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ABSTRACT

This paper investigates the role of environmental education in promoting activism or social action on behalf of the environment. The connection between between environmental education and social studies in school curricula is weak. Fields within social studies such as civics, history, law-related education, government, and problems of democracy have great potential to enrich environmental education by exposing students to the ways and means by which problems are managed or resolved through political systems. Recent studies have revealed the ineffectiveness of existing environmental education as a stimulus for meaningful social action. School programs have emphasized environmental awareness but have not changed the behavior patterns that perpetuate ecological problems. Because most environmental problems originate from socioeconomic conditions, it is argued that effective environmental education requires a strong social problem-solving component. Some of the issues addressed in this paper include the lack of emphasis on urban minority environments, making environmental education a vehicle for social change, the need for values clarification to develop a personal environmental ethos, and student empowerment. Several programs are described that involve students in the community through environmental action. The role of technology in environmental education and activism is also discussed. Contains extensive references and notes. (PVD)

Curriculum Development for Activism in Environmental Education

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Introduction

The world continues to face a serious ecological crisis. The evidence for this problem is compelling. In 1992 the Worldwatch Institute reported that the ozone shield is thinning at twice the predicted rate, atmospheric levels of heat-trapping carbon dioxide are rising, forests are disappearing at a rate of 65,000 square miles per year, an area the size of Tunisia, 140 animal and plant species become extinct each day and world population is growing by 92 million people per year. Ninety-five percent of new births occur in developing nations.[1] Future human survival may now depend on adoption of more effective policies and educational programs to protect and preserve the planetary environment.

There is rising concern around the world about this crisis. The level of awareness and anxiety has increased dramatically since 1970 when the first Earth Day was held. A 1980 survey in the United States showed that 45% of those polled favored "environmental improvements . . . regardless of cost"; a decade later in 1990 74% supported such action. A 1992 Gallup Poll found a majority in 20 countries who thought that safeguarding the environment should be a priority even if it meant slower economic growth. The same poll reported 71% in 16 countries were willing to accept higher prices on goods if this would save the environment. In Switzerland environmental problems have caused wide concern and anxiety about the future across all levels of society; young people there are most likely to see the environment as the number one problem. Focus group research in 1993 reported that children aged 8 to 14 rated the environment as the most important issue in their lives.[2] The environment clearly is one of the most pressing social problems of our time. The response of school curriculum to this crisis is a matter of importance and urgency. If schools are to become a part of the solution to this problem, students should acquire knowledge and skills which will enable them to reconstruct future societies into paths of greater harmony with the natural environment.

The mission of environmental education brings schools into the forefront of cultural change. Much of the modern ecological crisis is a result of the global effects of Western civilization which defined progress in terms of unregulated human exploitation of nature for economic development. Transmission of this culture is no longer consistent with the survival of the earth. Schools, therefore, must become agents for social and cultural reconstruction. This goal is reflected in the United Nations Environment Programme which defines environmental education as:

> a permanent process in which individuals gain awareness of their environment and acquire the knowledge, values, skills, experiences, and also the determination which will enable them to act -- individually and collectively -- to solve present and future environmental problems.[3]

The process of inducing culture change from within a society is difficult. Vested interests are resistant and the culture itself is controlled by established beliefs and systems of thought that defend the status quo. Nevertheless, education in its original Latin meaning, 'to lead out of,' has great potential for fostering new ways of thinking and action which are needed if the world is to change.

This paper is concerned with investigating the role of environmental education in promoting activism or social action on behalf of the environment. Several recent studies have

revealed the ineffectiveness of existing environmental education as a stimulus for meaningful social action.[4] School programs have emphasized awareness and knowledge about the environment, however, much less has been achieved in changing the mindsets and behavior patterns which cause the perpetuation of ecological problems. Likewise, many students who are aware of environmental abuses are less willing or able to undertake effective social action to correct or resolve the problems.

Because most environmental problems originate from socio-economic conditions, it is the premise here that effective environmental education requires a strong social problem-solving component. The objective is that learners will come to understand how individual and collective action can effectively mobilize political power in the interest of environmental protection. Student acquisition of attitudes and skills needed for social action will depend on model learning experiences in the activity base of the curriculum. These experiences should involve reasoning from data, problem recognition, collaboration in decision-making, practice in democratic political processes, social organization and empowerment through participation in concrete goal-directed actions. Many people feel disempowered and pessimistic about future prospects for the earth. They perceive that individualism, economic needs and political interests will confound every effort to resolve this crisis. However, this type of apathy is a compelling reason to value a stronger social action component in environmental education.

Foundations for social activism through education can be found in the historic roots of both environmental education and the pedagogy of problem-solving in social studies in the United States. In the late 19th century, for example, Ellen Swallow, a promoter of consumer protection and environmental education, was one of the founders of the ecology movement. In 1935, a group of Wisconsin conservationists gained passage of the first state law mandating conservation education in all public schools along with requirements for teacher education in protection of natural resources. In the same era the Outdoor Education movement initiated school camping programs with emphasis on appreciation, understanding and wise use of natural resources. Students learned by direct experience to identify and solve real-life problems. The Conservation Education Association was founded in 1953 to promote environmental education based on the ecological principle of the interdependence of all life.

The origins of contemporary environmentalism owe much to Rachel Carson's book Silent Spring which alerted the world to the problem of careless use of chemicals. Citizen action in the United States was born in the 1960's as a response to environmental threats posed by industrial development. In New York citizens resisted construction of a hydroelectric power plant at Storm King Mountain in the Hudson River Valley. In California the 1969 offshore oil blowout at Platform A in the Santa Barbara channel caused a "Black Tide" which awakened the country to the realities of human responsibility for biological destruction. On April 22, 1970 the first Earth Day gave momentum to the environmental movement and its focus on ecological citizenship and good earth-keeping. The idea of sustainable development crystallized in the Club of Rome study, Limits of Growth, which challenged the idea that progress requires continual economic expansion, a core notion in western capitalism. Innumerable books like Buckminster Fuller's Operating Manual for Spaceship Earth focused on the need to preserve the life and resources of a finite world.

The recognition that effective democratic citizenship requires training in decision-making and problem-solving emerged in the United States during the Progressive Era at the turn of the last century. Two National Education Association Committees in 1893 and 1916 recommended addition of civic education to the curriculum. The result was a 9th grade course in community civics and a 12th grade course in the economic, political and social problems of

democracy. The intent was to develop citizens who could function intelligently and actively in a democratic society. The means was study of serious social problems through background investigation, analysis of conflicts, value clarification and proposal of solutions consistent with desired values.

