepted practices, and relevant standards pertaining to professional work.
- Maintain an interest in professional organizations and their activities.
- Accept and provide appropriate employment review.
- Consult, when necessary, with colleagues in their areas of expertise.

[8] Onsrud, H. J., J. P. Johnson, and X. Lopez, 1994. Protecting personal privacy in using Geographic Information

- Continue to develop professional skills that supplement technical skills, such as communication, project management, and productive peer relations.

Professional Relations

- Encourage others to adhere to this code.
- Seek the advice from one's colleagues when faced with an ethical dilemma.
- Review the work of others in an objective, candid, and properly documented way.
- Respect and seek, when necessary, professional review and opinions from colleagues in their areas of competence.
- Give a fair hearing to the opinion, concerns, or complaints of a colleague.
- Do not unfairly intervene in the career of any colleague; however concerns for the employer, client, or the public interest may compel GIS professionals, in good faith, to question the competence of a colleague.
- Assist colleagues in professional development.
- Take appropriate action if one discovers a colleague engaging in unethical behavior.

Professional Responsibility

- Work toward the best possible data quality and integrity
- Assure Accountability
- Promote public knowledge of correct use of GIS
- Comply with laws and mandates
- Keep current with this code and any updates or amendments
- Adhere to appropriate data security procedures
- Acknowledge any sources of data that are used in any project

Code of Ethics for GIS Professionals by URISA [9].

Urban and Regional Information Systems Association-URISA in April 2003 defined the Code of Ethics for GIS Professionals.

This code is based on the ethical principle of always treating others with respect and never merely as means to an end: - *deontology* (*Immanuel Kant*). It requires ones to consider the impact of their actions on other persons and to modify these actions to reflect the respect and concern once have for the others. It emphasizes one's obligations to other persons, to one's colleagues and the profession, to one's employers, and to society as a whole. Those obligations provide the organizing structure for

Systems. Photogrammetric Engineering and Remote Sensing 60 (9): 1083-1095

[9]Approved by the URISA - Urban and Regional Information Systems Association Board of Directors; University of Wisconsin - Madison Environmental Monitoring Program Institute for Environmental Studies April 9, 2003

these guidelines. Contemplating the values and goals of alternative ethical paradigms may be useful in reaching a decision [10].

The URISA ethical policy structures itself around four types of ethics:

- View persons who exemplify morality as your own guide (Virtue Ethics)
- Attempt to maximize the happiness of everyone affected (Utilitarianism)
- Only follow maxims of conduct that everyone else could adopt (Kantianism)
- Always treat other persons as ends, never merely as means (Deontology)

"I. Obligations to Society

The GIS professional recognizes the impact of his or her work on society as a whole, on subgroups of society including geographic or demographic minorities, on future generations, and inclusive of social, economic, environmental, or technical fields of endeavor. Obligations to society shall be paramount when there is conflict with other obligations. Therefore, the GIS professional will:

1. Do the Best Work Possible

- Be objective, use due care, and make full use of education and skills.
- Practice integrity and not be unduly swayed by the demands of others.
- Provide full, clear, and accurate information.
- Be aware of consequences, good and bad.
- Strive to do what is right, not just what is legal.

2. Contribute to the Community to the Extent Possible, Feasible and Advisable

- Make data and findings widely available.
- Strive for broad citizen involvement in problem definition, data identification, analysis, and decision-making.
- Donate services to the community.

3. Speak Out About Issues

- Call attention to emerging public issues and identify appropriate responses based on personal expertise.
- Call attention to the unprofessional work of others. First take concerns to those persons; if satisfaction is not gained and the problems warrant, then additional people and organizations should be notified.
- Admit when a mistake has been made and make corrections where possible.

