

3

The Psychology and Philosophy of Ethics

3.1 Introduction

Ethical issues (Chapter 1) permeate every stage of the research process from the provision of a title to the study and the analysis of the data (Chapter 8). In fact, in order to study such unethical behavior in any science (including social science and political science, two sciences that are not usually based on the same forms of data gathering and data workup as the hard sciences) or engineering are a range of ethical issues emerging in the fields of qualitative and quantitative research. This has been and remains so because quantitative research is rooted in rationality and objectivity, and reflection can be used to correct/evaluate and logic of analyses done. Meanwhile, qualitative approaches to data collection are more personalized and allow for expressions of values, beliefs, motivations, emotions in sharing of information.

Furthermore, and in addition to the ethical responsibilities of researchers, respondents also have ethical responsibilities.

More often than not respondents do not breach their ethical commitments, spoken or unspoken. Researchers, for several reasons, may or may not adhere to their personal and/or professional ethics.

Ethics forms a major classification of philosophy and is a study of values and customs of a person or a group (Chapter 1). It deals with the analysis and application of concepts such as right or wrong, good and evil and clear distinction of responsibilities. Professional ethics refers to ethics specifically concerned with human character, acceptable behavior and conduct. Ethical behavior is something that goes beyond simply obeying a set of rules and regulations, it is about committing yourself to do and act according to what is right, cognizant of your own conscience. To put it simply, professional ethics concerns one's behavior, conduct and practice when carrying out professional work; it could be any profession such as consulting, research or writing. Most professional bodies set a code of conduct that is to be followed by its members such as doctors, accountants, lawyers to name a few. It is assumed that the members accept the adherence to these codes or rules, including restrictions that apply. At the same time, no two codes of ethics are identical. They vary on the basis of cultural group, profession or discipline.

Ethics in terms of philosophy, is often referred to as morality – the *right* or *wrong* of any action taken or will take place. Ethics is used to formulate judgment on any standards that are proposed for scientists and engineers to follow. Furthermore, ethics is often broken down into three main categories, as was mentioned in an earlier chapter: meta-ethics, normative ethics, and applied ethics.

Meta-ethics is the study of origin of ethical concepts and the name implies that it encompasses a whole concept of ethics. Meta-ethical issues give rise to such questions relating to the origin(s) and application(s) of human rights.

Normative ethics are the principles established that guide or regulate human conduct and are often what society considers the *norm*. Normative ethics are the guide for *proper behavior* that society sets as their standard. The golden rule is of normative ethics is: "do unto others as you would have them do to you" and NOT "do unto others before they do to you!"

Applied ethics is the study of specific problems or issues with application of *normative ethics* and/or *meta-ethics*. Often, applied ethics may involve political or social questions, but always involve some moral aspect.

Application of these three principles should help the scientist or engineer to decide the correct path to take when uncertainty arises. It is completely untrue that they cannot be responsible, cannot be held to be responsible for their actions, or cannot control what they do or what they choose to do. Indeed, scientists and engineers must be held responsible for their actions (or for their omissions). There are too many occasions when academics refuse to accept *responsibility* but will forge ahead, in order to be given unrestricted authority!

It is often claimed or acknowledged that scientists and engineers might not be responsible for their actions if what they do is the result simply of some chance, totally unexpected, unwilled, random, unexplainable, or unpredictable occurrence that takes place accidentally in their mind or body. Thus, if an act or choice is the result of forces over which the scientist or engineer had no control in the beginning then he should not be held responsible. In addition, compulsive behavior, which is unaffected by choice, can be an example of behavior which is the result of organic causes over which the scientist or engineer had no control and for which he, or it is not responsible.

If a choice or an action is the inescapable consequence of forces beyond the scientist or engineer's control, ethical

principles and moral reasoning would not actually show what was right or wrong (in those cases). They would have no effect at all regarding indeterminate, chance behavior and would not be reasons for behaving in certain ways but would be causes contributing to a scientist or engineer behaving that way.

However, the ability of scientist or an engineer to act freely is not to act either compulsively (determinism) or by chance (indeterminism) but to act in regard to an informed, rational or reasoned choice, which can be examined for its reasonableness and objectiveness. This does not dismiss emotions or sensations, as some would hold, since these can be taken into account by reason.

Scientists and engineers must be held responsible for any choice they make that they could have made differently (and for any resulting action) they did that they could have done differently, even though they may not have made the choice rationally or objectively. Irrational choices, which are neither accidental nor the result of uncontrollable forces, make the scientist or engineer responsible for his actions though they may not show responsibility in behavior or decision-making. Although there may be forces over which the scientist or engineer has no control, not all wrong acts or bad choices are the result of neither inescapable forces nor forces that the scientist or engineer people could not have overcome.

Even if the personal character traits of a scientist or engineer cause the outcome of the choice, that person is still responsible for his actions. How the scientist or engineer made the choice is irrelevant.

3.2 Ethical Responsibilities in Research

Research is an activity enabling us to test some hypotheses or conclusions and contribute to knowledge"

(Shrader-Frechette, 1994) or "*the process of making and proving claims*" (Altman, 1997).

Research ethics guides researchers about the conduct necessary when carrying out studies and data workup or data manipulation (Chapter 8). However the term *data manipulation* has a ring of untruth about it! Research ethics regulations have traditionally focused on informed consent, breaches of confidentiality, stress, injury, coercion, invasion of privacy and deception.

Whether or not researchers conduct scientific research, they have an implicit obligation to society as a result of training and education that they had received (Shrader-Frechette, 1994). Complete objectivity in research is impossible because human beings cannot be completely objective with respect to the exact margin of error, choice of statistical test, sample selection, research designs, data interpretations, assumptions and theories. Most of the ethical issues arise with respect to methodological value judgments and such value judgments should be specified even if they are defensible (Shrader-Frechette, 1994). Scientific results must also be presented in a manner that would avoid future misuse or misinterpretation.