This essential connection between school and society was deepened by John Dewey and other leaders of the progressive education movement in the early 20th century. Dewey regarded education as a method of social reform. He felt that learning arose from experience with real-life problems which enabled students to perceive relationships, take action and reflect on the results. In this conception of education, knowledge gained in school must be applied to life outside school just as experience from life outside school should also apply to work done in school. The school was to function as a model social community where students participate in democracy in action. In his book How We Think (1933), Dewey defined five phases of reflective thought: anticipation of solutions, definition of the problem, hypotheses for data collection, exploration of ideas and testing of hypotheses through action.

The project method developed by William H. Kilpatrick in 1918 treated subject matter as a means for problem-solving rather than an end in itself. Projects would be selected either on the basis of children's interests or community and societal needs. In the case of the contemporary environmental crisis there appears to be a degree of convergence between youth interest and the need for social reconstruction. There is a message in early 20th century progressive education for contemporary environmental education. This involves the need to connect the recognition and scientific study of environmental problems with the process of finding solutions through appropriate social and political action.

Curriculum theory in environmental education has been evolving since 1970. Today new currents of thought are pressing for change within the movement. Perhaps the most significant new directions are those which examine the issues of culture change, values clarification and the need for a new ethos of life through the means of social analysis and reconstruction.

Issues

In spite of the foreboding and critical nature of environmental issues, K-12 curricula for environmental education have achieved only an indefinite and non-binding status in most United States school systems. There are many environmental education programs but few of these are comprehensive and nearly all are optional for local school districts.[5] Existing curriculum provisions are varied. The subject may be taught separately in science or social studies, occur as a segment in a current problems course, stand on its own as an interdisciplinary offering or be infused piecemeal across the curriculum in many subjects. Nonetheless, the rapid growth of environmental student activism on college campuses in the 1990's suggests that many students came to college with prior learning and interest in this area. By 1995 the Student Environmental Action Coalition (SEAC) had representatives on 700 campuses, and the National Wildlife Federation's "Cool It!" Program which is focused on campus environmental quality had reached over 600 colleges. Other ecology-oriented organizations like the Sierra Club have also enlisted students as supporters of their efforts to protect the environment.[6]

Recognition of the need for more effective environmental education can be found in several national and international sources. In the United States the Science/Technology/Society (STS) Movement which began in the early 1980's with joint support of the National Science Teachers' Association (NSTA) and The National Council of the Social Studies (NCSS)

focuses education on current societal problems to engage students in the discovery of concepts and processes that can be applied as solutions. STS pedagogy is based on constructivism, in which humans learn by constructing their own meanings. The United States Environmental Protection Agency (EPA), in calling for expansion of environmental literacy, has cited the essential role that citizen action plays in improving environmental protection. Recently, the EPA has begun to focus on the need for increasing ecology awareness among minorities, Native Americans and the urban poor who often live in communities with higher risk environments.

International initiatives range from bilateral to multilateral plans. An International Joint Commission (Canada and the United States) asked that the Great Lakes ecosystem be made a priority topic in school curricula. The Commission reasoned that environmental education should be a means to reduce the contradictions between societal actions and values. It further recommended that "critical thinking and motivation development" were essential if these efforts were to produce the desired new environmental ethic. The Third International Social Studies Conference in Nairobi in 1994 cited the need for global initiatives in environmental education.

The interdisciplinary and transcultural nature of environmental education raise new issues for curriculum. On the one hand we must consider how the different disciplines should interrelate. What, for example, is the proper balance between natural and social sciences? On the other hand, because solutions to environmental degradation may require culture change, there is a need to embrace ethics and the process of innovation through paradigm shifts like the transition from a life style based on increasing consumption to one based on moderation or subsistence. Daniel Mayton has investigated the linkage between value types and environmental concern or biospheric orientation. Unlike the value of benevolence, which is tied to concern for human welfare, or power, which involves the exercise of egotism and self-interest, he sees universalism as the value most connected with pro-environment activities and attitudes. Universalism values social equality and justice, beauty, peace and unity with nature. The implications are that teaching, which is often a culture-bound activity, may need to cultivate transcultural or universal values to develop a functional environmental ethos.

Environmental education curriculum has experienced its share of debate and controversy as might be expected of any new subject which confronts established cultures and interest groups. Within education circles there is conflict between separatists and integrationists. The latter would infuse environmental studies into the existing curriculum; the former prefer a separate course with strong units focused on citizenship and action. The need to boost the action component in curriculum is supported by studies that show that students vary greatly in their willingness to accept the sacrifices and trade-offs needed to solve particular environmental problems.[7] Others have argued that environmental education needs to expand its scope and participants by embracing diverse human ecologies, particularly that of minorities living in poor urban localities and residents of developing nations. Revisionists, who favor a broad vision of environment, cite the Federal Environmental Education Act of 1971 which defines the field as "study of the factors influencing eco-systems, mental and physical growth, living and working conditions, decaying cities and population pressures."[8] Interdisciplinary confrontation flavored by culture conflict has also arisen in a recent debate between Raymond Miller and economic educators. Miller maintains that neo-classical capitalism, which is chiefly responsible for environmental degradation, is also the principle focus of economic education; he maintains that the two subjects are in conflict and recommends restructuring economic education to include ecological awareness and priorities.[9]

There are a number of new initiatives which aim to expand the humanistic dimensions of environmental education. H.G. Kastenholz thinks that the educational outcome of ecologically responsible behaviors requires that teachers impart "values such as social responsibility, compassion, nonviolence and equality" *and* that individuals gain awareness of the effects of their actions on the environment.[10] Reconceptualization within environmental education is also coming from the movements of ecofeminism, deep ecology, conservation biology, bioregionalism and socially critical analysis. The latter is of most relevance to this paper because it involves the fusion of environmental study with analysis of social causation to facilitate correction through political action. John Huckle, a British educator, believes that existing environmental education is deficient in socially critical analysis:

> Teachers and pupils rarely examine the structural causes of environmental problems and social alternatives which could enable sustainable development . . . environmental issues are presented as asocial or universal problems. They are attributed to such problems as over population, resource scarcity, inappropriate technology, overproduction, and exploitative values, but these factors are not explored in a way which relates them to underlying social forces. The relation between people and the environment is not taught in the context of economics, politics and cultural systems with the result that pupils remain largely impotent as agents of social and environmental change.[11]

The claim that most environmental education does not acknowledge the socio-cultural construction of the environment or challenge the ideologies that produce environmental problems suggests a weakness in holistic curriculum development. It is legitimate to ask: "Where is the full treatment of the real world?" This criticism also raises the question of balance in the interdisciplinary structure of environmental education. In trying to confirm the existence of imbalance, a Boolean search of terminology associations was conducted in the Educational Resources Information Center (ERIC), an international educational database, from 1980-1995. Matching terminology evidence showed a low correlation of the terms "action," "activism," "civics," "government" and "social studies" with the terms "curriculum" and "environmental." The term "action," for example, only appeared in 158 out of 10,857 publications which were also described with the terms "curriculum" and "environmental"; for "activism" only 12 documents were found in the same batch; for "civics" only 9 documents; for "government" only 111 documents; and for "social studies" just 296. These data suggest that most environmental education is conceptually unrelated or weakly related to political action or social studies.

