CHAPTER - I

INTRODUCTION

The life on the planet Earth has evolved to its present stage through millions of years of interaction between the organism and its environment. It, therefore, goes without saying that the very existence, survival and progress of man on earth depends on the quality of environment. As the most enlightened species, Homo-sapiens, man has paramount responsibility to preserve the environment and improve it qualitatively, not only for himself but also for the posterity. A cursory glance of the contemporary environmental scenario, on the contrary, presents a picture of dismay, gloom and to extend it a little further, a picture of doomsday looms large over the head of humanity like a Damoclesian sword. Catastrophic events like London smog, Torrey Canyon disaster, the Minamata tragedy, severe drought in Ethiopia and Sahel region, Chernobyl and Bhopal disasters etc. bear testimony to this. In the recent years the world is passing through an unprecedented environmental crisis, all created by man's action in an attempt to master nature through science and technology and exploit its resources for his lavish life style causing ecological disruption. History is replete with examples of flourishing civilizations which crumbled and decayed under the weight of environmental pressure created by them.

The challenge before the mankind is, therefore, as the Brutland report : Our Common Future (1987)[1] puts it-to save the global commons-the air, the water, the land, the biota etc. from degradation and destruction and development of a

value system in the people for 'one world, one future'. Sustainable development through interweaving of ecology and economy is the call of the time. But just as every dark cloud has a silver lining, many of the current efforts of man also rekindle hope about world's environment. The 'Stockholm Conference on Human Environment-1972', the 'United Nations Environment Programme (UNEP)', the recent 'Montreal Protocol on Chlorofluorocarbons (CFCs) and the proposed 1992, U.N. Conference on Environment in Rio de Janeiro, Brazil are examples of such global efforts. In our country shelving of the 'Silent Valley Project' in Kerala and the 'BALCO, Bauxite Mining Project' in Gandhamardan hills in the Eastern Ghats in Orissa, massive Ganga Action Plan etc. are pointers of national success stories of environment. The prospect for human environment is thus a mixture of gloom and rejuvenation like the mythical bird Phoenix.

The Environmental Crisis

The evidences of environmental crisis, are present everywhere in the biosphere. A global confession about this came in the report of the UN Conference on Human Environment, Stockholm, 1972.

> We see around us growing evidences of man-made harm in many regions of the earth : dangerous levels of pollution of air, water, earth and living beings ; major and undesirable disturbances to the ecological balance of the biosphere, deficiencies harmful to the physical and social health of man, in the man-made environment particulary in the living and working environment (UNESCO,1977)[2].

Even nearly two decades after the Stockholm conference the crisis, far from being blown over, is threatening mankind with menacing proportions, as evident from the report of UNEP-sponsored International Congress on Environmental Education and Training held in Moscow (USSR) during August 1987. The major pressing environmental problems of the globe as identified in this conference are : urbanisation, population explosion (in developing countries), energy crisis. depletion of tropical forests, deforestation, present and future climatic changes, mismanagement, pollution and shortage of water, loss of productivity of land, greenhouse effect and global warming, marine pollution, threat to human health and the environment by the hazards of 70,000 chemicals, erosion, floods and famines specially in developing countries, depletion of natural resources and ozone layer etc. (Ghaznawi 1989).[3]

While the industrialised or developed countries face environmental problems due to intensive application of science and technology and affluent life-styles, the developing or third-world countries are confronted with environmental problems which arise mostly due to underdevelopment and problems which arise in course of development. Poor conditions of human settlement, loss of productivity through disease, insanitation and malnutrition, high rate of population growth, poverty, deforestation, natural disasters and in general the poor quality of life in terms of standards of living, plague these countries. Late Mrs. Indira Gandhi rightly observed that environmental problems of rich countries arise out of affluence and lavish consumption styles, while in the developing world they arise mostly out of ignorance and poverty (Gandhi 1972).[4]

The reports : 'The State of India's Environment' (1985)[5], Environmental Problems of Orissa, (Praharaj, 1985)[6], Environmental Priorities in India and Sustainable Development (Khoshoo 1986)[7], all illustrate that in addition to environmental problems peculiar to developing countries, India also suffers from other global environmental problems outlined earlier, though in varying degrees.