Membership in a profession carries with it an implicit commitment to pursue the welfare of the profession. This is partly done by avoiding hasty, unconfirmed statements, incomplete analyses and by speaking out about these in the studies of peers, thus the significance of peer reviews. This is why many journals have stipulations to deal with fraud and may require researchers to place their raw data in a special archive (Shrader-Frechette, 1994). However different research applications often carry different degrees of risk for the public and, as such, researchers must aspire to high standards of reliability and validity in order to minimize damaging implications. This raises concerns for knowledgeable and ethical objectivity.

Studies on scientific misconduct has found that there are several categories of people who may engage in unethical practices, deliberately or not. These are:

1. new faculty/junior scientists/junior engineers who have not been properly mentored,
2. individuals seeking promotion or tenure,
3. those who like to see their name in print (preferable not the investigative press), and
4. those who lack clear thought about the consequences and potential dangers of cheating in science and engineering.

Some examples of ethical issues in research are:

1. Failing to keep important analysis of documents of a period of time.
2. Failure to maintain complete records of findings.
3. Seeking the status of co-author without making a significant contribution to the article.
4. Not allowing one's peers access to data collected and analyzed especially after the article was published.
5. Exploiting research assistants without acknowledging their assistance.
6. Bias in sampling.
7. Continuing studies until a point of statistical significance is reached, even though the statistics are faulty.

Ethics, it has been established, is concerned with what should and should not be done and this is one of the requirements of a profession. Professional ethics constitute standards that are widely accepted within the profession (Schwartz, 2009). Generally the stipulations of ethical associations worldwide emphasize

1. high technical standards,
2. a certain range of abilities, skills and cultural knowledge,
3. integrity, honesty and respect for people, and
4. responsibility for the well being of others.

These standards should be borne in mind when developing, carrying out and reporting research results (Wolf et al., 2009). Furthermore, ethical concerns of researchers often emanate from their awareness of the entities or communities or organizations that they represent, from attempting to be neutral, or from holding on to a specific set of principles. The assessment of the research in particular would focus on the approach to the study, degree of accuracy and the accuracy of the reporting of results (Wolf et al., 2009).

With respect to experimental research, it has been established that partial success in identifying cause-and-effect relationship, such as the researcher's role in decision-making and the contribution in reducing the cost of wrong decision-making, must continue to be valued. Once this approach provides the best possible answer in the circumstances, then it is doing what good ethics requires. Ethical concerns persist however with respect to risks and benefits and decision about which causal relation is more important to be investigated (Mark and Gamble, 2009).

Rigorous research, by unearthing the truth, may leave behind social chaos, breakdown and conflict. At the same time, if such research glosses over issues and unearths partial truths, especially if it is consciously done, that is unethical. Unethical development research is that which has a covert goal, peripheralizes the voices of participants, has little transparency, did not get informed consent, is not context sensitive, is insensitive to the power relationships that influence responses (Brydon, 2006). This challenge also applies to research on various aspects of family life: marriage, cohabitation, sibling ties, father involvement,

inter-ethnic relations, social class and family status, religious belief, parenting and others.

The ethical issues connected with publication, authorship, a willingness to share data and the accompanying conflicts of interest are myriad (Chapter 8) (Brown and Hedges, 2009). Data sharing is critical in those aspects of research that have implications for solving problems in science and engineering. Ethical issues also surface if and when a researcher ignores measurement errors (because the data fit or do not fit his theory). In fact, measurement errors (deliberate and unconscious) can occur in quantitative research with respect to test development (e.g. item-to-total correlations, item means, test-retest reliability, factor analysis, residual analysis, validity testing, scale development) and research designs (e.g. strength of tests of hypothesis, data collection) (Viswanathan, 2005).

In considering ethical issues in science and engineering, a distinction is often made between morals and ethics. When such a distinction is made, the term *morals* is assumed to refer to generally accepted standards of *what is right and what is wrong*. The term *ethics* is assumed to refer to the principles which appear in a code of professional ethics. However, the terms *moral philosophy* or *moral theory* generally refer to a set of abstract moral principles and it is often considered appropriate or more practical to use the words interchangeably. Both of the terms refer to standards of right conduct and the judgments of particular actions as right or wrong by those standards.

Moral and ethical statements should also be distinguished from laws. The fact that an action is legally permissible does not establish that it is morally and ethically permissible. Just as legality does not imply morality, illegality does not imply immorality. It would be illegal to introduce very small amounts of a chemical into the atmosphere if doing so violates environmental standards, but there might make a philosophical argument that there

are cases in which it is not immoral to do so because the environmental standards are too strict and fail to balance costs and benefits in a rational way.

The scientist or engineer is well advised to recue himself from such arguments that enter the realms of philosophy and psychology. Anyone not skilled in either of these two mental areas of scholarship will surely be on the losing side of the argument.

Ethics is a very relevant area in the study of psychology as ethical values on what is wrong and what is right relate directly to the moral standing of scientists and engineers in society. Ethical standards are closely associated with moral standards although morality is more individualistic and moral standards could vary between cultures. Ethical standards are, however, more general as they depend on our basic human nature and human values. Ethical values are more human and thus more about psychological dynamics than the moral values. Yet ethics is considered as a branch of moral philosophy.

When considering the *psychology of ethics* it is important to distinguish between ethics and morality and the *psychology of ethics* would be more about values of being human whereas *moral psychology* specifically deals with questions of morality. Moral psychology or psychology of morality is thus considered a part of the broader psychology of ethics. Ethics deals with morality as well as questions of right and wrong, moral and immoral, virtue and vice, good and evil and responsibilities of being human.