One wonders why existing curricula in formal education are so reluctant to connect the physical scientific reality of environmental destruction with responsibility within the social system. If this is a form of denial it is an evasion that society cannot afford, since the fate of future generations is at stake. The solution would seem to lie with more interdisciplinary balance and greater emphasis on problem-solving in the context of a democratic political system *and* advocacy based on defensible causes. This is a perennial issue in curriculum development; it involves the responsibility of teachers for guiding change in democratic societies. The question was raised earlier in this century by George Counts who asked whether the schools could and should dare to build a new social order.

Current Curriculum

The need for greater linkage between environmental education and social studies is further illustrated by the scarcity of references to economic causal analysis, social effects and organized political action in the content and learning activities of many curricula. This is all the more surprising in view of the fact that citizen action has played such a key role in the entire environmental movement. The schools, it seems, need to be more forthright in exercising this opportunity to teach the skills of participation in grassroots democracy. But obstacles exist outside and inside the educational establishment. Like any goal-directed social movement, environmentalism has caused controversy and attracted critics. In the United States, opposition comes from Christian fundamentalists, the radical right and resource-extraction industries. Their fears grow from a conviction that environmental ecology embodies New Age paganism, communism and anti-capitalism. Teachers who confront community pressure and face charges of proselytizing may tend to back away from teaching social action to avoid censorship.[12] The weak social action component in curricula also reflects the fact that most environmental educators are science teachers who approach the field primarily as a laboratory for instruction in scientific methodologies.

A sample of existing environmental education curricula were examined to identify the types of learning activities and their relationship to the goal of teaching students how to become active in defending and improving the environment. Two large databases were reviewed for this analysis: the Educational Resources Information Center (ERIC), 1980-1995 and Kraus Curriculum Development Library, 1978-1996.[13] The vast majority of activities in these guides involve awareness and understanding along with scientific techniques of observation, data collection and analysis. There is an implicit assumption that action and concern may follow from attitude changes engendered by awareness. However, there is hardly any examination of the complex processes of environmental regulation by government nor of the means by which citizens can exercise their right to petition for environmental safety. Most guides that engage students in action learning concentrate on individual efforts to protect the environment. This ignores the reality that most environmental destruction is the result of cultural, corporate, economic and political forces whose control requires government intervention, organized citizen action and culture change.

Twenty-seven programs in these databases were selected for having examples of outstanding social action activities. Only three of these curricula came from United States local or state education agencies. The remainder were produced by professional groups, advocacy organizations, private corporations, university-based environmental projects or state and municipal environmental agencies. Activities found in these curriculum guides included: water conservation in the home, community and school; tree planting; mock congressional hearings on toxic waste; petitioning a local coastal zoning board regarding a development proposal; planning improved use of community resources; organizing and executing local environmental improvement projects; designing waste disposal plans to fit community needs; encouraging parent adoption of environmentally responsible behaviors; democratic collaboration in decision-making; practicing ways to reduce, reuse and recycle; planning school recycling programs; doing door-to-door community education campaigns; publishing alternative product lists for shoppers; cleaning up parks, rivers and streets; monitoring water quality in lakes, streams and wetlands; monitoring acid rain; organizing boycotts of disposable products; conducting surveys and submitting reports to public agencies; collecting bottles and cans; setting up local composting procedures; and writing letters of concern to leaders.[14]

Some of these programs provide excellent models for linking environmental education with social action and student empowerment. Since 1979, for example, the Council on the Environment in New York City has conducted a curriculum which trains student organizers to carry out local environmental improvement projects; over 8,000 students were motivated to perform more than 300 projects like painting awareness murals, clean-up campaigns, energy conservation and letter writing for ecology causes.[15] A reform movement within science education known as Science, Technology and Society (STS) is striving to promote responsible citizenship by training students in critical thinking, problem-solving, social/ethical reasoning and decision-making within the context of studying content based on real-life problems. Examples of STS based curriculum include the units Animals, Nature and People, Environmental Dilemmas and Dilemmas in Bioethics developed by the Center for Coastal and Environmental Studies at Rutgers University.[16] The field of law-related education, a specialization within social studies, has also generated some good programs for linking ecology study with social action. Mary Louise Williams developed lesson units based on the study of how environmental disasters at Minamota, Japan and Love Canal, New York were dealt with by the two constitutional democracies; readings and simulations were used to explore the workings of these governments in their confrontations with crisis.[17] The Special Committee on Youth Education for Citizenship of the American Bar Association has developed a program Teaching for Tomorrow which includes a global education unit in which students study how the law can help people cope with social and environmental problems.[18]

Perhaps the most successful linkage of environmental education with social action and student empowerment has arisen in water monitoring programs. Here schools have aligned their curriculum with citizen action efforts for renewal and protection of coastal estuaries, lakes, rivers and wetlands. The Izaak Walton League of America's Save Our Streams program was a model for these efforts. The Rouge River Water Quality Monitoring Program in Michigan has involved over 50 high schools with an excellent balance of scientific study and social action. The Rouge project, which began in 1987, featured strong collaboration between the University of Michigan School of Natural Resources and participating teachers. Scientific data collection included water quality testing, heavy metals assessment, sampling of benthic macroinvertebrates and analysis of land use practices for pollution sources. The social action component of the curriculum featured a community survey of popular attitudes about the river, building group process and communication skills, computer networking, role playing simulations to explore the effects of land use decisions on water quality, brainstorming to find consensus on problem analysis, reporting of pollution sources to municipal water officials and research fact-finding about problematic local development.

Students in the Rouge River program also participated as representatives in a Student Congress which heard reports of data and causation and developed action strategies through discussion groups. Their recommendations called for restriction of development, increased media coverage of river pollution, recycling programs and raising public awareness through an educational campaign. Skill-building workshops for students included radio announcmeents, video production, community/school organizing, editorial writing, public hearing testimony, remedial action plans, artwork and poster-making, communication with legislators or public officials and street theater.[19]

After the two-week school unit, some students continued their involvement in the Rouge Rescue effort by clearing debris from the river banks, writing articles for school newspapers, poster work, persuading parents to use less toxic products and attending city council meetings to testify against development projects with adverse environmental effects.

