

Good Practices in Teacher Education Institutions



**Good Practices in Education for Sustainable Development:
Teacher Education Institutions**

U N E S C O

**Education for Sustainable Development in Action
Good Practices N°1**

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Prepared by UNITWIN/UNESCO Chair on Reorienting Teacher Education to Address Sustainability and the International Network of Teacher-Education Institutions, and edited by Rosalyn McKeown

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Foreword

Since the advent of the United Nations Decade of Education for Sustainable Development, UNESCO has received numerous requests for case studies that illustrate good practices in ESD. The publication of *Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability* (UNESCO 2005) has proven to be a popular document as countries around the world examine what it means to reorient education to address sustainability and how teacher education can contribute to that process. To encourage and facilitate such efforts, UNESCO requested that the UNITWIN/UNESCO Chair at York University in Toronto, Canada write eight case studies on education for sustainable development (ESD) and teacher education. The Chair turned to its associated International Network of Teacher-Education Institutions and requested case studies of the work they had been undertaking for the previous five years.

The case studies in this document reflect individual and institutional efforts to reorient curriculum, programs, practices, and policies to address sustainability at institutions of teacher education. The studies come from Africa, Asia, the Caribbean, Europe, and North America. The case studies deal with professional development for in-service teachers, curriculum revision at the pre-service level, research with students in a local school, greening of a building and its garden, creating a network of universities, starting a journal, and creating new undergraduate and graduate programs. The diversity of efforts is broad; the impact is deep. The dedication of teacher educators around the world is evident on every page of this document.

We hope that these efforts will provide tangible and inspiring examples of reorienting education to address sustainability. These case studies illustrate how individuals and institutions accepted challenges associated with creating and implementing ESD programs. The authors and their colleagues worked to ensure a more sustainable future for their communities and thus contributed to a brighter future for the world.

Charles Hopkins, Chair
Rosalyn McKeown, Secretariat and Editor

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1. Literature to Address the Problem of Violence: Infusing ESD in the Curriculum

Lorna Down (University of the West Indies, Jamaica)

Introduction

The project aimed at infusing education for sustainable development into the curriculum at the largest teachers' college in Jamaica. It began with the reorientation of the Literature program for student teachers who were preparing to teach English literature and language to secondary school students.

The program introduced major issues of sustainability and focused on that of violence in Jamaican society. To begin, we explored with our students the concept of sustainable development through lectures, discussions, and projects. In doing so, we reflected on a number of issues related to the environment, the economy, and society and encouraged students to pursue further research in this area.

In addressing attitudes to and behaviors of violence through literature, we taught the set literary texts by focusing on their social/historical, economic, and environmental aspects. We examined (1) the roots of violence in Caribbean society, (2) the impact of violence, and (3) alternatives to violence, in other words, the path to peace. This included conflict resolution management.

Program Presentation

In 2000, as part of the initiative undertaken by the International Network of teacher-education institutions associated with the UNITWIN/UNESCO chair to reorient teacher education to address sustainability, I introduced the concept of infusing education for sustainable development at Mico Teachers' College where I was Head of the Department. Working with colleagues in the Department of Languages, Mrs. Karen Morgan, Miss Hyacinth Williams, and Miss Mavis Smith, I began with reorienting the existing literature program to address sustainability.



Figure 1-1. Lecturers for the ESD perspective and approach to the study of Caribbean literature (Dr. Down far left)

The objective was to introduce students to the concept of education for sustainable development (ESD) and to methodologies for infusing ESD in the curriculum as well as to help them see themselves as change agents – able to transform society by becoming active citizens.

Innovative Aspects

We began the program of infusing ESD in literature with the Caribbean Literature course. This course was a 90-hour course common to all Year 1 student-teachers pursuing a Single or Double Option English program in teachers' colleges in Jamaica. At Mico Teachers' College,

students were divided into two main groups which met together as a large group for specific lecture sessions on ESD and then separately in their two groups for small group discussions. I was responsible for the large group sessions and one of the small groups. The other lecturers were responsible for the other small groups in different years. Lecturers met and discussed the approach that was being tried and at the end of the first year we reflected on what had taken place and discussed relevant changes for the upcoming year.