Ethical philosophy also shows how ethical judgments and ethical statements or attitudes are formed. Ethics is related to self realization about the needs of the human condition – such as doing the right thing at the right time and in the right manner for the right reason is considered virtuous and ethical. Yet the *psychology of ethics* involves more than just understanding moral values and appreciation of the human condition by scientists and engineers.

The *psychology of ethics* is about basic beliefs and attitudes and the formation of these beliefs as also how scientific and engineering value systems are shaped through moral development.

Scientists and engineers often think of psychological reasoning and philosophical reasoning as fuzzy and imprecise. It is true, after all, that the qualitative thinking that is related to the application of ethical principles is not susceptible to the same kind of precision that can be achieved in science or engineering. Often, however, ethical thinking is unnecessarily confused, and much of this confusion is due to the failure to distinguish between three kinds of statements that are made in ethics: (1) factual statements, (2) conceptual statements, and (3) moral statements.

Factual statements (the essence of the scientific and engineering disciplines) are either true or false and refer to claims that can be confirmed or refuted by empirical observation. In discussing factual disagreements, appeal is made to factual or empirical considerations.

Conceptual statements are statements about the meaning or scope of certain terms or principles and discussions of conceptual issues can be very important in ethics. In considering conceptual disagreements, arguments are presented about the appropriateness of one definition as opposed to another.

Moral statements are statements that imply an issue or an action is right or wrong, and, needless to say, there are many disagreements over moral statements. Working on a defense contract to produce the next generation of weapons may allow one scientist to work on the project in good conscience while another scientist could not. In evaluating moral disagreements, appeals are made to broader and more basic moral principles.

It is often recognized that correct actions and behavior involve doing the right thing when it is not in the personal

self interest of the scientist or engineer. Sacrifices may have to be made that can never be regained because it is in someone else's interest and because it brings about the greatest good for the greatest number of deserving people.

3.3 Ethics in Science and Engineering

There is a widespread assumption that scientists and engineers conducting basic or applied research should not neglect the fact that their work can ultimately have a great impact on society.

Since the beginning of the seventeenth century, research programs have been used to transform concepts into theories and, simultaneous with this development, there has been some degree of diffusion as researchers have explored new lines of inquiry as they attempt to make their contributions to the literature.

On the other hand, it should be recognized (but not used as an excuse for unethical behavior) that the acceleration of scientific advances in the last few decades raises unprecedented ethical dilemmas. Common moral intuitions are often sufficient for every day moral decision making but such intuitions are insufficient when applied to the problems raised by recent developments in science and engineering. Thus, it seems clear that some specific ethics training is essential to make scientists and engineers mentally and morally equipped to face the emerging scientific and engineering challenges.

However, contemporary ethical concerns do not only cover the potential negative *results* of scientific and engineering activity, but also the *procedures* employed in the laboratory and in the field for conducting scientific and engineering research. There are honest and dishonest ways of doing science. *Falsification of data* and *plagiarism* are the most typical examples of scientific and engineering

misconduct. Allegations of scientific and engineering misconduct are not unique to the present time or the last several decades but they now receive a broad coverage in the mass media. In this respect, it is often acknowledged that each time that a new scandal of scientific and engineering dishonesty comes to light, the public trust in science and engineering deteriorates.

The general consensus is that the only effective way to mitigate scientific and engineering misconduct is through education of young researchers. In fact, in context of this book, it is more urgent than ever to provide scientists and engineers with the conceptual tools they need to develop their ethical reasoning.

Every society and professional group has in place a range of norms to guide the behavior of its members. There is a direct correlation between levels of moral outrage expressed and the importance of the norm. In the realm of higher education, norms specify the desired practices with respect to teaching, research and service. Without scientists and engineers in academia, government, and industry would be free to follow their own unconstrained preferences in research.

Thus, norms are indicators of professionalization and also represent what is considered important by a group articulating how professional choices mesh with service. Some have argued however that it is difficult to establish unambiguous ethical standards in academia, and this leads to a range of judgment calls (Whicker and Kronenfeld, 1994). The nature of this challenge is shaped by contextual factors such as societal changes, information overload, competencies all of which impact departmental cultures, individual academic roles and identities. There is a relationship between academic communities and the ideas they express (Becher and Trowler, 2001). Academic culture comprises disciplinary knowledge, growth, enquiry methods, and research outcomes.

Ethical behavior (and, by inference, unethical behavior) in science and engineering is attracting increasing interest in colleges of science and colleges of engineering both on a national and international scale. Evidence of this interest in professional ethics is manifested in the creation of courses in scientific and engineering ethics as a means of introducing ethical issues into required undergraduate science and engineering courses. These courses are increasing in number as students show a willingness to learn more about the philosophical and psychological value of the implications of their actions as professional scientists and/or engineers.

In response to this demand, universities and organizations alike must be prepared to introduce literature and courses on scientific and engineering ethics into their classrooms or education programs.

Increasing levels of subjectivity seem to be associated with improvements in one's qualification in the realm of higher education. As such, professors might display more subjectivity in their conduct than first-time lecturers. High levels of emotion become associated with which students get what, when, where, how and why in terms of grades. The orientation to act unethically is loaded with emotions and not rationality. Of relevance in this regard is underlining of the importance of focusing on values, traditions and collective identities that shape higher education institutions as social entities that are loaded with affect and non-rationality (Gumport, 2007). Academic freedom has to be enjoyed within the constraints of ethical consideration (Chambers, 1983).