School involvement in watershed salvation projects has spread to all states and now includes over 200 United States river systems. Not all of these programs offer as strong a social action component as the Rouge River project. For example, the Rivers Curriculum Project at Southern Illinois University focuses mainly on science, math and language arts; the program examines social and economic implications of river conditions but emphasis is on awareness more than action.[20]

In Rhode Island, a small state in the northeastern United States with a long history of industrialization and environmental pollution, several ecology-oriented school programs have promoted student activism. Project Learn and Serve has involved hundreds of K-12 students from eight schools and five towns in efforts to monitor water quality and begin a cleanup of the watershed of the Pawtuxet River; students report their findings to the Pawtuxet River Authority for follow-up studies by officials. The project combines science and the arts with community service.[21] Another Rhode Island water resource project, the Whole Rivers Program, engages students from five urban high schools in water quality monitoring of rivers and estuaries of the northern Narragansett Bay watershed. Each of these projects publishes student newsletters and holds conferences focusing on river conditions. The Whole Rivers students have presented findings to local health officials to raise awareness, conducted community surveys and education activities and produced a detailed list of solutions for the river pollution problem.[22]

Lead poisoning affects one in six children under the age of six in the United States; most victims come from poor urban districts. The Sierra Student Coalition, an activist environmental network of the Sierra Club, recently established a National Lead Education Campaign. Program materials for this campaign were developed with assistance from the Environmental Studies Department at Brown University in Providence, Rhode Island; Brown students field tested the materials in Providence area public schools. Clean Water Action, another Rhode Island based group, employs high school students in summer for door to door awareness campaigns to inform home owners about clean water, toxic products and proper waste disposal. The Rhode Island Audubon Society focuses its K-12 program on personal life style with emphasis on recycling, waste avoidance and letter-writing for endangered species. The state's major utility company, Narragansett Electric, sponsors a middle school energy conservation curriculum entitled "How Many Light Bulbs Does it Take to Change a People" which engages students in home energy audits to demonstrate energy-saving possibilities to their parents.

The potential for future change through involvement and empowerment of young people has been recognized by some major environmental advocacy organizations. Kids Against Pollution was among the environmental groups that organized the "send back" campaign to mail plastic and foam packaging back to McDonald's national corporate headquarters; this action influenced the company's officials to abandon use of these materials at 11,000 restaurants around the world. The Sierra Student Coalition counts over 60,000 members in its activist network, and maintains that it can send 15,000 letters to Congress on a single issue in a week. The coalition was spawned in Los Angeles by 500 high school students who conducted the "Big Green" campaign for the 1990 California conservation and toxics reduction initiative. The Sierra Club High School Environmental Leadership Training Program prepares students from grades 9-12 with skills for activism and promotion of diversity and social justice.[23]

Mass media initiatives have also accelerated the willingness of young people to become involved. Nickelodeon, a television network oriented toward children, organized a Kids Earth Summit in 1993 and founded the Children's Earth Fund to raise money to alleviate global

warming by reduction of carbon dioxide emission. In 1990, Student Action for a Viable Earth (SAVE), an environmental group which tours Canada to educate and empower youth on environmental and social justice issues, was formed by ten high school and college students. SAVE has brought its message about environmental exploitation and student action tactics to over 600 schools and 400,000 students.[24]

Environmental activism has emerged as a major interest on many college campuses. The Student Environmental Action Coalition (SEAC), a network which began in 1988 now links students on 1,500 campuses nationwide in an effort to establish recycling programs, boycott polluting industries and fight unsound public works projects. Recycling programs have been set up by SEAC groups at over 900 universities. SEAC's membership ranges from conservative to radical. In 1993, SEAC established 600 new environmental groups in high schools. The organization resembles the 1960's group Students for a Democratic Society in its emphasis on environmental and social justice issues. SEAC is also networked with college students in 53 countries through its international arm, Action for Solidarity, Equality, Environment and Development (ASEED). Lobbying, policy-making and direct action are SEAC's major activities.[25] Students at all levels of education regard environmental quality as a major world problem and many are determined to do whatever they can to try to stop the abuses and improve conditions. Part of their motivation for action may derive from the lack of opportunities for empowerment and political involvement found in most traditional school curricula.

New Technology Frontiers

Interactive global computer networks have added a powerful communication medium to education. This technology revolution has greatly increased the potential for student activism and empowerment. Electronic mail services, document transfer, computer conferencing and access to information databases offer a virtual cornucopia of new activities for students. Cooperative projects, resource-sharing and collaborative learning can now occur on a transnational basis between classrooms anywhere in the world. For environmental education this technology facilitates student recognition of the global nature of ecology problems while also assisting local action in home and community.

One concern in the technology revolution is global inequalities in access to computer networks. Disparities exist within and between countries. Well-to-do individuals and nations have more and newer technology. Poorer people and nations may have little or no opportunity to profit from the new communication tools. Cooperative citizen networks like the Association for Progressive Communications (APC) have formed to hold costs down and extend network access to over 90 countries.

One of the APC affiliated networks is EcoNet, which is operated by the Institute for Global Communications (IGC) to advance the cause of education and action for the environment. EcoNet is a veritable fount of resources and activities for students and teachers. One EcoNet site for teachers is EE-Link, maintained by the National Consortium for Environmental Education and Training (NCEET); resources here include instructional materials, funding sources, network opportunities, projects, organizations, people, activities, lesson plans, curricula and programs.

Another EcoNet site oriented toward student activism is Earth Force which promotes environmental action, citizenship and education by providing students with what it claims are "meaningful activities that make a positive difference in their lives and to their communities

today and help develop real world problem-solving skills they can use throughout their future."[26] Recent listings on Earth Force included "Team-Up-For-Trees Campaign" materials with paper saving and tree planting activities, "Environmental Action Campaigns" like "Go Wild for Wildlife," "Press Announcements," "Kids Speak Out!," and "Earth Force Town Meetings" where students can voice concerns and share ideas with adult decision-makers. The "Go Wild for Wildlife" Campaign involves youth in community wildlife surveys, protecting a habitat for some species, birdfeeding, letter writing to officials, volunteer work in parks and planting butterfly gardens. The "Global Thinking Project" also on EcoNet under 'environmental education' enables schools to join a global team of five schools to collaborate via telecommunications on projects concerned with air quality, ozone depletion, water quality and other environmental projects such as endangered species and waste disposal.[27]