First the concept of ESD was introduced. This was done in various ways: lectures, discussions, PowerPoint presentations, and projects in which students had to find and present material on various sustainability issues. They were encouraged to further research these areas.

We taught the texts assigned for Caribbean Literature with a focus on the social/historical, economic, and environmental aspects of violence. The class engaged with the specific context of these texts – enslavement, colonialism, post-colonialism, a context of rich cultural mixes, creolisation, but also a context of inequities, resistance and violence. The class also explored the texts' exploration of alternative visions to violence, as in Jamaican playwright Denis Scott's play *Echo in the Bones*, where the play becomes a ritual emphasizing forgiveness and reconciliation. Dominican author Jean Rhys' novel *Wide Sargasso Sea* highlights the need for taking into account the other side. The Jamaican poet Lorna Goodison evokes the spiritual response as she maps the systemic nature of violence.

Contemporary situations of violence became another text to be analyzed. Students and lecturers both kept journals that reflected their experiences with and responses to violence. These served as powerful texts for understanding violence and charting a way for peace. Sharing of h

Using an "ESD perspective and approach" to the study of literature impelled a critical analysis of violence in the Caribbean that disclosed specific regional factors, historically and currently, that have given rise to violence. Alternatives to violence within the Caribbean context also emerged. Yet the connection between local, regional, and global violence was not missed as a systematic overview revealed. Students, in effect, saw how a global context of violence influenced local violence and how that too helped to contribute to global violence. Problem solving and action planning also became central as a result of this approach.



Figure 1-2. Students in Caribbean literature class

Effects, Results, or Impacts

Students found the program meaningful and valuable. They commented that approaching literature in terms of sustainable development deepened their understanding and extended their knowledge of global and local issues. For them too it was "literature in action." Of particular importance to them was the conflict resolution workshop that gave them the tools to deal with conflict and anger. They spoke too about how the journal sessions gave them an opportunity to express 'negative' feelings in a safe place.

Some were at first wary about dialoguing with the police, but most of them at the end of the session saw it as providing another, more human perspective of the police. The candid discussion encouraged them to review negative feelings they have had towards the police and helped them explore community policing from different perspectives.

Students' performance on the examination common to all the teachers' college was, in general, commendable. Though the course was extended to include a conflict-resolution workshop and planning peace projects, students did not lose focus on the immediate testable items—their analysis of these was in fact deepened.

Lecturers also stated that the curriculum became more relevant as it focused on real life experiences. They felt that approaching literature from a sustainability angle also emphasized for their students the connection between different aspects of life, between theory and practice. They saw their students as having an opportunity to explore sustainability issues globally as well as locally. Critical too was the exploration of alternative responses to violence, of other possibilities for the future, and for the transformation of society.

Success Factors

The major factor was the passion and the commitment of the lecturers. They wanted education to make a difference in the lives of students. They wanted their subject area to address at least one major 'life' issue at the local level in a concrete way so that students understood education as a lived experience and not just a means of upgrading certification. They also saw themselves as agents of change, with a responsibility to help effect meaningful change in their society, and they wanted their students to see themselves as such.

The support of the International Network of Teacher Educator Institutions associated with UNITWIN/UNESCO has helped sustain the commitment to sustainability. In particular, the Chair, Charles Hopkins, and the Secretariat, Rosalyn McKeown, provided materials, gave advice, and made suggestions. They also offered emotional support so that one felt part of a team instead of an isolated individual attempting to effect change.

Another important factor for success was the support given by the principal, the head of the department, and colleagues in the department in which the project was implemented. Their critical inquiry about ESD impelled lecturers in the program to research extensively the subject and clarify their objectives. Expressions of interest from colleagues in Science and Social Studies also aided the work. One lecturer from Science, for example, requested an article about ESD for the department's science magazine. Another lecturer from Social Studies shared her approach of introducing 'informally' issues of sustainability in the Social Studies curriculum. An additional factor was that lecturers had autonomy over the delivery of the program and so were able to determine the kinds of activities and ways the topics could be extended.