International publication and reports of commissions such as the club of Rome's-'Limits to Growth (1972)'[8], 'Global-2000'(1980)[9], the International Commission on Environment and Development's report 'Our Common Future' and the Brandt Commission report, 'North-South-A Programme for Survival' (1980)[10] have warned the mankind against the impending doomsday and catastrophic nature of environmental problems unless corrective measures are taken well in advance.

The problems of environment are matters of common concern for the entire humanity as in their solution lies the future survival of man. The all-inclusive aspect of environment makes it necessary, that these problems be conceived in terms of their totality and should not be limited by national, geographical or regional considerations. Since in their total impact the environmental problems concern the entire humanity, a concerted effort is absolutely essential for their control, prevention and solution.

The Role of Environmental Education

The declaration of the UN Conference on Human Environment organised in Stockholm in 1972 proclaimed "To defend and improve the human environment for present and future generation has become the imperative goal for mankind"[11]. Hence humanity needs to become aware, conscious of and knowledgeable about environment and its problems. It

has to understand the underlying causes, the manifestations and impact of these problems, so as to act in a concerted manner for alleviation and solution of the existing problems and their recurrence. Education can be a powerful intervention in this respect. Swaminathan (1978)[12] has pointed out that education is essential for generating wide-spread awareness of environmental problems. Awareness is essential for action. Without proper educational efforts, the awareness-analysis-action chain does not move smoothly and effectively. Awareness and action have to be supplemented by inculcation of appropriate environmental ethics and positive attitude towards environment, as well as decision-making abilities.

Considering the potential of education as an effective instrument in tackling environmental crisis 'Environmental Education' can be a powerful instrument in understanding, preventing and solving environmental problems. The role of environmental education can be visualised in two ways in this context.

First, to develop human resource of the highly specialised and professional groups such as scientists, technologists, doctors, engineers, architects, town planners, economists, industrialists and other skilled professionals and workers who will contribute to the solution of environmental problems through appropriate technological know-hows.

Second, to promote environmental awareness among students, teachers, the members of the community and general public through a thorough understanding of environmental

problems, their nature, cause, manifestations, solution and inculcation of ethics and values conducive to environment. This will, in the long run, result in motivation, commitment and action geared towards prevention and solution of environmental problems.

The Importance of Environmental Education

The importance of environmental education in understanding, preventing and solving problems related to the environment has been widely recognised all over the world. Evidence to this are a number of national and international conferences, seminars and workshops on the theme and efforts made by different countries in introducing the perspectives and scope of environmental education at all levels of education during the last two decades.

The beginning in this direction was made by the International Working Group Meeting on Environmental Education in the School Curriculum organised in 1970 at Neveda by the Forests Institute for Ocean and Mountain Studies under the aegis of UNESCO and International Union for Conservation of Nature and Natural Resources, (IUCN). It recommended as follows :-

The Working Meeting

> Considering the appropriate education being a necessary pre-requisite for improvement of the total critical environmental situation.
>
> Being aware of the urgent need for environmental teaching and adequate training of teaching personnel.

> Suggests to the Governments and their responsible educational authorities as well as to the national education organisations.
>
> (1) that through a reform of the total curriculum the environmental education be introduced as an obligatory and integrated component of the school educational system at all levels.
>
> (2) that appropriate pre-and in-service teachers training be organised through obligatory environmental conservation courses in teacher training colleges, universities and other educational establishments involved in teacher training.[13]

The Tbilisi Intergovernmental Conference on Environmental Education, (1977)[14] appealed to member states to include in their educational policies, measures designed to introduce environmental concerns, activities and contents. It further invited them to promote and intensify thinking, research, and innovation in regard to environmental education. The Belgrade Charter (1977)[15] also recommended on similar lines.

In our country the national concern was reflected in the 'National Policy on Education-1986' document. The document observed:

> There is a paramount need to create a consciousness in the environment. It must permeate all ages and all sections of the society beginning with the child. Environmental consciousness should inform teaching in schools & colleges. This aspect will be integrated in the entire educational process[16].

The national sentiment and concern for environment was echoed further by Mr. Rajiv Gandhi, during a key-note address to the UN General Assembly in September 1987. This was followed up by mooting the idea of 'Planet Protection Fund' (whereby each country was to donate certain percentage of its GNP for conservation of environment to a globally established fund) in the Belgrade non-aligned meeting of nations.