In 1989 Professor William B. Stapp of the University of Michigan School of Natural Resources launched the Global Rivers Environmental Education Network (GREEN) with the objective of promoting transnational cooperation between secondary schools in the study and improvement of worldwide river systems. The GREEN goals are hands-on study of river environments, student empowerment through community problem-solving and promotion of intercultural communication and understanding. The project, which now reaches thousands of students in 50 states and 125 countries, offers networking opportunities, educational materials and workshops in air, water and heavy metals monitoring, action-taking, watershed land use studies and problem-solving.[28]

Another major web site focused on environmental action and education is ENVIROLINK, which maintains a search service, library, news column, a guide to ecologically responsible companies, an opinion exchange forum and a list of prisoners of conscience. One action-oriented ENVIROLINK site is the Rain Forest Action Net which engages students in e-mailing to Congress and responsible companies, internship opportunities, boycott campaigns, forest acre adoption and participation in local rain forest action groups. A general ENVIROLINK site for environmental activism covers action alerts and worldwide news, along with advice on organizing, types of action and legal resources. A K-12 internet resource list for teachers offers a comprehensive range of links; topics include air quality, birds, deforestation, energy, global warming, indigenous peoples, nuclear disasters, oceans, ozone depletion, recycling, rivers, timber wolves, vanishing species and weather.[29]

Technology-based resources have multiplied with great speed; fortunately, several consortiums have formed to provide schools with guidelines and resources for curriculum development. The United States based Alliance for Environmental Education has created an interactive network of environmental education centers at colleges and universities.[30] A professional organization of environmental educators, the North American Association for Environmental Education (NAAEE) provides a database of "Essential Learnings in Environmental Education" with key concepts for inclusion in curriculum.

Other internet sites which accommodate student projects and discussion are I*EARN, K-12Net and KidLink. I*EARN, the International Education and Resource Network, enables youth to "undertake projects . . . to make a meaningful contribution to the health and welfare of the planet and its people" and creates demonstration schools for telecommunications methodology. In one project, high school students in Moscow and New York City studied air pollution in each city and then sent reports of findings to legislators in each country with requests for remedial action. "K-12net" facilitates open-ended international conferences for students and teachers on topics from the curriculum. KidLink promotes global dialog for children aged 10-15 on various topics including environmental concerns.[31] Over a million

young students have been motivated by NGS Kids Network, sponsored by National Geographic Society, which promotes cooperative learning projects on "real world, socially significant" problems using "hands-on experiments."[32]

Learning through technology-driven programs appears to stimulate high motivation, interest and feelings of empowerment in students. Facility with technology engenders confidence. Global awareness is also stimulated through direct experiences with students in other lands. There is a sense of achievement and satisfaction that comes from working with peers of another culture on a common problem. Technology also provides a transnational communication medium which is congruent with the global nature of many environmental problems.

Conclusion

Education for life in democracy should include opportunities to learn and practice the skills of responsible citizenship. Social welfare and political stability depend on problem-solving, which requires analyses of causation, evaluation of possible solutions, decision-making and commitment to remedial behavior. These skills are best learned through confrontation with real life problems which are part of the students' world perspective.

Few problems today are more pervasive than human abuse of the environment; a recent report of the World Resource Institute confirms the depth of this crisis. "The world faces a wide variety of critical environmental threats: degradation of soil, water and marine resources essential to increased food production; widespread, health-threatening pollution; stratospheric ozone depletion; global climate change; and a loss of biodiversity."[33] In many parts of the world large corporations with great financial power have undertaken resource projects which endanger the environment and the welfare of local residents who depend on natural resources for their survival. Many individuals, likewise, live in ways that have little relationship to resource conservation. Broader adherence to a new ethos of environmental stewardship is essential to the future of our planet.

Governments should exist to protect the welfare of their citizens; citizens in democracies also have the right and duty to petition government for action in matters involving their safety and welfare. Social responsibility for environmental destruction has become a global issue. Environmental education provides an opportunity to develop student awareness of the means by which individual and collective efforts can link scientific understanding of problems with corrective political action.

This study found a weak connection in school curriculum between environmental education and social studies. Fields within social studies such as civics, history, law related education, government and problems of democracy have great potential to enrich environmental education by exposing students to the ways and means by which problems are managed or resolved by political systems. In many of the curricula surveyed in this study, treatment of social action was rarely found; when it did occur, it was predominantly concerned with teaching the individual how to effect change by adopting a new personal life style such as recycling, reusing containers or consuming less. Very few curricula introduced other forms of responsible action such as letter writing, community organization, public education campaigns and political activism. These findings are supported in other studies by Boerschig, DeYoung, Pomerantz and Sakots which found environmental education curricula were deficient in developing critical thinking, changing attitude and behavior and imparting an ability to transmit knowledge into social action.[34]

There are many ways to improve the socio-political viability of environmental education. A common denominator for these efforts is the transmission of awareness into meaningful social participation. In the United States, study of the environment has focused mostly on suburban, rural and global issues; new emphasis is needed on urban minority areas where concentrations of toxic waste and poor human services endanger human ecology and present a problem of social justice defined as environmental racism. In the 1970's Congress empowered citizens to take legal action to ensure enforcement of federal environmental protection laws. Schools have a responsibility to educate students about this civic responsibility; curriculum should cover law enforcement procedures, environmental controversy, the role of environmental impact statements, advocacy for local interests in regulatory proceedings and education of the general public about issues.

If environmental education is to become a vehicle for social change, motivation of learners is a critical element in any curriculum. Students need to understand how their knowledge can be used to promote change and also how they can become empowered to act as change agents. Many students can not envision the power of citizenship because they have never seen how activism can produce change. Teaching can make use of cases which clearly show what gains were expected, why these would improve the quality of life and how and why such social action failed or succeeded. Good teaching of controversial issues should introduce fairness by explaining all points of view in the conflict; students need to know ways to deal with opposition when advocating for a particular solution. Student empowerment is an important foundation for developing later commitment to environmentally responsible behavior. Teaching should encourage student participation, decision-making, problem-solving and intuition. Activities should enable students to perceive how they can act in ways that may produce the desired results.

One effective means of teaching for longer term effect is to facilitate value clarification and encourage students to develop a personal environmental ethos. For very young children, enjoyable activities which carry a message about environmental stewardship are an effective means of learning by doing; tree planting, recycling, turning off lights, feeding birds and composting provide a foundation for later cultivation of environmental ethics. Engaging students in positive vision-formation by having them imagine how they would like to see their future environment is another means for constructing a proactive ecology ethos. This activity could be amplified by having them communicate these ideas to city councils, local newspapers, school principals, community organizations and parents. Some elements of ethos-building include awareness of the world, being informed about conflicts, having empathy for affected life, understanding the value of biodiversity, perceiving positive and negative relationships between humans and nature, and involvement in activities through which attitudes and values are transmitted into action.