[10] William J Craig: GIS Ethics: Understanding implications of action; Center for Urban and Regional Affairs, University of Minnesota, USA

II. Obligations to Employers and Founders

The GIS professional recognizes that he or she has been hired to deliver needed products and services. The employer (or founder) expects quality work and professional conduct. Therefore the GIS professional will:

1. Deliver Quality Work
   - Be qualified for the tasks accepted.
   - Keep current in the field through readings and professional development.
   - Identify risks and the potential means to reduce them.
   - Define alternative strategies to reach employer/founder goals, if possible, and the implications of each.
   - Document work so that others can use it. This includes metadata and program documentation.
2. Have a Professional Relationship
   - Hold information confidential unless authorized to release it.
   - Avoid all conflicts of interest with clients and employers if possible, but when they are unavoidable, disclose that conflict.
   - Avoid soliciting, accepting, or offering any gratuity or inappropriate benefit connected to a potential or existing business or working relationship.
   - Accept work reviews as a means to improve performance.
   - Honor contracts and assigned responsibilities.
   - Accept decisions of employers and clients, unless they are illegal or unethical.
   - Help develop security, backup, retention, recovery, and disposal rules.
   - Acknowledge and accept rules about the personal use of employer resources. This includes computers, data, telecommunication equipment, and other resources.
   - Strive to resolve differences.
3. Be Honest in Representations
   - State professional qualifications truthfully.
   - Make honest proposals that allow the work to be completed for the resources requested.
   - Deliver an hour's work for an hour's pay.
   - Describe products and services fully.
   - Be forthcoming about any limitations of data, software, assumptions, models, methods, and analysis.

III. Obligations to Colleagues and the Profession

The GIS professional recognizes the value of being part of a community of other professionals. Together, we support each other and add to the stature of the field. Therefore, the GIS professional will:

1. Respect the Work of Others.
   - Cite the work of others whenever possible and appropriate.
   - Honor the intellectual property rights of others. This includes their rights in software and data.
   - Accept and provide fair critical comments on professional work.
   - Recognize the limitations of one's own knowledge and skills and recognize and use the skills of other professionals as needed. This includes both those in other disciplines and GIS professionals with deeper skills in critical sub-areas of the field.
   - Work respectfully and capably with others in GIS and other disciplines.
   - Respect existing working relationships between others, including employer/employee and contractor/client relationships.
   - Deal honestly and fairly with prospective employees, contractors, and vendors.
2. Contribute to the Discipline to the Extent Possible
   - Publish results so others can learn about them.
   - Volunteer time to professional educational and organizational efforts: local, national, or global.
   - Support individual colleagues in their professional development. Special attention should be given to underrepresented groups whose diverse backgrounds will add to the strength of the profession.

IV. Obligations to Individuals in Society

The GIS professional recognizes the impact of his or her work on individual people and will strive to avoid harm to them. Therefore, the GIS professional will:

1. Respect Privacy
   - Protect individual privacy, especially about sensitive information.
   - Be especially careful with new information discovered about an individual through GIS-based manipulations (such as geocoding) or the combination of two or more databases.
2. Respect Individuals

- Encourage individual autonomy. For example, allow individuals to withhold consent from being added to a database, correct information about themselves in a database, and remove themselves from a database.
- Avoid undue intrusions into the lives of individuals.
- Be truthful when disclosing information about an individual.
- Treat all individuals equally, without regard to race, gender, or other personal characteristic not related to the task at hand."

Codes of ethics are created in response to actual or anticipated ethical conflicts A few of the guidelines that are unique to the GIS profession include the encouragement to make data and findings widely available, to document data and products, to be actively involved in data retention and security, to show respect for copyright and other intellectual property rights, and to display concern for the sensitive data about individuals discovered through geospatial or database.

Case studies application

The URISA, The GIS Certification Institute and other GIS institutions and experts continues to work even after the Code of Ethics has been adopted and certifying professionals formally. There are discussions to developed courses on GIS ethics for students and workshops for working professionals. One important task is to develop case studies in the discipline. Case studies are a proven way of engaging people in ethical discussions. Another aspect of a good case study is that there is no right answer.

Codes of ethics and case studies need each other. Without guiding principles, case studies are difficult to evaluate and analyze; without context, codes of ethics are incomprehensible. The best way to use these codes is to apply them to variety of situations and see what results. It is from the back and forth evaluation of the codes and the cases that thoughtful moral judgments can best arise [11].

Case studies aside, there are real ethical dilemmas facing each of us. It is important to face up to these situations and not to ignore them. One useful way to sort things out is to discuss them with colleagues. Verbalizing the problem may help to see things more clearly.

GIS professionals tend to think of themselves as competent people whose main concern is keeping current in the technology. We need to admit that we are part of the social world and reflect on the implications of our actions (or inaction). Then we will truly be professionals.