As with any other higher-order intellectual activity, resolving moral problems requires that we be both analytical and imaginative. In the analytical mode, a scientist or engineer can recognize the component parts of ethical problems, which assists him to know what kinds of solutions are appropriate. However, resolving ethical problems

often requires something more – usually in the form of a philosophical or psychological approach.

Scientists who believe that they deserve more recognition are more likely to falsify, plagiarize or manipulate their data in order to report successful results. Small scale deviant practices continue to be practiced because, despite the canons of scientific and engineering researchers, it is always possible to attribute small inconsistencies to unavoidable errors that accompany or infiltrate all research (Glaser, 1964). One of the major determinants of judgments of the degree of responsibility is whether a controllable act is perceived or intentionally committed or due to negligence (Werner, 1995) but, either way, the outcome is wrong.

Since judgment can only be reliably made after some period of observation or investigation it is essential, however, that the following criteria should be given consideration:

1. whether ethical standards should be known and are clear,
2. whether they are clear but ignored, or
3. whether they are being followed (McDowell, 2000).

However, these criteria should not be used as an excuse to allow the miscreant to be absolved of all blame since he should have applied individual philosophical and ethical principle to the work. Having the three criteria in place can be used to absolve the organization of any blame – the blame must fall squarely on the shoulders of the errant individual scientist or engineer.

Whether or not there is a crisis in the perceived (or real) responsibility of scientists or engineers depends very much on the extent to which individuals were responsible and disciplined before acquiring professional status. The search for truth, knowledge, and understanding of the scientific and engineering world pose strong ethical demands on the

scientist or engineer (Guba, 1990). Indeed, methodological, analytical and ethical issues are closely interconnected (Ryen, 2009), particularly so because of the relationships with scientists and engineers involved whose research and whose philosophical and psychological attitudes, values, perceptions of issues vary.

In making judgments about the right conduct or behavior, scientists and engineers must recognize the value of moral consistency. The requirements of consistency take several different forms. An example of moral consistency occurs when a consulting scientist/engineer breaks confidentiality with a client because it is in the scientist/engineer's interest to do so but condemns another scientist/engineer for doing the same thing. The scientist/engineer is not applying the same standards to himself that he expects everyone else to follow. A scientist or engineer must be consistent with his own moral standards. Moral beliefs must be consistent with one another and those relating to confidentiality must be consistent with moral beliefs in professional ethics and any other moral issue.

One way to think consistently in this way is to have a *moral theory*, i.e. a set of moral principles which systematically link moral beliefs to one another by means of a set of coherent moral principles. A moral theory in any area allows the scientist or engineer to have the opportunity to define terms in uniform ways and to relate a set of moral ideas to one another in a consistent manner.

There is always the need for a scientist or engineer to test his moral views for overall consistency. On this basis, it is desirable to have a single moral theory in which all of scientific and engineering views (as they pertain to research) can be included. However, moral philosophers have generally concluded that it is not possible to incorporate all of the moral views that are generally accepted by scientists and engineers into a single coherent moral theory. As a result, there seems to be two systems of moral concepts that are

the most influential, although there are considerable areas of overlap: (1) utilitarianism and (2) the ethics of respect for individuals.

The moral standard of *utilitarianism* is: those actions are right that produce the greatest total amount of human well-being. Utilitarianism has intuitive appeal to many scientists and engineers because human well-being seems to be such a natural goal of their respective endeavors. Furthermore, a utilitarian analysis of a moral problem consists of three steps: (1) determination of the audience of the action or policy in question, i.e. those people who will be affected for better or for worse, (2) the positive and negative effects of any alternative actions, and (3) the course of action that produces the greatest overall utility.

Implementation of the utilitarian perspective requires extensive knowledge of facts, which may not be available. This is especially evident in the case of cost/benefit and risk/benefit analysis. In order to balance the cost or negative utility of a scientific or engineering project against the benefit or positive utility, the long-term effects of the project on the public must be calculated. This requires considerable knowledge, some of which may not be available and the long-term positive and negative consequences of an action or policy remain unknown. In such cases, evaluation from the utilitarian perspective involves a *best guess* approach, which may not be very satisfactory.

The moral standard of the *ethics of respect for persons* recognizes equal respect for each human person as a moral agent (an individual capable of both formulating and pursuing purposes of his or her own and of being responsible for the actions taken to fulfill those purposes). Thus, moral agents must be distinguished from things, which exist to fulfill purposes imposed on them by moral agents.

The emphasis on respect for each individual is expressed in the phrase, "do unto others as you would have them do unto you," which requires that a scientist or engineer

to consider others by imaginatively placing himself in the position of other members who could be affected by his or her actions. However, this line of thinking or behavior may lead to seemingly perverse results because it seems too permissive and sometimes because it seems too restrictive.

In order to provide a more precise and objective guideline for respecting the moral agency of individuals, some moral philosophers have appealed to a *doctrine of rights*. A *right* is an entitlement to act or to have another individual act in a certain way. *Rights* serve as a protective barrier, shielding individuals from the unjustified infringements of others. The rights necessary to implement the ethics of respect for persons are the rights to freedom and those physical and non-physical conditions necessary to realize the well-being of an individual as preferred by the individual.

Thus ethics in science and engineering is concerned with what ought to be (what we ought to do, what we ought to be, the right and the wrong). Science and engineering, taken very generally, are concerned with *what is* (what the world is like, the true and the false). There is more to science and engineering than a collection of facts. Even if it were possible to know and to express all the truths there are, a complete listing of them would not constitute an adequate scientific or engineering discipline. At a minimum, there is an additional need to subsume particular truths under general laws. Furthermore, a proposed law of science or engineering may cover all the relevant phenomena yet still be unsatisfactory if it lacks explanatory force.