Incorporation of Environmental Education

Following the 1977 Intergovernmental Conference on Environmental Education at Tbilisi,many countries have included environmental education in school curriculum either directly or through related areas of science, social science and other disciplines or as environmental study. A brief summary of such incorporation in a few developing countries is given below.

In Afghanistan environmental education has been incorporated in school curriculum through ecological education. Topics like conservation of land, protection of flora and fauna, sanitation, values concerning animals and plants and their environment find place in grades V- XI. In grades III and IV a subject called 'Nature Studies' is included to teach about environment.(Fazil, 1988)[17].

In Bangladesh as per recommendation of a national curriculum and syllabus committee, a subject 'Environmental Studies' has been included at primary schools in grades I-V. The subject which is inter-disciplinary in nature contains elements of natural and social sciences, so that, the learners are exposed from the beginning and acquainted with immediate environment and its associated problems. Topics included range from family, neighbourhood, food,

shelter, clothing, schools, festivals etc. and are developed in a spiral manner. Participation of learners in observation, analysis and practical work enables them to develop positive attitude, skills and competencies. At junior secondary level (grades VI_VIII) topics on environmental education are included in general science and social science. There is no well defined syllabus on environmental education for secondary and higher secondary level (Haq,1988)[18].

In Malyasia a new subject 'Man and the Environment' is being studied in grades IV-VI. The rationale for the subject stresses on the need for humans to live in close harmony with the world around him in order to ensure better quality of life. At the secondary level topics and concepts pertaining to the environmental problems and issues are sporadically found in disciplines such as the sciences, health, home, economics, geography and other related subjects (Ali, 1988)[19].

In Nepal environmental education does not constitute a separate subject of study at any school level. Elements of environmental education are incorporated either through science or health education course. But science is not compulsory at secondary level. However, curriculum contains elements of population education (Mallick, 1988)[20].

In Pakistan, text-books of social studies and science of classes (I-X) have been revised to high-light the environmental education concepts and ideas. (NIEPA 1959).[21]

In Srilanka formal environmental education has been integrated into the curriculum at primary, secondary, higher and professional training levels. At primary level the subject is taught through environmental studies containing eleven themes like what we drink and eat, our home, how we travel and communicate etc, developed in a spiral way. At secondary level different subjects have been given environmental dimension. Topics include atmosphere, climate, animal diversity, pollution, soil, natural resources etc. At higher education a new subject, Environmental Ecology, have been introduced (Fernado,1988)[22].

Environmental Education in India

The great books of Indian wisdom, the Vedas, the Upanishads, the Hindu philosophy, Indian culture as well as history, all afford significant place to environment, bestowing upon nature, love and reverence. Basic education propounded by Mahatma Gandhi, was a pedagogic attempt to forge the missing/weakened linkage between man and his environment through utilisation of local environment as a medium for study.

The first attempt to make education environment based emphasizing acquisition of knowledge through processes of science using the local environment was made in the experimental edition of 1963 syllabus in general science for classes I-VIII (Bhattacharya, 1985)[23].

But to a large extent the national syllabus of 1963 and 1973 lacked environmental dimension due to three reasons-

lack of awareness among the curriculum framers, colonial legacy, and lack of expertise in spite of recommendation of the Education Commission (1964-66) that in lower primary classes the focus should be on child's environment-social, physical and biological.

The documents 'Curriculum for the Ten-year School : An Approach Paper' and 'Curriculum for the Ten-year School : A Framework (1975)' contained elements of environmental education. It recommended :-

> For the middle stage ..... environmental education, nutrition, health and population education should receive adequate attention ; so that science is related meaningfully to life.
>
> x x x x
>
> ... at secondary stage .... in science and mathematics the student should have competence to apply his/her knowledge to the solution of problems around him. He should be able to contribute meaningfully to environmental conservation, reduction of pollution, development of proper nutrition, health and hygine in the community.[24]

NCERT in 1975 undertook a programme of massive curricular revision of text books for school stage making the curricular material environment-based. At the primary level for classes I and II, the natural and social environment was included in a holistic way and a teacher guide in environmental studies was developed in view of the limited language competencies of these students. The instructional material in classes III-V dealt with natural and social environment separately, in an activity oriented and spiral manner focussing on environment.