Key to the success of the program was students' attitude. Though conscious of the syllabus, students were open to different approaches. The syllabus is the set of objectives and topics for a particular course within a specific time limit. Marks for course work and for examination are also specified for each course. Anxieties that they may have had about their need to be strictly focused on the syllabus never became an issue. Instead they allowed themselves to engage with issues beyond the confines of the classroom and texts.

Constraints

A major constraint was the lack of a policy on ESD at the college and at the Ministry of Education level. The Joint Board of Teacher Education, which is responsible for programs and assessment for teachers colleges, however, does speak to the need for 'each professional to take a lead role in the preparation of our children for citizenship.' The Board also encourages 'the development of professionals competent to contribute to the achievements of desired societal goals.' As a result, the individual lecturer though s/he is encouraged to include some form of 'citizenship education' is not obligated to do so, as neither the colleges nor the Ministry of Education specifies what that should entail.

In addition, the program would have benefited from a literature syllabus that included action research or project work related to the community and one that attracted a substantial percentage (at least 25 percent) of the marks for the course. A new syllabus could, of course, determine a change in how each course work or examination item should be weighted. If this had been in place, the peace plans would have been part of the required course work and therefore implemented.

Another constraint was the lack of follow-up. At the time the lecturers did not recognize the importance of research and of data collection in this program. There was also little scope and time for such an undertaking at the college level. As a result the follow-up in terms of tracking and researching recent graduates' attempts to infuse ESD in the schools' curriculum was extremely limited. Yet this would have provided valuable information for the ongoing implementation of the program.

Perspectives

The Ripple Effect. Having introduced ESD into the curriculum, many lecturers became more aware of the concept of an education that engages students on various levels to focus on sustainability issues, on creating a better future for society.

Lecturers at the college, having seen the value of ESD, were prepared to voice the need for an ESD focus in the revised curriculum of Language Arts in the teachers' college. This has led to the inclusion or infusion of ESD into the language and literature curriculum.

Based on the literature project I initiated at Mico Teachers' College, I later designed and taught a course, *Literature and Education for Sustainable Development*, to graduate students at the University of the West Indies, having joined the staff there in 2002.

Other developments in the Caribbean have helped promote ESD. In 2004, a Caribbean Network of Teacher Educators to address sustainable development was formed. In October 2005, the Regional Conference in ESD was held in Kingston, Jamaica, to launch the UN Decade for ESD. In 2006, in Jamaica, The Joint Board of Teacher Education (JBTE) in association with CIDA/GOJ ENACT (Environmental Action Programme) and UNESCO conducted ESD workshops for lecturers in teacher education from Jamaica, Belize, and the Turks and Caicos Islands. Most recently, in August 2006 in Jamaica, a presentation on ESD at the JBTE Conference provided an opportunity for us to share our experience with the ESD literature project. The cascading effect of that single initiative has been tremendous.

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2. Swiss International Teachers' Program

Lawrence Byrnes (Florida Gulf Coast University, USA)

Introduction

The Swiss International Teachers' Program (SITP) is a custom-designed, four-week, university-based experience for elementary- and secondary-school teachers. In the six-year history of the program, Florida Gulf Coast University (FGCU) has hosted more than 200 schoolteachers and administrators from Switzerland, Brazil, South Africa, Canada, and the United States.

Since participants live together in residence hall apartments, a valuable aspect of the program is the exchange of ideas and best practices that lead to new perspectives about education, culture, and sustainability. The primary purpose of the program is to provide integrated learning experiences in which participants study ecology, economics, and social and political issues pertinent to their respective countries and the world. Participants in the program learn to engage in team problem solving and critical thinking by managing a fictitious country called ECOLAND utilizing a computer simulation program called ECOSYS¹. The program generates a macroeconomics database that allows participants to understand the cumulative impact of their decisions on ECOLAND.

