UNESCO Consultation Meeting on Codes of Ethics in Engineering and Sciences

24-25 April, 2006
Qutab Hotel, Shaheed Jeet Singh Marg New Delhi, India

Report for Information

Introduction

This consultation meeting was the result of a collaboration between UNESCO New Delhi, the Regional Adviser for Social and Human Sciences in Asia and the Pacific, UNESCO Bangkok, and the Indian National Commission for Co-operation with UNESCO.

In the ***Opening Session***, Ms. Minja Yang (Director, UNESCO New Delhi) explained that this was a two-day public consultation to look at the needs and priorities in different fields of science and engineering: What are the good points that uphold responsible professional conduct in these professions? What codes of ethics work, and what do not? Can we link these to international codes? In the global community, are international codes needed? Mr. Keshav Desiraju (Secretary General, Indian National Commission for Co-operation with UNESCO) reaffirmed the solid support of India to the programme of work of the Division of Ethics of Science and Technology, and the work of the World Commission on Ethics of Scientific Knowledge and Technology (COMEST).

Context and Goals of the Meeting

Session 1 was on the ***Ethics of Science and Technology, and Goals of the Meeting,*** chaired by Judge Leila Seth (Indian Jurist and Member of COMEST). Prof. Jun Fudano (Kanazawa Institute of Technology, Japan, and Member of COMEST) reviewed *Codes of Ethics in Science and Engineering in Japan, with International Comparisons.* He mentioned how engineering ethics had become mandatory curriculum for engineering students in Japan. He reviewed the content of Japanese codes of ethics, and few mention whistle blowing. When he asked the participants whether there is a need for a universal code, there was unanimous agreement. He then outlined some previous attempts, introducing the NAFTA principles for ethical conduct for engineers (1995). He also reviewed themes for an international code (quoting Heinz Leugenbiehl).

Prof. Darryl Macer (Regional Advisor in Social and Human Sciences for Asia and the Pacific, a.i., UNESCO Bangkok) made an overview for the meeting in a talk on *UNESCO Programmes in Ethics of Science and Technology and Goals of this meeting*. The expected outcomes he outlined were:

1) List of current national, regional and international codes of ethics in science and engineering that are actually being used/implemented.
2) Review of these codes with summary of positive and negative points, and discussion of their origins and evolution.
3) Expert cross-cultural review of the UNESCO 1974 Recommendation on the Status of Scientific Researchers, covering topics included in that recommendation.

4) Recommendations for UNESCO and COMEST on the needs for codes of conduct for scientists and engineers, and their scope in topics and geographical alliances.

Prof. Dinesh Mohan (Coordinator, Transporation Research and Injury Prevention Programme, IIT, Delhi) talked on *Codes of Ethics in Engineering in India.* He has spent 25 years in biomedical engineering and transporation safety research, but his talk was focused on the overall issues of ethics of the governance of science and scientists. He observed that faculty members say different things pending which political party is in power, and that freedom of expression decreases as the society moves towards privatization. He asked how to continue to advance knowledge, standards, and intellectual cooperation in order to facilitate social transformations where the values of rights are presently lost. He considered article 42 of the 1974 Recommendation (that scientific researchers need to be able to make trade unions) as being important in the Indian context, as many organisations prohibit unions. If scientists purely say what they believe to be the truth, they may not get funding.

The Indian Institute of Technology rules of conduct tell employees that they should neither undertake any political activity, nor criticise the institute or the government in public. He wondered whether this violated the Constitution of India, and considered it a barrier to the development of policy decisions based upon freedom of research and expression. He gave some examples from highway and road engineering, and the lack of safe places for pedestrians in urban areas, which go against international recommendations and standards. He also discussed the Delhi and Kolkata metros, asking whether they were justified as public works projects on a per capita basis of expenditure, and suggested bus lanes as a more economically fair and efficient way to achieve the goals of alleviating traffic. Should we assign responsibility to those who do feasibility studies and question the ethics in such activities? When environmental impact statements that include worst-case scenarios and cost effectiveness analysis seem to justify most projects proposed by big industry or the government, shouldn't there be a case questioning the ethics of those involved?

Dr. Rajendra Prasad (Scientific Secretary to DG, Council of Scientific and Industrial Research (CSIR), New Delhi) talked on “Ethics in Engineering Sciences in a Research Environment”. He said an engineer is a grand translator between science and technology, who creates and uses new knowledge and also makes new standards. They also deal with many new research areas. He said that a universal code of behaviour, including items such as against discrimination, is essential.