For the middle stage an integrated science curriculum based on environment and directed to achieve competencies essential for living and changing environment has been developed. The understanding about the social and physical environment developed at the middle stage is further reinforced in the secondary stage, through the study of subjects like geography, biology and chemistry etc. Some of the units dealing with environmental education are population, land, resources and their use, food and nutrition, conservation, pollution, health and hygiene, man in nature. Many of the states have adopted/adapted these curricular materials developed at the national level.

Curriculum development has undergone further change in 1986 following the implementation of National Policy on Education-1986. (NPE). The 'National Curriculum Framework' which outlines implementation of the NPE has recommended several measures for implementation of environmental education. These relate to (i) the approach to curriculum construction and transaction (ii) selection of relevant content (iii) teaching-learning strategies (iv) preparation of instructional material for teachers and (v) orientation of teachers.

The scheme 'Environmental Orientation to School Education' is being implemented in the country since 1988 under the aegis of Department of Education, Ministry of Human Resource Development, to allow educational programmes in the schools to be fully harmonised with the local environmental situ ations and concerns. A compact area having uniform ecosystem and hence similar environmental concerns is taken as an unit and a project. One hundered such projects have been visualised for the country by 1990. Special cells in the directorates of education of states/union territories and

project cells in the project areas have been established with adequate staff to plan, co-ordinate and monitor activities proposed to be undertaken under the schemes. The project activities envisaged under the scheme are, adoption of monuments, nature study, study of ecological problems of a village, adoption of a municipal ward or locality to study its social and ecological environment, history and culture and their dissemination, review of curriculum to make it local specific through curriculum workshops, preparation of text-books/instructional material, slides, audio-and video tapes, films of environmental conservation, plantation of trees, visit to zoos/wild-life sanctuaries, trekking, nature walks, measurement of environmental erosion etc. (MHRD, 1988)[25]. The scheme is being implemented in collaboration with state government departments like Department of Forest and Environment, Pollution Control Board and Non-Government Organisations in the state with 100 per cent financial assistance from Govt. of India.

The Centre for Environment Education (CEE), Ahmedabad is involved in spreading environmental awareness among children and general community. The scope of its programmes include the natural, man-made and the cultural environment. The thrust area of centre's activities include : environmental education in schools, interpretation of national parks and sanctuaries in India, media support on environmental issues to regional language newspapers, production of good television programmes and films on environment, arranging exhibitions, propagation of India's rich and varied natural heritage through books, field guide, charts, posters etc, eco-development for communities living in and around national parks and sanctuaries, preservation of

cultural heritage etc. In 1987 CEE trained 7,000 teachers in the country in 100 teacher training workshops as a part of National Environmental Awareness Campaign in collaboration with state departments of education and voluntary agencies on environmental education. The Ganga Pollution Awareness Programme launched in 1986-87 by the centre with assistance from Ministry of Environment and Forests, Govt. of India is being implemented in 100 secondary and higher secondary schools located along the river Ganga in Uttar Pradesh, Bihar and West Bengal. The students of these schools are involved in regularly monitoring river water quality by applying the scientific knowledge and experimental techniques learnt at school to a real-life situation thus understanding the environmental significance of their findings (CEE,)[26].

Many non-government environmental groups are working in India for promotion of environmental education. The Centre for Science and Environment, New Delhi is regularly monitoring the environmental scenario of the country and bringing out its findings through its publication 'the State of India's Environment'. The 'Kerala Sastra Sahitya Parishad' Trivandrum, the 'Indian National Trust for Art and Cultural Heritage' New Delhi, the 'Society for Clean Environment and Sea', Baroda are few of many such organisations promoting environmental education. Prominent personalities like Baba Amte, Sunderlal Bahuguna, Shabana Azmi, Anil Aggrawal etc., are on the forefront for spreading environmental consciousness.

Rationale for the Study

From the above analysis it is clear that elements of environmental education have been incorporated or are being

incorporated in the curriculum. But mere existence of instructional material at school stage does not guarantee that the gains of environmental education will accrue to the pupils automatically. An essential pre-requisite for this is the involvement and commitment of teachers. Any curricular innovation or renewal for its effective implementation, in its final analysis is contingent upon the performance of the teachers. The innovation has to be accepted/adopted by the teacher and initiated preferably by himself/herself. Environmental education as an approach and a new thrust has its own content and methodological characteristics. Teachers as a vital group have to understand and internalise these characteristics to bring in the required focus in their teaching. They should be sensitized to environmental education and motivated to innovate and experiment with strategies for incorporation of environmental education. The challenges before the teachers are therefore immense, considering the over expectations and poor resources at their disposal to deliver the good.