Each week participants responded to a survey evaluation so we could make rapid improvements to our services. There was also a formal evaluation at the end of the program used to make programmatic changes for the following year. As one participant noted in her evaluation:

Referring to your question about the impact of your excellent program, I can assure you that it has changed my whole outlook on life and teaching. I am aware of my personal attitude towards political and environmental views... The key word sustainability must not only be used as an essential business-orientated word but also experiences, lived and believed in. This is exactly what I learned during those four wonderful weeks.

Program Presentation

The SITP is a partnership between the College of Education at Florida Gulf Coast University, the School of Education at the Zurich University of Applied Sciences, the City of Zurich, and private sponsors in Switzerland, Brazil, and South Africa. Planning began in 1999, and the first summer program was held in summer 2000 with 30 Swiss teachers in attendance. Since then, the program has hosted Brazilian, South African, Canadian, and American participants.

FGCU contributes classrooms, computer laboratories, meeting rooms, recreational and fitness facilities, and international program assistance, as well as library, health, and food services. The program budget ranges from U.S \$100,000 to \$150,000 depending on the number of participants, the number of field trips, and fees for various activities. Some participants personally contribute funds for the experience while others are fortunate enough to be fully supported by private sponsors. The participant cost has ranged from U.S \$3,000 to \$3,400 for the four-week experience. This fee covers all essential programmatic components including housing and one rental automobile per apartment to provide mobility in the evenings and on weekends.

¹ ECOSYS is a macro-economic, environmental awareness computer simulation program copyrighted by Ernst Schmidheiny Stiftung.



Figure 2-1. Six Mile Cypress Slough Walk

Innovative Aspects

There are five primary components of the SITP.

- (1) A major objective is to understand systems and the integration of ecology, economics, and societal frameworks while exploring the dynamic tension between economic growth and environmental stewardship.
- (2) The program creates teams to solve 'real-life' problems, uses continuous quality improvement tools such as affinity diagrams and plus/delta charts, and applies the principles of Stephen Covey's *7 Habits of Highly Effective People*. This helps participants learn to understand and apply basic business practices. They also learn to work together as high performing teams and to meaningfully discuss the fundamental interdependencies and delicate balance between societal needs, economic growth, and ecological stewardship.
- (3) Participants also play an active part in managing a fictitious country called ECOLAND. They assume a variety of roles: a member of a household, a member of government, a business owner, or a member of the media. Participation in parliament allows all participants to articulate a point of view and influence others to change their opinion on an issue.
- (4) Participants also interviewed southwest Florida community leaders to gain first-hand knowledge of the ecological, economic, and social challenges facing southwest Florida. The goal is to apply the knowledge and skills gained in the ECOSYS experience to elementary and secondary school classrooms in the participants' home country. The immediate availability of computer printouts displaying the economic effects of decisions highlights the importance of macroeconomics to sustainability.
- (5) Another objective is to improve English language proficiency for non-native English speaking participants by speaking, reading, and writing English throughout the program.

Instructional Technology. The program offers participants access to current computer technology tools that enhance learning and teaching through experiential activities using software applications and presentations. For example, participants use presentation software, the Internet, the World Wide Web, curriculum materials, e-mail, and Web boards. These varied activities help participants become distance learners, communicators, and more sophisticated users of instructional technology.

The challenges of the 21st century require everyone to work interdependently with people of diverse backgrounds to solve complex problems, mediate conflicts, and find common ground among differing belief systems and worldviews. The international living arrangements, the team building activities of ECOSYS, and the interdisciplinary curriculum play significant roles in preparing SITP alumni to meet those challenges with knowledge, skill, and confidence.