In response to the 1974 UNESCO recommendations, he thinks CSIR is doing well when it comes to: using scientific and technological knowledge for the enhancement of cultural and material well being; public funding and public investment; conditions for mobility of scientists; and vocation of intellectual freedom. These values are also in the mission statement of CSIR. Societal benefit is a core value for ethical transmission of science. There are some other issues that need discussion, such as secrecy, IPRs, use of material in partner institutions, and answerability to society.

He discussed three codes of ethics in India and social responsibility, including: Consulting Engineers Association of India, item code 17; Institution of Engineers, India, Annex II (this code also includes corporate members); Code of the Computing Society of India (this code discusses compliance with anti-piracy law, personal integrity and transparency, and ways to take action against any members).

The following ***discussion*** focused on mapping existing codes of ethics and conduct relating to physical sciences and engineering in India. The issues discussed included a need to consider gender perspectives, a need for a universal curriculum guide, and resources for teaching ethics of science and technology. There was also a need to consider the implications of information overload, given all the information that is available on Internet. There is a need to consider the ethics of knowledge production as well as in the dissemination of knowledge. Although there are IRBs to clear research in medical and life science, there are no ethics committees in engineering. The general principle is that the projects need to be for the good of the country.

Session 2 was on ***Discussion and Review of the 1974 Recommendation on the Status of Scientific Researchers.*** Dr. Darryl Macer, UNESCO Bangkok, chaired the discussion, that followed the paper by Prof. P.N. Tandon (President, National Brain Research Centre, Manessar, India; Member of UNESCO International Bioethics Committee), entitled, *Does the 1974 Recommendation fit Emerging Areas of Life Sciences?* Tandon's reply to the question is a clear "no". The very fact that UNESCO established the IBC implies that the existing guidelines were not sufficient to deal with life sciences and technology. Many recent issues are not discussed in the 1974 document, which is really looking at science promotion. The three UNESCO Bioethics Declarations focused on human rights. But in Asian society, community rights are more important than individual rights.

Since 1974, India has implemented everything in the Declarations, including the demanded national science policy. In India, in the life sciences, there are guidelines on protection of research subjects; for human genome research; and now there is work on an overwhelming document (under the chairmanship of M.G.K. Menon) that will cover all documents including engineering.

Despite their existence, codes and even laws are not implemented. Since the implementation is by country, there is little UNESCO can do. In the 2005 Declaration, the inter-governmental commission rejected monitoring that the IBC had drafted. Also, most countries have no monitoring ability; policy formulation is not enough. International codes are needed, given the industrial influences across countries. He said IPRs are the most important ethical issue in the international community today.

In response to the issue of individualism, Dr. Jasdev Rai said that not all communities in the East are communitarian. For example, individuals are sovereign in Sikhi; also, the Indian constitution is based on the individual level. Dr. Tandon replied with examples of seeking permission for medical research which first required the village head permission, then family head, and finally individual. There was also detailed guidance for genetics research in the 2003 International Declaration of UNESCO, including informed consent, donor issues, risks and benefits of competing values.

Dr. Matar, from the All Indian Institute of Medical Sciences (AIIMS), described their IRB as well as biosafety and animal welfare committees. Implementation and monitoring are very important to them. There was also general discussion of fetal rights, organ donation, and advance directives. There was a call for social scientists to be included in these bodies, and for interdisciplinary research principles.

Dr. Anwar Nasim mentioned that busy scientists do not have time to read all the guidelines, nor are familiar with all the committees. He is a member of the Pakistani

National Bioethics Committee, and they spent days just trying to understand how to apply informed consent. He asked how we can facilitate knowledge sharing between regions, and, secondly, how to really deal with these ethical issues, given that we live in an unethical world.

There was then extensive **general discussion** on the need for ensuring motivation of persons to develop a voluntary code for their life. Internal qualities like self-control and intellectual honesty are as important as life goals. The institutional responsibility is important to separate from the duties of every scientist.

Publication Ethics and the Internet have emerged as important issues in the past decades. Science has undergone a transformation in issues such as peer review. There was skepticism of impact factors and other measures to assess quality. Piggyback writing, where the head of the department automatically is added, is a problem in India. Plagiarism is also important, and second language publishing made it more difficult to prove plagiarism.