The teacher preparation courses and role of teachers have to be reviewed and revamped suitably to meet this challenge. Realising this the Tbilisi Conference had recommended the member states that environmental science and environmental education be included in the curricula for training of teachers (pre-service training). Necessary steps be taken to make available in-service training in environmental education to all the teachers who need it. Teachers in training should be given an understanding of the widest possible range of educational materials and aids with special reference to low cost materials and opportunities for adaptation and improvisation according to local circumstances.

Efforts have been made from time to time to identify the difficulties of the teachers and keep them abreast of the development in content, methodology, use of aids etc, through orientation and training programmes. Inspite of all efforts the updating in knowledge of teachers has not kept pace with curriculum renewal. It is more true for the school level (Connect-1985)[27]. In a stock-taking after a decade of Stockholm Conference, Troy and Schwab (1982) noted :

> - a number of countries have made significant advances towards implementing environmental education programmes. Important as these efforts and achievements may be ..... there are still a number of gaps and short-comings. Less seems to have been achieved at the secondary level than at the primary level in schools - both quantitatively and in terms of innovations. Little has been done for training educators for environmental activities. There are still far few teachers .... trained for teaching of ecology or able to participate effectively in a multidisciplinary approach for teaching. Much remains to be done in the way of a complementary education for in-service teachers[28].

It is amply clear from the above analysis that there is an urgent need to renovate the training programme of in-service and pre-service teachers in the context of environmental education. Before embarking on any curricular revision/renewal for teachers, it is necessary to know where they stand, i.e. their present status with reference to environmental education. A study of the existing status will provide empirical baseline about their knowledge, attitude and perceptions regarding environmental education. Such data will also facilitate evaluation of environmental education programmes undertaken at a later stage by measuring changes in the parameters stated above.

It is being increasingly felt that technological solutions to environmental problems alone have a certain intrinsic futility, since many of the present environmental problems can be best conceptualised as stemming from consumptive and parasitic behaviour/life-style of modern man. Added to it, such solutions often lead to the creation of yet another problem which did not exist before. (Asimov, 1975)[29]. Hence traditional technological solutions have to be supplemented by alterations in human behaviour and life styles, or to be more specific, modification of currently held attitudes and values. The presently held environmental attitude of teachers assumes added significance, when viewed in this way. Emphasizing this the International Congress on Environmental Education and Training held at Moscow (USSR) in August 1987 observed...

> Environmental education is not an educational approach contained purely to the transmission of knowledge, it is concerned with emotional and axiological or value-judging issues.. with this end in view, it is highly advisable to conduct research and experiments on attitudes and values pertaining to the environment in educational context (Connect, 1987)[30].

Thus an analysis into teacher's environmental knowledge, attitude towards environment and perceptions regarding environmental education yields significant insight into the current situ ation of environmental education among teachers. It gives guidelines for curriculum renewal/development in teacher education pertaining to environment for making it more thorough, realistic and practical. Although studies pertaining to the survey of knowledge and attitude towards environment have been undertaken in England (Richmond, 1977)[31], USA (Melton, 1976)[32] Australia (Eyers, 1976)[33], Nigeria (Nwosu, 1983)[34]

and Philippines (Cortes, 1987)[35], such studies have not been undertaken in the Indian context. Hence the need has been felt for the present study.

While collecting base-line data pertaining to environmental knowledge, environmental attitude and perception regarding environmental education of pre-service and in-service teachers of secondary schools, a number of questions need to be answered. Do they think that a grave environmental crisis exists ? Are they aware of environmental problems from which the country, the locality and the world suffer ? What is their level of knowledge about the origin, prevalence and possible solution of different environmental problems ? What are the areas of knowledge deficiency about environment among the teachers ? What are the sources of their environmental knowledge ? Do the teachers feel that they have an important role to play in helping to solve environmental problems ? Do they realise that offering a course in environmental education can help combating environmental deterioration ? What according to the teachers should be the status of environmental education in school curriculum ? Should it be taught in an integrated manner or should it be an independent subject ? Is there enough scope for taking field trips as an essential component of environmental education ? What is their attitude towards environment ? Is it that of the attitude of a man in harmony with nature ? Do urban teachers perceive environmental problems, differently from rural teachers ? If they do, how should knowledge of this affect curriculum development, revision of the existing curricula ? Does any relationship exist between environmental knowledge, and environmental attitude ? Do environmental knowledge, and attitude of teachers vary depending upon their place of residence, sex, subject background, teaching experience and socio-economic

background ? The present study endeavours to find answers to some of the issues/questions raised above.