Figure 2-2. 2005 SITP participants

Effects, Results, or Impacts

Creating workable democratic communities of diverse learners within the residence hall apartments was crucial to the program's success. An important component of the program was developing a "Sense of Place" about participants' immediate surroundings and southwest Florida. By interviewing community leaders ranging from an environmental activist, the manager of a major hotel, and a prominent home and golf course developer, participants gained a real sense of critical issues in southwest Florida. In addition, field trips included a major hotel, a major agribusiness, ranches, and nature preserves. In one field trip, participants took a walk through a swamp and had an "up close and personal" look at the flora and fauna of southwest Florida, including alligators. The "Sense of Place" theme also included visits to local schools to meet with teachers, administrators, and students. These popular visits provided a brief but intimate look at teaching and learning in southwest Florida. The excursions also allowed SITP participants to compare circumstances in their school with those of a local southwest Florida community. Participants found the visits interesting and enlightening, as they witnessed the opening of a new school year, classroom management issues, and the challenge of teachers working with diverse student populations.

Field trips like the swamp walk and a visit to the Alico cattle ranch enhanced the knowledge and understanding of a "Sense of Place." Other activities that fostered a "Sense of Place" included community interviews with the use of guiding questions, the use of award-winning local teachers for the post-interview debriefing session, school visitations, and the International Cultural Festival organized and led by the participants.

Clearly, the SITP program had a positive effect on participants' understanding of ecosystems and the interrelationship between ecology, economics, and societal issues in dealing with issues of a sustainable environment, societies, communities, and families through the ECOSYS simulation program and the field activities.

One participant expressed her feelings as follows:

After attending SITP, I regularly e-mail to Brazil, South Africa, and Florida. But there are other things too. First, I'm going to give some presentations on the occasion of our team meeting. I'm going to talk about ECOSYS, the hot topics such as bullying and diversity at schools. Second, I changed the first topic in the subject: people and their environment. Normally, I started the new school year with the learner's improvement of language skills. But after SITP 05 I started with: 'I am responsible for my own learning and responsible for the success of others.... While discussing topics at our schools with my colleagues from South Africa, I decided to do that. Finally, the Brazilians are tremendously interested in the peacemaker project at our semi-independent state school. To sum up, my time in Florida was great and I learned a lot. Thanks.



Figure 2-3. Charles-Mar Weber, Swiss Project Director



Figure 2-4. Margaret Byrnes, ECOSYS Instructor

Success Factors

To fully appreciate the evolving success of the SITP over six years, we need to understand the complexities of the enterprise and the challenges of designing and implementing a multifaceted international program. The participants came from different nations, spoke a variety of languages, and had different worldviews and cultural traditions. They had to leave family and friends, live and study together for four weeks during their summer holiday. They made arrangements to shop together, shared an automobile, shared space, grappled with an economics-based simulation game, and created democratic communities of learners within their living quarters.

In light of these factors, the program's success was impressive. It incorporated a number of elements, including a challenging international living experience and the ability of the ECOSYS instructor to turn difficult subject matter into "real life" terms. These included a variety

of creative initiatives like mock passports, conferring “World Bank consultant” status on participants, and using helpful learning tools for all aspects of the simulation program. These included brochures on housing, energy, and transportation as well as newsletters that described the results of group decisions. The program also used continuous quality improvement techniques and regular feedback from students to make changes in instruction. This was new, challenging, and exciting for the participants.

One participant captured the impact of the program as follows:

I originally chose to come to Florida because I saw it as a great opportunity to brush up on my English. I personally consider it as most important to do so.... But then I realized that it was more important to have conversations with the Brazilians and the South Africans, because studying grammar is something that can be done in Switzerland as well, but there was no Reggie telling us about his time in the underground when the Apartheid still took place in South Africa, no Sureya speaking of her daily struggle being a divorced mum and so on....I definitely improved my speaking skills, and in addition to that got to learn a lot about other people's circumstances of life.