IPR's interference with open publication is difficult, as it leads to differences in access to scientific data between countries. There is a need to have a level playing field, because access to journals and publications is often difficult. Also, in molecular biology much research is based on borrowing of gene constructs, not just published results.

There followed an extensive discussion on commercialization. There was a debate between supporters of commercialization and industrial sponsorship of funding, versus traditional public science. It is difficult to clearly separate basic and applied research, as commercial interests are increasing in many fields.

Dr. Prasad mentioned that the government of India is discussing a new legal framework for the university sector to be more aware of patents and their filing. Others mentioned that in the agricultural field it is a very critical issue, as both private and public partnerships are needed. Issues in marketing and publishing were discussed.

Also, 3-4 major tragedies relating to industrial disasters have occurred, including Bhopal.

Prof. Sivakami pointed out that the state does not make the technology available. Rather, industry or NGOs make it available, as in the case of medical techniques.

There was discussion of military research, given that more than 55% of funds from the government for research go to defense and strategic research. These areas are "sacred cows", and we cannot talk about these; little knowledge comes out of this. There are risks of research and development (R&D), but currently there were minimal debates on these subjects. Biological warfare was a common concern. There were also interlinkages between civilian and military R&D.

The second day started with ***Session 3,*** which was a ***Roundtable Discussion on Ethical Codes in Life Sciences***, chaired by Leila Seth. The first speaker was Prof. S.P. Thyagarajan (Vice Chancellor of University of Madras, Chennai). He reviewed the need for codes of ethics in research, and the ethical foundations of current codes that govern biomedical research in India. They are related to the system of international guidelines. The professional members have to be made conscious of these guidelines in order to implement them. He cited article 19, UDBHR that spells out the responsibilities of the ethics committees. In 2000, The Indian Council of Medical Research (ICMR) also laid out guidelines. In universities they also have animal welfare committees, governed by freedoms including: freedom from discomfort, hunger, and thirst; freedom from pain,

injury, or disease; freedom to express normal behaviour; and freedom from fear and distress. He concluded that professional ethics is equal to good discipline.

Dr. Nandini Kumar (Deputy Director-General, ICMR, New Delhi) then reviewed the basis for ethical considerations in biomedical science, which included the ten recommendations of innovation technology by the UN millennium project. The statistics showed that the most common causes of death created a disastrous situation for the poor countries, as they led to great economic suffering. Thus, health influences economy. Many examples of ethical issues pertaining to health research and biomedical research were mentioned, including: funding for R&D, managing IPR, vaccine trials, drug delivery systems for rural health care systems, advocacy for policy making, pharmaceutical R&D requiring ethical codes, access to genetic resources, informed consent, community consultation, prenatal diagnosis, DNA technology, fora of ethics committees like FERCAP, FERCI (for India), etc.. She stated that within India, there is interagency collaboration between ICMR and DBT on framing related ethical guidelines that would soon be legislated. She informed that ICMR has already initiated sensitization and training of scientists in bioethics, and from the Grants received from NIH (Fogarty), USA and WHO, it has targeted trainers, researchers, and students for education on this subject.

Mr. Saionton Basu (Advocate, Supreme Court and Associate, Amarchand Mangaldas, New Delhi) made comments from a legal perspective on stem cell research and the clauses on punishment. Using the example of the "seven pillars of good governance", at the Rajiv Gandhi memorial, many issues are common. He called for national bioethics committees. He discussed animal rights committees, mentioning that local ethics oversight is needed rather than reliance on a central committee. He called for the development of comprehensive, uniform regulatory implementation, and the need to devise means to implement international instruments in each jurisdiction. It was necessary to engage in discourse and debate with stake holders in every jurisdiction.

Dr. Anwar Nasim (Adviser Science, COMSTECH, Islamabad, Pakistan; Chairman, National Commission on Biotechnology of Ministry of Science and Technology) said that the principles outlined for India apply equally to the situation over governance of life science research in Pakistan. Recently, there was positive cooperation in biotechnology forums to bring persons from India and Pakistan together, which can also provide an opportunity to discuss bioethics. There needs to be a good method of implementation, and therein lies the challenge. There should be initiatives for promotion of knowledge sharing. He also talked on the many useful books and information being produced by various groups, including UNESCO, and the need for international discussions.