Having an ethos informs us in making choices in life. Empowerment requires action in the world. Schools can motivate student learning by enabling them to experience the process of transmitting ideas into action. In environmental education this could entail taking responsibility for living things, participation in school and community action projects, working to save endangered species and green space, persuading others to adopt conservation practices, striving to resolve conflicts over use of the environment and informing public officials about concerns. The goal of such education is the critically reflective citizen envisioned by Paulo Freire.[35] This person should be able through dialogue to question the status quo, reveal factors that mystify reality, reject ideas that represent false consciousness and act in ways that will achieve a more beneficial future state of being. If schools were able to equip students with

these abilities, the future possibility of solving the global environmental crisis would look more favorable.

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3. Cited in France Bequette. (June 1993). Environmental education in action. UNESCO Courier, p. 23.

4. See Finger, op.cit., 143; Bequette, op.cit., 23; G.L. Volk, H.R. Hungerford and A.M. Tomera. (Spring 1993). Effects of issue investigation and action training on eighth grade students' environmental behavior. Journal of Environmental Education, 24(3), 31-36; L. M. Gigliotti.(1990). Environmental education: what went wrong? What can be done? Journal of Environmental Education, 22(1), 9-12.

5. See Abby Ruskey. (Spring 1995). State profiles in environmental. EPA Journal, 25-27.

6. See Julian Keniry. (September-October 1993). Environmental movement booming on campuses. Change, 25(5), 42-50; Steve Lerner. (Summer 1994). The green boom on campus. The Amicus Journal, 16(2), 38-39.

7. See Larry M. Gigliotti. (1994). Environmental issues: Cornell students' willingness to take action, 1990. Journal of Environmental Education, 26(1), 34-42.

8. See Susan Lewis and Kathy James. (Spring 1995). Whose voice sets the agenda for environmental education? Misconceptions inhibiting racial and cultural diversity. Journal of Environmental Education, 26(3), 5-11.

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11. Cited in P. Corcoran and E. Sievers. (Summer 1994). Reconceptualizing environmental education: five possibilities. Journal of Environmental Education, 25(4), 4-8.

12. Paul Rauber. (March-April 1993). Friends of the devil. Sierra, 78(2), 40-42.

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14. See Give Water a Hand. Leader Guidebook. Youth Action Program. Promoting Water Management Practices at Home and in the Community. Chevy Chase, MD: National 4-H Council, 1994; Trees, Students, Local Government: A Partnership for a Beautiful Community: A Secondary Education Curriculum. Sacramento, CA: Sacramento Tree Foundation, 1987; J.S. Goldman, et al. Investigations: Toxic Waste. A Science Curriculum in the Participation Series. Cambridge, MA: Educators for Social Responsibility, 1984; P.M.Millette. (May 1991). Real World Writing in a Secondary School Earth Science Class. Journal of Geological Education, 39(3), 174-5; R.Peters. Participatory Citizenship: A Learned Way of Living. Plaistow, NH: Global Horizons--The Center for Applied Ecosocial Studies, 1993; P. Wasserman and A. Doyle. Earth Matters: Studies for Our Global Future. Washington, DC; Zero Population Growth, 1991; A. Ballin, et a.. Trash Conflicts: A Science and Social Studies Curriculum on the Ethics of Disposal. An Interdisciplinary Curriculum. Cambridge, MA: Educators for Social Responsibility, 1993; Community Solutions to Solid Waste Pollution. Operation Waste Watch. The New Three R's for Elementary School Grade 6. Richmond, VA: Virginia State Department of Waste Management, 1990; Less Waste in the First Place. Six Lessons on Packaging and Source Reduction. Washington, DC: Flexible Packaging Education Foundation; New York City Water Saver's Workbook. New York: New York City Department of Environmental Protection; Acid Acid Everywhere. A Unit Designed for Grades 4-6. Williamsburg, VA: College of William and Mary, Center for Gifted Education, 1993; A Curriculum Guide to Closing the Loop: Integrating Waste Management Activities for School and Home. Chagrin Falls, OH: Institute for Environmental Education, 1991; Let's Get Energized. Sacramento, CA: California Energy Extension, 1992; Naturescope: Pollution: Problems and Solutions. Washington, DC: National Wildlife Federation, 1990; Recycling: The Fourth R. Edwardsville, IL: Madison County Educational Service Region, 1991; Waste in Place. Stanford, CT: Keep America Beautiful, 1990; Wee Recyclers. Madison, WI: Wisconsin Department of Natural Resources, 1992.

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18. Jack Wolowiec, Ed. (1994). Teaching for Tomorrow: Integrating LRE and the Social Studies. Bar/School Partnership Program. Chicago: American Bar Association.

19. Mark K. Mitchell and William B. Stapp. (1993). Field Manual for Water Quality Monitoring, 7th ed. Dexter, Michigan: Dexter Shore, p. 6-11, 170-79.

20. The Rivers Curriculum Project: the Illinois Rivers Project. Edwardsville, IL: Southern Illinois University, 1990-1995. See also Save Our Streams and Waterways. Indianapolis, IN: Indiana State Department of Education, 1991.

21. Project Learn and Serve brings the river to the classroom--and vice versa. Newstream: A Newsletter of the Pawtuxet River Authority. (Spring 1996), 2; Charlotte F. Spang, Ed. Active Watershed Education, It's Awesome: Curriculum Guide for the Pawtuxet Watershed. Kingston, RI: Southern Rhode Island Conservation District, 1995. In this curriculum Unit XII gives an in depth overview of public hearings and citizen action.

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23. Paul Wapner. (April 1995). Politics beyond the state: environmental activism and world civic politics. World Politics, 47(3), fn 53-54; John W. Bartlett. (September-October 1993). Young Crusaders. Sierra Club, 78(5), 20-21.

24. Susan Fry Bovet. (April 1994). Teaching ecology: a new generation influences environmental policy. Public Relations Journal, 25; Allyson Wellburn. (Winter 1993). Activism on the road. Environmental Action Magazine, 24(4), 20-21.

25. Brooke Nelson. (Winter 1993). SEACing student activism. Environmental Action Magazine, 24(4), 17-18.

26. EcoNet: Earth Force. Available: http://www.earthforce.org

27. EcoNet: Global Thinking Project. Available: gopher://gopher.igc.apc.org.70/11/ environment/enveducation.

28. EcoNet:GREEN. Available: http://www.igc.apc.org/green; Mitchell and Stapp, op.cit., 191-220.

29. Envirolink. Available: http://envirolink.org/enviroed/

30. Alliance for Environmental Education. Available: http://alliance.igc.org.

31. Andy Alm. (1992). Computer communications and environmental education. Convergence, 24(2), 55-61; Peter Copan. (October 1995). Connecting classrooms through telecommunications. Educational Leadership, 44-47.