A significant factor in the program's success was the strong partnership and collaboration between the FGCU-based program director, the ECOSYS instructor, the Swiss-based program director, the FGCU College of Education, the School of Education at the Zurich University of Applied Sciences, and Holcim, Inc., which was the Swiss business sponsor. These close working relationships created energy and the teamwork necessary to anticipate and respond to changing circumstances related to equipment, facilities, the needs of participants, changes in personnel, complicated travel plans, and homesickness. This collaboration provided continuity, historical memory, a commitment to continuous improvement, and a determination to provide the best possible experience for every participant. The partnerships were enhanced by a number of people at the University who provided a variety of services to support the program and offered continuing encouragement as the program evolved over six years. Indeed, it is important to note that the University itself was evolving as a new institution during the early years of SITP. As FGCU's enrollment increased, its facilities, technology support, health services, food services, and residence-hall services expanded and were able to provide more comprehensive support for the SITP.

The tireless efforts of the Swiss partners in recruiting financial sponsors were also important to the program's success. In addition, their ability to secure financial support from a variety of sources was critical to the success of the program.

Constraints

Over the years, the program faced a number of challenges as well as successes. Clearly, the group dynamics required great skill in conflict management and mediation, interpersonal communication, active listening skills, and sensitivity to different lifestyles. As you might expect, the ability and disposition to successfully practice these skills differed dramatically among the participants. In addition, it was challenging to assemble a group of culturally and linguistically diverse people in a confined setting over four weeks. As you might expect, the ability and disposition to successfully practice these skills differed dramatically among the participants. Some students became homesick, which made it hard for them to focus on program goals. Others were a bit distracted by recreational and entertainment opportunities. They confided that, after all, this was holiday time for them. The availability of an automobile for each apartment was also a mixed blessing. The car provided mobility for participants in an area where public transportation was limited, but it was also a liability since there were diverse opinions about the driving skills of the assigned driver, the preferred destination for any given trip, and who should be included in events that required automobile transportation. Cultural differences about appropriate protocol in any given situation also engendered spirited discussion about “personal space” and privacy.

Another challenge was adapting ECOSYS in the context of what is essentially an academic program focused on the concept of sustainability. The ECOSYS simulation is a critical component in exploring the many dimensions of the concept and its applicability to real life policy development and decision-making. Most of the participants, however, had little or no background in economics, so the macroeconomics foundation of the system made the subject complex and difficult for participants. Fortunately, as the program evolved, the ECOSYS instructor made significant adjustments to accommodate the knowledge base of the participants while maintaining the integrity of the ECOSYS model. These included real-life applications like

the development of brochures about various production methods and materials used by business. This made the model more understandable and the decision-making process more enjoyable.

Another challenge in the early years of the program was the wide range of English language skills among the participants. Since the language of instruction was English, good faith efforts were made to ensure a minimum level of English speaking and writing skills. In the early years the program, this goal was not achieved. As the program evolved, however, it developed a more in-depth review of the English language verbal and writing skills of applicants. Improved language skills allowed participants to more fully participate in the academic program component and the residence hall international living experience. The addition of the "Didactics" teaching methods program by the School of Education at the Zurich University of Applied Sciences was instrumental in helping teachers learn to teach using the English language.

Finally, the logistics of orchestrating the SITP enterprise were challenging, but in the final analysis, doable. Long-distance communication and time differences among the countries presented challenges to participants. Teaching and administrative personnel were recruited from Switzerland, FGCU, and South Africa. Field trips had to be coordinated, appropriate community interviews needed to be scheduled and classrooms and laboratories reserved. Juggling all these variables required tenacity, flexibility, and a good sense of humor. One variable included humorous and sometimes frightening stories about the drive from the Miami airport to Fort Myers. These stories capture the complexities, challenges, and excitement of the SITP.

Perspectives

The Swiss International Teachers Program is an exemplary model for preparing educators with global perspectives. The integration of theory and practice, the uniqueness of ECOSYS in engaging participants in major policy decisions for ECOLAND, the variety of "Sense of Place" visits, and the human dynamics of residence-hall apartment living with people from different countries presents a microcosm of the 21st century world we live in. Participants took home one very important lesson, however: developing sensitivity to other points of view and respecting the human dignity of everyone.