Science and engineering are both attempts to make sense of the world and to explain natural phenomena. In principle, the basic premise of science and engineering is observation. Scientific and engineering theory must account for observations, which are detailed and not simply glances, glimpses, or impressions. Scientific and engineering observations have to measure up to certain standards, which may be more or less well-defined, depending on the scientific

or engineering discipline. Scientists and engineers are quite willing to discard supposed observations as simply mistaken, biased, fraudulent, hallucinatory, or otherwise spurious.

A theory constructed to account for a set of observations may end up presenting an explanatory framework that includes most of the observations, but eliminate some. If the theory covers 95% of the observations, but cannot account for the remaining 5%, the deviant 5% are conveniently rejected as being due to *experimental error*, usually an error of some ill-defined or unknown sort. Even though observations are basic, the scientist or engineer is willing to sacrifice observations to theoretical simplicity and/or explanatory power.

Corresponding to scientific observations are *intuitions* of right and wrong, correct and incorrect. Intuitions are not merely transitory emotions or responses just as observations are not glances or momentary impressions. Intuitions are reflective evaluations and a scientist or engineer may at first react to experimental data with disapproval but may, upon brief reflection, reject his reaction and replace it by the intuitive feeling that there is nothing amiss with the data. At a high level of generality the criteria for the adequacy of intuitive reaction are the same as those for the adequacy of scientific theories.

Moral intuitions are significantly affected by a wide range of prior commitments and inclinations, and there are similarities with scientific and engineering observations. Scientific and engineering observations are often *theory-driven* and subject to bias from many sources – the scientist or engineer observes what he is looking for and the experience is categorized within the limits of the conceptual frameworks that are brought to laboratory or to the field. The danger is that the scientist observes what he is looking for, and he observes what he wants to see. Personal commitments, inclinations, and theories influence scientific and engineering observations and our moral intuitions.

Progress in both science and engineering is a matter of developing theories of increasing inclusiveness and coherence, which make sense of our intuitions and discipline them.

In this respect, academic institutions play an important role in ensuring that scientific and engineering students develop better moral reasoning skills and that they learn to behave ethically from the start of their professional lives. Although this need is widely recognized in theory, it remains largely neglected in practice. Young scientists and engineering have a real need for specific ethics training and for more opportunities to discuss about the ethical dimension of their work (Andorno, 2003).

In fact, belonging to a group (such as a society or association of scientists and engineers) means following basic standards of conformity and conformity determines the extent to which social behavior would be in accordance with what the Society or Association accepts or considers as standard (Chapter 6). Standard behavior is, in fact, closely related to ethical behavior, which about conformity of behavior and doing what is right according to social standards or values.

For example, when considering developmental psychology, individual needs are met through social conformity as following ethical standards and engaging in ethical behavior, which can be rewarding to an individual and which would encourage or reinforce ethical standards. Ethics fulfils our social and recognition needs and our moral needs of regulating the desires of scientists and engineers.

Ethics can be considered as the moral aspect of the psychic structure of scientists and engineers and is essential to group behavior. Ethics is an important social developmental process and ethical values and beliefs must be forged early in the careers (or lives though parental guidance or educational system) of scientist and engineers (Chapter 5).

3.4 A Phenomenological Theory of Ethics

Phenomenology is a philosophy or method of inquiry based on the premise that reality consists of objects and events as they are perceived or understood in human consciousness and not of anything independent of human consciousness.

Human nature is inherently self-centered. Emotional expressions (mild to extreme) dominate human behavior. While such emotionality is natural, thinking is a process that requires time and has to be cultivated. As such, the process for becoming increasingly rational or ethical is also time consuming and its outcomes are not guaranteed to evolve and emerge as expected. Emotion, however, remains at the core, intensifies and establishes an inverse relationship with the development of rational or logical thinking.

The continued presence of emotionality is necessary to feel desire, passions. Emotions are the flames that will fire up our rational thinking in a manner that will move us to act on our thoughts. Without emotions, the completely rational person would remain unmoved. Without the acquired ability to reason, the completely emotional individual would be unrestrained to get whatever he or she wants. The baser or basic instinct of humans would definitely run amok since our underdeveloped reasoning skills would not be able to constrain or slow down the emotional onslaught.

The willingness and orientation to conform to ethical standards and make proper ethical judgments is rooted in the extent of internalization of a sense of morality in earlier years of one's socialization. The socialization of reasoning lags behind the emotional development of the individual and, thus, moral decision-making is guided by greater levels of emotionality rather than rationality. As such, moral judgments are more subjective and the ability of a scientist or engineer to reason about ethical issues in later years is affected by the extent to which one has emerged out of the emotionality of the past Self. Indeed, given this situation,

some individuals may not subscribe to the notion of ethical fact and their ethical judgments would not really be as objective (Hurley, 2007).

Phenomenology posits that: (1) scientists and engineers live in a natural world of values, assumptions, judgments, feelings and free choices, and (2) subjectivity and objectivity are intertwined. This phenomenological perspective on ethics emphasizes the role of the individual differences in meanings as providing the impetus for chosen actions.

Objectivity and subjectivity correspond to cognition and emotions respectively. With respect to ethical/unethical practices, academia is one of several contexts in which such scenarios happen. In all such sittings, the authors posit that individuals take aspects of social life (i.e. those that they were socialized into) with them and these aspects interact and are assessed by the individual's subjectivity and objectivity. For those individuals who are more emotionally driven (subjective) their ultimate actions would reflect their feelings. For those individuals who reflect on consequences in a rational and objective manner, their final actions might reflect the same. In situations where individuals know better and act otherwise, this may be due to emotionally loaded cognitions or outcomes of emotions (Phelps, 2005).