32. M. Bradsher and L. Hagan. (October 1995). The Kids Network: student-scientists pool resources. Educational Leadership, 38-43.

33. Cited by Calvin E. Bruce. (March-April 1993). Environmentalism and student activism. The Black Collegian, 24(4), 52.

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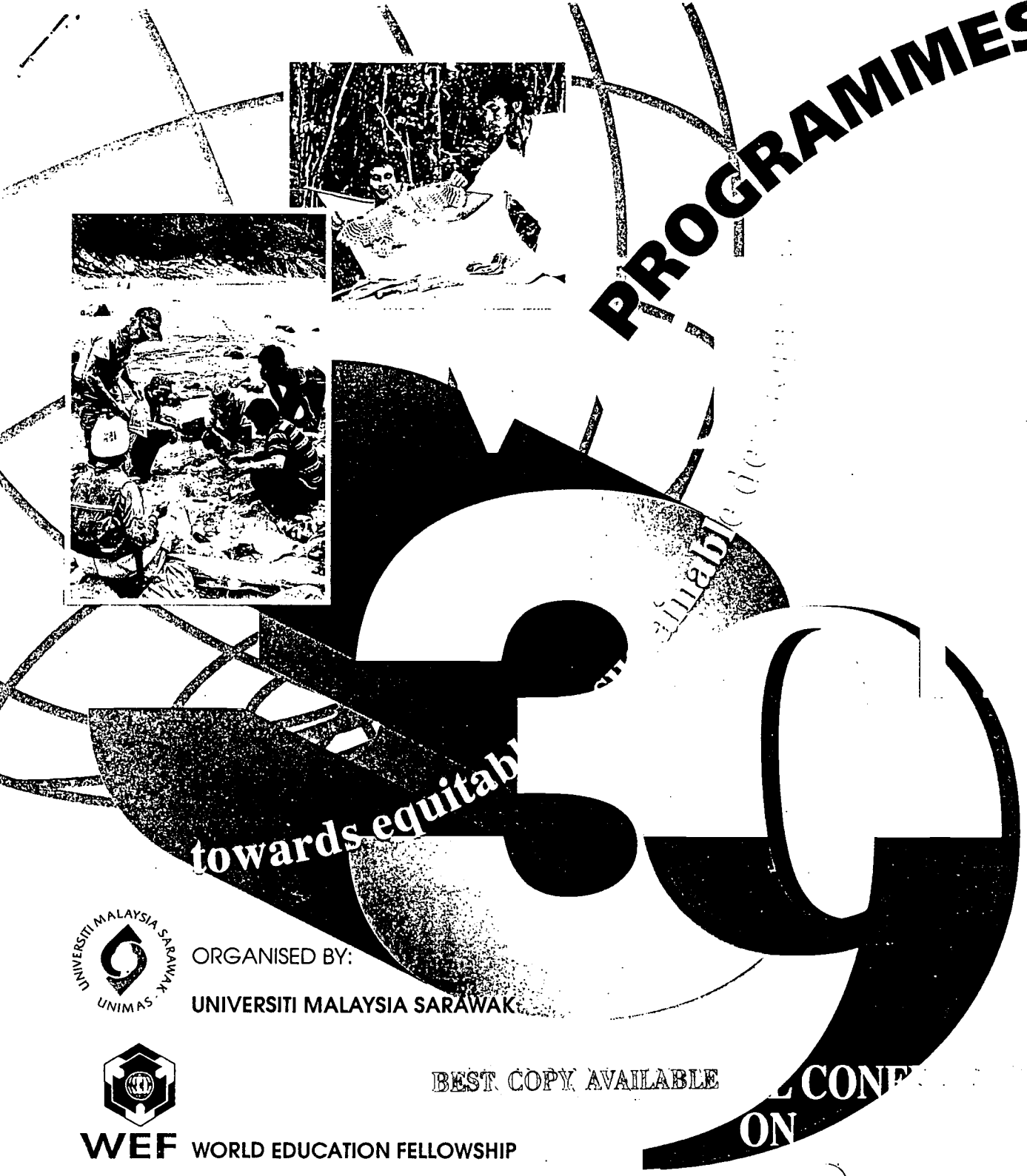

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UNIVERSITI MALAYSIA SARAWAK

WEF WORLD EDUCATION FELLOWSHIP

Education & the Environment

P r o g r a m m e

Sunday, August 4, 1996	
	Arrival of WEF Delegates
Monday, August 5, 1996	
Morning	WEF Meeting including *Beatrice Ensor and the New Education Fellowship - What she sought.* Prof. Y. Yamasaki and Prof. H. Iwama, Kokushikan University, Tokyo, Japan.
Afternoon	WEF visit to university & schools in Kuching
Tuesday, August 6, 1996	
0730 - 0830	Registration
0900 - 1000	Opening Ceremony Morning Refreshment
1000 - 1145	*Chairperson:* Professor Ghazally Ismail *Towards the next millennium: Setting the real bottom line* by **Professor David Suzuki**, Sustainable Development Research Institute, University of British Columbia. *The view of youth*, a video of a speech by Severn Suzuki at UNCED ('Earth Summit"), Rio de Janeiro.
1145 - 1245	*Chairperson:* Dr. Kallolini Hazarat *The role of the World Educational Fellowship in the development of environmental education.* by **Dr. David Turner**, Senior Lecturer in Education, University of East London. *The education of wonder and caring* by **Dr. James Hemming**
1245 - 1345	Lunch and Briefing of Learning Group Leaders
1345 - 1435	*Chairperson:* Professor John Stephenson *Environmental Education: The key to a sustainable future* by **Professor Ian Lowe**, Head of Faculty of Science, Griffith University, Queensland.
1435 - 1445	**Briefing on Learning Groups and Contributed Papers Sessions** by Professor John Stephenson

1445 - 1545	**Session 1**

A *Environment - Ethics - Economic Development - Education (4Es)*
Prof. M.G. Kanbur, Professor of Economics, UNIMAS

Curriculum development for activism in environmental education
Dr. David C. Woolman, Curriculum Resources Centre, Rhode Island College, Providence, Rhode Island, USA

B *Education and environment - Practical implications*
Dr. Usha Rao, Principal, Ghokale Education Society, College of Education and Research, Bombay, India.