Conclusion

The Code of Ethics for the GIS Professional is a foundation document that sets guidelines for making ethical decisions. The code emphasizes the social responsibilities that GIS professionals have to society and presents goals and aspirations that professionals should strive toward throughout their careers. The purpose of the code is to serve as guidance to make decisions that will benefit society, the field of GIS and the GIS professional.

"There is not universal agreement on whether formal, legally binding sanctions are required or need to be strictly enforced in relation to achieving the ultimate goal of producing a code of ethics or professional conduct, e.g. to promote standards for ethical performance which members are expected to achieve via ethical behavior. In one sense, imposition of sanctions indicates that the code of ethics has not achieved this goal, at least in respect to certain members' behavior"[12].

The Code of Ethics is intended to provide guidelines for GIS professionals and it should help professionals make appropriate and ethical choices also it should provide a basis for evaluating their work from an ethical point of view. The GIS professional has many opportunities to do harm and to do good, same as professionals from other important disciplines. We all try to make the right decisions, but sometimes it is not obvious what that decision should be.

We like to think we are ethical, but are we consistently applying formal ethical procedures? How do we recognize the problems and how do we think about the right solution? More ethical and moral answers can bring the solid background, also in ethics.

Key words: GIS, ethics, Code of Ethics, morality, principles, information.

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Abstract

Information is a source of power and, increasingly, the key to prosperity among those with access to it. Consequently, developments in information systems also involve social and political relationships and make important ethical considerations in how information is used.

The purpose of this paper is to focus on facts that ethical questions arise when using spatial information and GIS tools and applications. These include moral choices made by individuals in relation to the rest of the community, standards of acceptable behavior and rules governing members of a profession.

Ethical rules of good behavior in GIS profession, GI and GIS associations, need to define the term 'ethics'. Ethics refers to principles of human conduct, or morals, and to the systematic study of such human values, or the study of theories of conduct and goodness, and of the meanings of moral terms, which is called moral philosophy, the study of theories of conduct and goodness and of the meanings of moral terms.

The article citied a text of a Code of Ethics for GIS Professionals given by Urban and Regional Information Systems Association in April 2003.

Paper focuses also on the importance of create the case studies for discipline.

Etyka w GIS

Kodeks Etyczny dla profesjonalistów GIS

Streszczenie

Informacja staje się źródłem potęgi i kluczem wzrostu zamożności oraz sukcesów. Dotyczy to szczególnie tych, którzy posiadają do niej dostęp, a rozwój systemów informacyjnych implikuje społeczne i polityczne relacje, związki i zależności, co oznacza, że coraz bardziej istotnymi i ważnymi stają się pytania i rozważania dotyczące etycznego wykorzystywania i używania informacji.

Celem tego artykułu jest zwrócenie uwagi na fakt, iż problemy natury etycznej wzrastają wraz ze wzrostem zastosowań, także informacji przestrzennej i wykorzystywania aplikacji i narzędzi informatycznych GIS. Pytania z dziedziny etyki dotyczą tu m.in. problemu moralnych wyborów i decyzji podejmowanych przez indywidualnych twórców, dystrybutorów i użytkowników systemów

GIS, akceptowanych standardów zachowań w odniesieniu do grupy osób czy społeczeństwa oraz zasad rządzących wśród profesjonalistów związanych z tworzeniem i wdrażaniem geograficznych systemów informacyjnych.

Etyka, jako dział filozofii zajmuje się badaniem moralności i tworzeniem systemów myślowych, z których można wyprowadzać zasady moralne, czyli zasady ludzkiego postępowania i moralności. Etyczne zasady dobrego postępowania wśród specjalistów zajmujących się systemami GIS, informacją geograficzną czy członków towarzystw GIS powinny zostać zdefiniowane, podobnie, jak sam termin „etyka" w odniesieniu do tej dziedziny.

Artykuł cytuje tekst Kodeksu Etycznego dla profesjonalistów związanych z systemami GIS zaproponowany przez URISA (Urban and Regional Information Systems Association, University of Wisconsin, USA) w kwietniu 2003.

W istocie zagadnienia etyczne dotyczą wszystkich specjalistów i profesjonalistów z każdej dziedziny wiedzy i życia.