Increases in the level, frequency and severity of ethical dilemmas are directly linked to the quality of humanizing experiences, consideration for self, other sources of influence and the reward system of a society. Questionable socialization practices, whether self-inflicted or not, usually orient people in the long term to develop certain beliefs, values, and attitudes. These beliefs, values and norms can influence people independent of socially acceptable standards. Such individuals would experience a greater propensity to deviate from normative behavior in any context. This is the basis for unethical, inconsiderate conduct. For such individuals the extent to which their literature reviews, methodology, data analysis, and discussion of findings are

indefensible is of little concern to them. Of greater importance is their ability to make "wrong" look "right" in order to convince others and be rewarded.

The proliferation of unethical practices is both a culmination and constituent of *values in conflict* which leads to a focus on ends instead of process. Ethics and morals both equally refer to prescriptive rules or principles of action, rules presumably designed to make things better in some important sense by guiding appropriate action (Wagner and Simpson, 2009). In later years the word, "ethics," was used only in association with rules and regulations to govern the actions of professionals and morals were used only in reference to personal conduct.

There is a concern that both the social and personal questionable sense of morality at the individual level is evidence of the weakening of sociality, the loss of a sense of collegiality and the emergence of individualism even in the tertiary education environment. Differences in moral, personal and interpersonal orientations are due to a division between individualistic and collectivistic, independent and interdependent, bounded and unbounded (Turiel, 2002).

Moral identity formation is part of personality development. "The more you identify with a moral standard...the more that standard will direct your attention and flavor and filter human perception and interpretation. Aspects of the moral experience across space and time include being conscious of different interpretations of reality, different emotional expressions and exposure to differential degrees of commitment to fairness" (Peterson and Seligman, 2004).

"Ethical questions are essentially linked with choice" (Bali, 1997). Depending on the choice that an individual makes, there are certain consequences in the form of positive, negative, indifferent or delayed actions and reactions from others in the short or long term. Such actions on the part of subjects or objects may or may not conform

to proper ethical conduct. Any judgment of the ethics of the action is however dependent on organizational and societal requirements as embedded in Codes of Ethics (Chapter 6). In democratic scientific and engineering societies (Chapter 5) there is an expectation that individuals would align their behavior with that of others in order to promote general well-being.

There is a big difference between personal goals and public morality (Hakim, 2003) and, as a result, individuals are willing to engage in unethical practices particularly if they believe that such would not be detected and/or because of prioritization of the personal in the context of the social. The greatest challenge then is how to balance individuality with sociality in any context. This is further aggravated in circumstances where one enjoys freedom of choice in a context of deteriorating social norms and unenforced rules, regulations and sanctions. In pursuit of moral standards or proper ethical conduct, one set of standards must be capable of getting general agreement from all who can think rationally (Bali, 1997).

Ethics is indeed one of the pillars of scientific research, teaching and community service, thus one of the requirements of higher education. It is definitely one of the criteria for evaluating the quality of higher education in these aforementioned areas. Despite the range of factors that contribute to (un)ethical behavior, the central determinant is personal norm which determines the meaning that an individual scientist or engineer attaches to his position with respect to ethics. Personal norms can override the influence if any other factor including the codes of ethics of professional bodies. The ability of a scientist or engineer to manage emotions during the process of coming to know orients many individuals to act on feelings and engage in unethical practices.

This is followed by further discussion and clarification of meanings which results in less emotionally loaded

arguments and more rational views. At this stage there might be further reflection and research on the outcomes of the discussions and depending on this greater acceptance of the views advanced.

3.5 Conflicts of Interest

All members of the scientific community are faced with balancing conflicting interests and there is growing concern by many that a commitment to profit has resulted in a loss of confidence in the integrity of institutions of higher education and scientific and engineering research.

A *conflict of interest* occurs when a scientist or engineer or their respective organization becomes involved in multiple interests, one of which could possibly corrupt or destroy the integrity of the other.

A conflict arises when a scientist or engineer has the potential to lose impartiality because of the possibility of a clash between the scientist or engineer's self-interest and professional interest or public interest. Thus, it is a situation where a scientist or engineer limits his ability to discharge duties responsibility to another party (be it a scientist or engineer or the public).

A conflict of interest also exists if a scientist or engineer is entrusted with some impartiality. A modicum of trust is necessary to create it. The presence of a conflict of interest is independent from the execution of impropriety and can be discovered and voluntarily negated before any corruption occurs.

Professional ethics need to be set, especially in a business or a large organization where a group of individuals (in this context, scientist and/or engineers) may find themselves in situations where their respective values are in conflict with another, and they are in need of some reference as to what is considered ethical and not.

Briefly, a conflict of interest may be described as a situation where your personal interests or activities could influence an individual's judgment or decision-making and consequently, your ability to act in the best interests of the company or business.

Generally, there are three categories of conflict situations:

1. real conflicts of interest,
2. situations that constitute potential conflicts,
and
3. situations that are likely to be perceived as conflicts of interest.

Each type of conflict presents its own problems for scientists and engineers and requires careful review and appropriate management or elimination. They all have one thing in common: Unless they are addressed adequately, they will cause a loss of public trust in the institution and the scientific or engineering research it conducts. Over time, an institution (and its scientist and engineers) that has a reputation for being indifferent to conflicts of interest can suffer a number of consequences: loss of prestige, a lessening of respect for the scientists and engineers or faculty, and suspicion that research findings are tainted and/or manipulated.