Towards an environmental education curriculum in Hong Kong (The people or the professionals)
Dr. Roger P.K. Ho, Cambridge University and Hong Kong

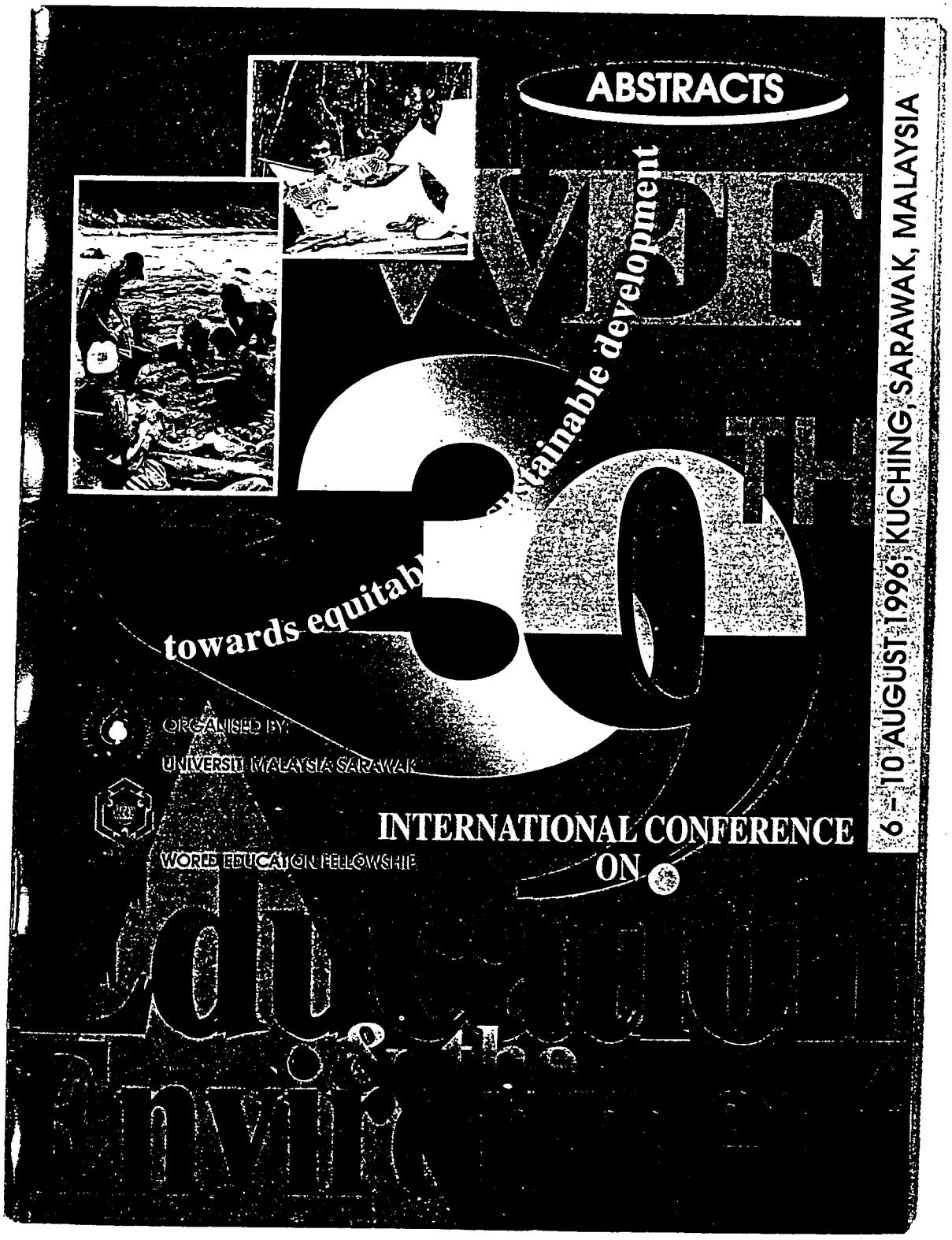
C *Environmental knowledge, attitudes and actions of people of Sarawak*
Prof. Geoffrey Wain, UNIMAS

Facing facts, changing the emphasis of curricula to reflect the reality of global pollution control
Dr. Steve G. Oakley, Institute of Biodiversity and Environmental Conservation, UNIMAS, Malaysia.

D *The scientist as environmentalist - ASTA's Earthworm Award Program, a national initiative*
Ms. Belinda Lamb, Australian Science Teacher's Association, Canberra, Australia.

Twelve steps to perpetual inadequacy: Making of an environmental educator.
Mr. K. Rubeli, Wangat Lodge Environment Centre, Dungog, NSW, Australia

1545 - 1615	Afternoon Refreshments
1615 - 1700	Learning Groups Meeting 1
1900	Conference Dinner



1A2 Curriculum development for activism in environmental education

David C. Woolman
Curriculum Resources Center
Rhode Island College, USA

This paper will begin by briefly examining the historic and philosophical foundations of environmental education and then survey the contemporary practice and future potential of environmental activism in the conservation movement and in progressive education's emphasis on the study of social problems in curriculum. The emergence of global consciousness and the concept of a finite and endangered earth provide philosophical underpinnings for growing concern about the fate of the natural world. This concern is also driving a cultural transformation in the way human societies view their relationship with nature.

Many possibilities exist for schools to play an important role in developing environmental awareness and activism. Awareness and activism build relevance into education by linking learning with student empowerment. This potential may even involve schools directly on behalf of environmental protection. Such activities, which usually include field experience, should incorporate learning by doing, community involvement and global awareness.

This paper will survey the role of activism in current environmental education curriculum and explore the potential for expanding activism through learning projects which involve integration of science with education in the process of political change. Specific examples of current practice in environmental

education in Rhode Island, a state in the industrial northeast region of the United States, will be presented to illustrate some possibilities for activism. These local curriculum efforts will be compared with a wider selection of U.S. school activities. Possibilities of intercultural and global co-operation using new technologies will also be covered.

1B1 Education and environment : towards equitable and sustainable development

Usha Rao
Gokhale Education Societies
College of Education & Research
Parel, Bombay-12 INDIA

Interaction between man and the environment is as old as the existence of mankind in the world and the interaction is changing very fast. But, in this rapid change, thoughtless destruction of the environment is going on. There is a lot of environmental degeneration. Man is polluting and exploiting nature. Hence, the introduction of environmental education in schools is a must. This can be brought about through curricular and co-curricular activities. For this, adequate teacher training is required.

In some countries there are a lot of children who drop out of school. For them environmental education may be introduced through voluntary agencies and mass media.

De-linking development from environmental factors is not possible. Minimising pollution and eco-degradation can be achieved by developing Environmental Impact Assessments using the application of science and technology.

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