In Pakistan, the National Bioethics Committee under Pakistan Medical Research Council has been set up. There are both research ethics and medical ethics committees. He also applauded the Centre for Bioethics and Culture at the Sindh Institute of Urology and Transplantation in Karachi, and their joint UNESCO Bioethics Conference in 2006. Religion can help with resolution of these issues; there is flexibility in religion, and Islam means peace and submission to the will of Almighty Allah. In terms of basis of Islamic society, there is a need for discussion; *Ijtihad* is a concept which gives flexibility to examine and adopt new developments and resolve issues in the light of basic sources of Islam.

Dr. S.K. Tandon (ADG, Indian Council for Agricultural Research, ICAR, New Delhi) discussed the types of choices in agriculture. By 2020, India needs to double production. There are many centres of agriculture, and each is doing regionally relevant research. For example: design of tractors requires agro-morphological data to reduce drudgery in the farm, and reduce accidents. There was a need to create infrastructure in the villages. Poor farmers need to get returns from crops, if they use hybrid crops. Biological control of pests and Bt cotton were important concerns given the pesticide usage without these methods. Indian farmers could not compete well in a global market, as India cannot afford to pay subsidies to farmers. He considered that IPRs are only for industrial benefit. A code of ethics means we need to acknowledge the work of others.

There was then **general discussion**. Dr. Kondon at the National Center for Biotechnology suggested that we should not waste too much time discussing biosafety and IPR issues, but focus on conducting research ethically. There was discussion over genetic engineering and the contrast between some NGOs and the Indian Department of. Biotechnology. Dr Matar from AIIMS discussed that they had spent a long time discussing guidelines on stem cells, and there are two sets: one on adult stem cells, and one on embryonic stem (ES) cells. He argued for the need for a central monitoring committee. There was widespread discussion on topics including ethics and IPRs, embryo research, common heritage, genetic testing, and GMOs.

After lunch, ***Session 4*** was a ***Discussion on Ethics Codes in Society***, chaired by Dr. Darryl Macer. Professor V. V. Krishna (Professor in Science Policy and Chairperson, Centre for Studies in Science Policy (CSSP) School of Social Sciences, Jawaharlal Nehru University, New Delhi) made a presentation discussing globalization and the changing structure of science as social institutions. There was a trend away from open science. Too much policy focus on the commercialisation of knowledge and intellectual property rights and secrecy by public research systems in developing countries in Asia is giving way to a "new social contract of science". This trend that drives science more to market and commercialisation needs to be checked and regulated. Co-production of knowledge involving the participation of different stake holders in the decision-making process in biomedical and biological sciences needs to e strengthened in developing countries, particularly SE Asia and South Asia. This will not only arrest unethical practices, but will regulate new knowledge in the interest of society.

There was a call by Prof. Sivakami that we should develop ourselves in the name of globalization. Then there was discussion of the lack of spending on R&D, and high funding of military research. There was a need to distinguish between fundamental research and applied research.

Comments from the **religious groups,** including Hinduism, Islam, Christianity, and Sikhism, were presented. Mr. Gokulnanda (Ramakrishna Mission, New Delhi), discussed how to make people ethical. He gave quotes from the Bhagavad Gita that the interconnectedness of persons is important. Spiritual intelligence is beyond emotional intelligence. Students need self-reflective processes, as well as education on the ability to review both their short- and long-term goals. Religion can help develop the commitment to work and do good, without dividing among ourselves.

Father Pinto (Catholic Diocese of New Delhi) described some basic moral rules: Whatever our actions are, our intentions are really important. We have to respect the human person, so we cannot harm them. There is respect for life from the womb to the

tomb. Sex determination and abortions are very wrong. If we are concerned about life, we are called to improve the quality of life. On stem cells, if love is the hallmark of our behaviour, then life is for procreation, not for production. The church does not accept ES cell research, as it kills the embryo.

Dr. Jasdev Rai gave a presentation on Sikhi and the ethics of engineering and science. Science has become value laden; he said that Science is a knowledge of "how" rather than a metaphysics of "why", but it has claimed the public space as a culture in the last century. He reflected on why science in Chinese, Indian, and Islamic civilisations had failed to develop compared to Western science. Technology is a race, and we need codes of practices. Maybe science did not stagnate in earlier civilisations, but rather society in the past thought it was dangerous; those civilisations may have made a decision of when to stunt the development of science. We may have to reflect on wisdoms from history. He also thought that India, the land of Dharmashastras, may have some useful insights to offer in the field of ethics.