On the other hand, a *conflict of commitment* (often interwoven with, and related to, a conflict of interest) is, generally, a situation in which a scientist or engineer is dedicating time to personal activities in excess of the time permitted by institutional policy, or to other activities that may detract from his or her primary responsibility to the institution. The issue is whether the scientist or engineer's commitment of time and effort are inconsistent with commitment to the organization/institution and its interests.

Some examples of conflicts of commitment (taken from academia since the corresponding behavior patterns from

a company are not known) are: a faculty member dedicating more than the permitted one day per week on personal consulting with a company or companies, a faculty member accepting an unpaid position on a company's scientific board of advisors and having access to and/or divulging confidential information when the company is sponsoring the faculty member's research, or a faculty member uses institution resources, including office or laboratory space and secretarial services in support of his personal consulting.

Again, using academia as the example, a conflict of commitment also exists when a scientist or engineer faculty member has instructional and mentoring responsibilities and he uses graduate students on a personal consulting project. While graduate students may be interested in the work performed on the consulting project, their participation is primarily of personal benefit to the faculty member. It is a misuse of a graduate student's time and detracts from his or her efforts to complete degree requirements. Furthermore, due to the intellectual property and confidentiality provisions included in most consulting agreements, graduate students would be unable to publish the results of their work.

A code of ethics enables the organization/institution to establish the ideals and responsibilities of the profession or business and also serves as a reference on acceptable conduct, increases awareness and maintains consistency and ensures improved quality. When scientists and engineers follow a set code of conduct, it also enables their colleagues and clients customers to trust the scientist or engineer with their critical information and is a conscious effort to protect the interests of the clients and professionals. This is especially true when a scientist or engineer is in business as a consultant. The client must know and feel comfortable that any facts or data disclosed to the consultant will not appear in a report or presentation to another client or

as an additional slide in a presentation at a scientific or engineering symposium.

Thus, scientists and engineers must exercise reasonable care and sound judgment to achieve and maintain independence and objectivity in their business-related activities. They must not intentionally conceal or misrepresent information or facts relating to recommendations, actions and findings or reveal any kind of information to deceive their customers, clients or partners, as the case may be. In short, the philosophical and psychological aspects of being a professional scientist or engineer involve doing the right things in the interest of the organization, profession or business, as the case may be.

On this basis, it is assumed that professionals maintain confidentiality and do not disclose sensitive and critical information about their clients/customers to third parties. The exceptions to this statement are if the scientist or engineer is required to disclose by law, if the information concerns illegal activities on the part of the client, or if the client expressly permits disclosure of information.

Conflicts between competing obligations, both of which appear to be valid, are common features of scientific and engineering life. The issue is the means by which such conflicts can be approached.

The most obvious criterion for separating conflicts (i.e., separating legitimate activities or obligations of scientists and engineers employees from illegitimate activities or obligations) is that the scientist/engineer employee has an obligation to avoid any activity that interferes in a clear and direct way with ethical performance.

If a potential conflict does arise, the scientists/engineer should make his feeling obvious in as responsible a manner as possible. If a corporate hierarchy is involved, this should be done in a private and non-confrontational way. The scientist/engineer should do everything possible to

avoid embarrassing the employer and give the employer the opportunity to correct the problem.

Thus, if disclosures are submitted indicating that a real or potential conflict exists, the organization/institution must have in place (if not, develop quickly) a plan to eliminate or mitigate the conflict. The plan must also contain monitoring provisions so that the organization/institution can be assured that the plan is successfully implemented.

Certain scientific and engineering professionals (especially those who may appear as an expert witness in court) are required either by legal rules or by rules related to the respective professional organization, or by society statute or association statute to disclose any actual or potential conflicts of interest. In some instances, the failure to provide full disclosure is a crime. Any scientists or engineers with a conflict of interest are expected to recuse themselves from (i.e., abstain from) decisions where such a conflict exists. This is in keeping with common sense ethics, codified ethics, or by (as noted above) by legal statute. In fact, to minimize any conflict, the scientists or engineer should not participate in any way in the decision, including general or specific discussions on the particular issue.

Generally, a code of ethics will forbid conflicts of interests. Often, however, the specifics can be controversial. For example, in the current context, it is arguable (often convincingly so) that a professor should not be allowed to have extra-curricular relationship or an extra-professional relationship with a student. There are those who will argue that the outcome should depend on whether the student is in a class of, or being advised by, the faculty member. It must also be remembered that the professor may sit on a committee (some levels removed from the usual professor-student level) that eventually decides whether or not the student has sufficient abilities to graduate. Is this not a conflict?

Some will argue “no” on the basis that the professor (no matter how eloquent his argument) is outnumbered. The same is true of many industrial settings in regard to a relationship between a supervisor (at whatever level) and an employee (at a lower level) in the company.

In-place codes of ethics in any organization can help to minimize problems with conflicts of interests before such conflict arise. The codes of ethics, assuming that they give details, can state the extent to which such conflicts should be avoided, and state what the involved parties should do where such conflicts are permitted by a code of ethics. In such cases, scientists and engineers cannot claim that they were unaware that their improper behavior was unethical. It is also important to recognize that the threat of disciplinary action (whatever is prescribed by the code of ethics) helps to minimize unacceptable conflicts or improper acts when a conflict is unavoidable.

Disclosure of potential conflicts of interest is a key issue because the organization/institution must review each case and make a determination as to whether a conflict exists or not. To accomplish this, many organizations/institutions have formed a conflict of interest committee. Scientists and engineers (no matter how logical their argument might be) cannot make this decision for themselves. It must be done by those having (in this context) no scientific or engineering or financial interest at stake. It must also be done by those appointed by and representing the organization/institution.