Statement of the Problem

ENVIRONMENTAL KNOWLEDGE, ENVIRONMENTAL ATTITUDE AND PERCEPTION REGARDING ENVIRONMENTAL EDUCATION AMONG PRE-SERVICE AND IN-SERVICE SECONDARY SCHOOL TEACHERS.

Definition of Terms

Environment Environment may be defined as the sum total of all the conditions and influences that affect the life and development of an organism.

In view of the broad meaning of this term the present study focusses only upon certain aspects of human environment namely population, pollution, ecological relationships, natural resources, land use, and energy and related social, political, scientific, economic and cultural aspects of these dimensions.

Environmental Knowledge

Environmental knowledge means awareness or understanding of facts and concepts relating to the following environmental problems :-

- population explosion
- depletion of natural resources
- pollution
- land use
- deforestation
- species extinction
- ecological disruption
- energy crisis

There are three indices of environmental knowledge viz.

(i) Factual Environmental Knowledge

(ii) Conceptual Environmental Knowledge

(iii) Total Environmental Knowledge.

Environmental Attitude An attitude is a relatively enduring system of evaluative, affective reactions which have been learned, towards an object. Object means any aspect of the individual's world including people and ideas (Open University, 1975)[36].

Viewed in this way environmental attitude means an individual's affective, evaluative reactions towards environmental crisis.

An individual's environmental attitude is considered positive or favourable if he holds a view that favours continuation of human species on the earth through sustainable development ; in harmony and symbiosis with nature. It is considered negative or unfavourable if his reactions are detrimental to the very existence of mankind on this planet.

Environmental Education Environmental education is the process which develops knowledge, understanding, attitude and commitment among individuals about environmental problems and their solution.

Pre-service Secondary School Teachers Pre-service secondary teachers mean the prospective secondary school teachers who were undergoing B.Ed. training at the time of data collection.

In-service Secondary School Teachers : In-service secondary school teachers mean those teachers who were teaching in classes VIII, IX and X during the period of data collection.

Subject Orientation: Subject orientation of a teacher means his major discipline-whether science or non-science-in which he/she pursued first bachelor's degree. There are two levels of subject orientation viz. science and non-science.

Objectives of the Study

Following were the objectives of the study.

1. To study the environmental knowledge of pre-service and in-service secondary school teachers.

2. To study the environmental attitude of pre-service and in-service secondary school teachers.

3. To find out the relationship between environmental knowledge and environmental attitude.

4. To determine whether there are significant differences in environmental knowledge of pre-service and in-service secondary school teachers with reference to the following variables : sex, place of residence, subject orientation, teaching experience and socio-economic background.

5. To determine whether there are significant differences in environmental attitude of pre-service and in-service secondary school teachers with reference to the following variables : sex, place of residence, subject orientation, teaching experience and socio-economic background.

6. To study the perception of pre-service and in-service teachers regarding environmental education in the school curriculum.

Hypotheses

Based on the study of related literature and objectives of the study as stated above the following hypotheses were formulated.

1. There exists no significant relationship among pre-service and in-service secondary school teachers with reference to their
   - factual environmental knowledge and environmental attitude
   - conceptual environmental knowledge and environmental attitude
   - total environmental knowledge and environmental attitude,
2. In-service and pre-service secondary school teachers do not differ significantly in their factual, conceptual and total environmental knowledge.
3. There are no significant differences among in-service and pre-service secondary school teachers with reference to their environmental attitude.
4. There are no significant differences in factual, conceptual and total environmental knowledge of pre-service and in-service secondary school teachers with reference to their sex,place of residence, subject orientation, socio-economic background and teaching experience.
5. There are no signficant differences in environmental attitude of pre-service and in-service secondary school teachers with reference to their sex, place of residence, socio-economic background, subject orientation and teaching experience.

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