Jun Fudano said that Buddhism and Shintoism are combined. Considering the relationship between man and the world, there is no separation between creator and creation. They emphasise the relationship between human beings rather than God, so when we define ethics, we try to consider these relationships. There is a lot of emphasis on our ancestors; there is also a basis for an intergenerational ethics. He thought we do have some basic universal values. We can identify these, and see how each culture can use them.

Anwar Nasim said that in Islam, one has freedom to behave, but in consonance with the basic Islamic principles. How do we behave with regard to our neighbour? What is our role in society? We have non-government individuals (NGIs). If we wish to become more positive in our thinking, we must consider this: The world we live in has great scope, but we as individuals need to be motivated. We must examine our purpose of existence and have a well-defined mission in our lives. No religion teaches you not to be friendly and considerate to your neighbour. In Islam, there is no final authority for moral decisions.

Macer mentioned that there was not time to reflect on all the various interpretations of these religious teachings, but that the remaining time be used to consider the 1974 document and ethical codes. There is a common basis in all religions to have individual and social responsibility for ethical action as professionals. Plenary discussion reverted to some discussion of IPRs, and it was pointed out that discovery of nature is the property of all of humankind. Genetic resources were also part of the common heritage of humankind.

Concluding discussion of the **1974 Recommendation** on the Status of Scientific Researchers included the additional following points.

1) It is hard to distinguish applied and basic science, science and technology, and nature and culture. Science is both a system of knowledge and a specialized activity that we need to sustain.

2) Ethics education is important, and the sentence in the definition of science in the 1974 document includes the importance of questioning. Science both solves and creates problems. Science graduates should receive education in ethics, philosophy, science, and society, and perhaps comparative religions and culture. Jun Fudano asserted that as we generate many engineers and scientists, we need to ask: What are the basic values for

science to rely upon? What is the platform for science? We need some behavioral guidelines for students to absorb. In most engineering colleges in India, there used to be a social perspective in philosophy and social science. But nowadays it is lost from the curriculum. Leila Seth mentioned that children learn social responsibility, honesty, and sharing early in life.
3) There was debate over whether the importance of religious values should be specifically mentioned. There is a lot of disagreement over religion, but some common agreement exists on some values. Moral integrity is important to mention. Respect for life is important as an attitude, and there are some examples of this in prayers for cadavers in anatomy classes or animals sacrificed for research in some countries such as Japan.
4) Scientific knowledge needs to be open.
5) The 1974 document is different from another document called *A Code of Ethics*. We need to think of the relationships between codes of ethics. There is sensitivity in a few areas.
6) Referring to p.2, section II does not take into consideration the whole context of scientific decision making. Participatory decision making should be included. The earlier role of science was more deterministic; civil society is now asking questions. Stakeholders should participate and discuss science. That element must be brought into the development. There is a need for relevant social groups to be involved in shaping discussion.
7) This document does not say much about employment of scientists in private research labs. Nowadays there are many multinational companies. What codes of ethics are important in this context? What are the norms that govern this?
8) For a code of ethics in medicine, we have a medical council model which can be adapted in other sciences and engineering, to be able to punish those who are unethical. But although there are many codes of ethics in India, there is no implementation there. When it comes to punishing unethical doctors, the council feels sorry for the professional who will be punished. How can we ensure it is implemented? For example, how can we ensure that scientists get proper equipment or environment? And if there is some deviation, what should happen? The lessons from the United Nations and human rights commission was given, as well as recent improvements in women's rights. The body may need to be outside of government; an independent body. The forum for research ethics committees (FERCAP) was discussed.
9) Ishmar Verma noted that this document should be structured into three sections for target groups: One for states, one for individuals, and one for institutions. He considered that some reference to all the issues discussed is in the document, but it needs extension. Others pointed out that sciences may differ with specialty, and they reaffirmed the need for separate sections. Also, different countries are at different stages in knowledge use and production.
10) There was discussion of the vocation of scientists, and on p.4, article 13, it says that the work of scientists is knowledge production. This needs to be emphasized.
11) The term "mankind" needs to be changed throughout to "humankind".

Conclusions of the meeting were given by Darryl Macer, UNESCO Bangkok, who thanked everyone for participating and for the staff of UNESCO New Delhi Office. The follow-up would be developed with the Indian National Commission to UNESCO,

and the COMEST committees. The participants requested more meetings on ethics in India; Macer said that there would be more meetings with network partners, and that the feedback given in the consultation had been very useful for the work of the Division of Ethics of Science and Technology and the regional programmes out of UNESCO Bangkok.