Conflict of interest committees have a range of options available to them when a conflict of interest needs to be managed. Each situation will have its own unique aspects and, therefore, the committee must carefully review each situation and ensure that the problems or potential problems are adequately addressed. At the same time, it is important that the committee not micro-manage the situation so that the scientific and engineering research is not

impeded unnecessarily. Some of the options available to the conflict of interest committee are:

1. require that the researcher disclose his or her conflicting interests to all collaborators;
2. require that the researcher have a person unaffiliated with his or her research provide an objective review of any manuscripts intended for publication;
3. require that the researcher revise aspects of the research project so as to mitigate any real or potential conflicts; and
4. prohibit the researcher from participating in certain proposed research activities.

However, while institutions can create policies, criteria, and guidelines, each case has its unique characteristics and must be evaluated on its own merits. Sometimes a case may present very obvious problems that must be managed. Sometimes two cases may be very similar and yet managed in very different ways. The bottom line is that each case must be reviewed in light of the policies of both the institution and the scientist and engineers involved.

Finally, conflicts of interest are not inherently bad or unethical. It is the failure to acknowledge and report real and potential conflicts or the failure to manage them effectively that are clear violations of the relevant policies.

In summary, the methodology of choice is that whenever conflicts of interest interfere with the conduct of scientific and engineering research, the work should not be undertaken (Bok, 2005). The best way to handle conflicts of interests is to avoid them entirely.

References

- Altman, E. 1997. "Scientific Research Misconduct." In *Research Misconduct: Issues, Implications and Strategies*. E. Altman and

- P. Hernon (Editors). Greenwich: Ablex Publishing, New York. Page 22.
- Andorno, R. 2003. "Teaching Ethics to Scientists: An Experience Report." *Ethik in der Medizin*, 15(3): 243–245.
- Audi, R. 2009. *Business Ethics and Ethical Business*. Oxford University Press, Oxford, United Kingdom.
- Becher, A., and Trowler, P.R. 2001. *Academic Tribes and Territories*. 2nd Edition. ed. Buckingham: Open University Press, McGraw-Hill Education, Maidenhead, Berkshire, United Kingdom.
- Bok, D. 2006. *Universities in the Marketplace*. University of Princeton, Princeton, New Jersey.
- Brown, B.L. and Hedges, D. 2009. "Use and Misuse of Quantitative Methods." In *The Handbook of Social Research Ethics*. D.M. Mertens and P.E. Ginsberg (Editors). Sage Publications, Thousand Oaks, California. Page 373–390.
- Brydon, L. 2006. "Ethical Practices in Doing Development Research." In *Doing Development Research* edited by V. Desai and R.B. Potter. Sage Publications, Thousand Oaks, California. Page 25–33.
- Chambers, C. 1983. "The Social Contract Nature of Academic Freedom." In *Ethical Principles Practices and Problems in Higher Education*. M.C. Baca and R.H. Stein (Editors). Charles Thomas Publishers, Springfield, Illinois. Page 23–36.
- Crane, A., and Matten, D. 2004. *Business Ethics*. Oxford University Press, Oxford, United Kingdom.
- Glaser, B.G. 1964. *Organizational Scientists : Their Professional Careers*. Bobbs-Merrill Company, Indianapolis, Indiana.
- Gumport, P.J. 2007. "Sociology of Higher Education: An Evolving Field." In *Sociology of Higher Education: Contributions and Their Contexts*. P.J. Gumport (Editor). Johns Hopkins University Press, Baltimore, Maryland. Page 17–50.
- Hakim, C. 2003. "Public Morality Versus Personal Choice: The Failure of Social Attitude Surveys." *British Journal of Sociology*, 54(3): 339–345.
- Hurley, P. 2007. "Desire, Judgment and Reason: Exploring the Path Not Taken." *The Journal of Ethics*, 11(4): 377–403.
- Mark, M.M., and Gamble, C. 2009. "Experiments, Quasi-Experiments and Ethics." In *The Handbook of Social Research Ethics*. D.M. Mertens and P.E. Ginsberg (Editors). Sage Publications, Thousand Oaks, California. Page 198–213.
- McDowell, B. 2000. *Ethics and Excuses: The Crisis in Professional Responsibility*. Quorum Books, Westport, Connecticut.
- Peterson, C., and Seligman, M.E.R. 2004. *Character Strengths and Virtues*. Oxford University Press, Oxford, United Kingdom.
- Phelps, E.A. "The Interaction of Emotion and Cognition: Insights from Studies of the Human Amygdala." In *Emotion and Consciousness*.

- L.F. Barrett, P.M. Niedenthal and P. Winkelman (Editors). The Guilford Press, New York. Page 51–66.
- Shrader-Frechette, K. 1994. *Ethics of Scientific Research*. Rowman and Littlefield Publishers, Inc., New York.
- Turiel, E. 2002. *The Culture of Morality: Social Development, Context and Conflict*. Cambridge University Press, Cambridge, United Kingdom.
- Viswanathan, M. 2005. *Measurement Error and Research Design*. Sage Publications, Thousand Oaks, California.
- Wagner, P.A. and Simpson, D.J. 2009. *Ethical Decision Making in School Administration: Leadership as Moral Architecture*. Sage Publications, Thousand Oaks, California.
- Whicker, M.L., and Kronenfeld, J.J. 1994. *Dealing with Ethical Dilemmas on Campus*. Sage Publications, Thousand Oaks, California.
- Wolf, A., Turner, D., and Toms, K. 2009. "Ethical Perspectives in Program Evaluation." In *The Handbook of Social Research Ethics*. D.M. Mertens and P.E. Ginsberg (Editors). Sage Publications, Thousand Oaks, California. Page 170–183.
- Yow, V.R. 2005. *Recording Oral History*. Rowman and Littlefield Publishers, New York.