Indeed, the decision to have individuals from different countries share an apartment was a conscious one. In addition, the ECOSYS teams themselves were cross-national, although they didn't reflect the same nationalities as groupings in the apartments. These team arrangements made it possible for a focus on community building and activities to evolve, for people to get acquainted with one another, and for team leaders to emerge.

Can the SITP model be replicated at other institutions? Yes, if the critical elements of success are followed and lessons learned about constraints and challenges are heeded. The critical focus on sustainability, the creative use of the ECOSYS simulation, along with culturally relevant and locally appropriate field trips and apartment living arrangements, would make the SITP experience successful in any geographic and cultural setting.

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3. ESD: Bringing Students' Community Experience into Schools

William Scott, Elisabeth Barratt Hacking & Robert Barratt (University of Bath, UK)

Introduction

Researchers at the University of Bath recently led a project funded by the United Kingdom's Economic and Social Science Research Council (ESRC), "Listening to Children—Environmental Perspectives and the School Curriculum."² This one-year, participatory action research project was conducted in partnership with teachers, 11- to 12-year-old school children, and community representatives.

The setting was a secondary school with students aged 11 to 19 years serving an urban community on the edge of a large metropolitan area in England. This area exhibits the sorts of social, economic, environmental, and educational challenges that many urban communities in developed economies face, for example, unemployment and associated social/cultural deprivation, street crime, old/decaying building stock, and derelict land. These conditions raise concerns about the effect such environments have on youth.

Teachers and administrators of the secondary school recognize the need to involve local people in helping the school to improve. This might include improvements in its students' achievements, curriculum, and the campus and its contribution to local community development. The L2C project provided an opportunity for the school to work in partnership with parents, children, and local volunteers to develop a curriculum that relates at the same time to Educating for Sustainable Development (ESD) and to citizenship. For 12 months, the researchers (including child-researchers) studied children's local environmental perspectives. The focus was on how children perceive their surroundings and act within their local environment and community. The researchers also examined how children make sense of their surroundings in relation to their lives and to the school curriculum, and how schools might help children incorporate local environmental perspectives into their curriculum experience.

The study highlights the desire young people have for schools to address community issues within the curriculum and for schools to play a much more significant role in community development. It critically explores the conditions necessary for children to be fully involved in developing a community-related school curriculum. The study also illustrates the potential such work has to contribute to ESD and to the promotion of local environmental citizenship.

Program Presentation

Five key ideas informed L2C:

- Local people in their communities have key roles in sustainable development.
- Children need to be accepted as key stakeholders in this effort.
- 11-12-year-olds are often neglected in local and community decision-making.
- Adults are typically unaware of children's experience and knowledge of their locality.
- Local schools often neglect children's experiences in curriculum thinking and organization.

Around age 11 to 12, children start to make the transition from child to teenager and undergo a period of personal change and challenge. As they start to interact more independently with their environment and community, children move away from their home-centered and adult-controlled environment. Both government and children's support agencies have expressed concern about the impact a rapidly changing society and increasing societal problems have on children. For example, neither the home nor the local community now provides the same integrity and security as in the past. This change affects children's sense of security and belonging and, consequently, their relationship with the local environment and community. In exploring children's experience of their environment and community, L2C focused on the context in which children do not just exist, but also influence and give meaning to their surroundings.

Innovative Aspects

In the early stages of the project a small number of children were identified to be part of the management group so they could play a key role in steering the research. Teacher researchers presented the project in a school assembly, asking for volunteers. Fifty out of 200 children volunteered. Through a negotiated process, four girls and four boys, representing a range of scholastic ability, parental background, in-school behavior, and motivation to study, were identified. The remaining volunteers were involved in later activities.

When the management group first met, the children began by sharing their perspectives on the school and their surroundings, which they illustrated with maps and photographs. Next, the children wanted to draw a picture or map of their home area, showing their personal spatial representation of where they lived. This was the first step in the process of listening to children explain why they were so interested in joining this project. This first meeting also helped us consider our first research question: How do 11-12-year-old children experience and think about their local environment? Because no other members of the group, other than the parent, lived nearby, it was the children who brought the most knowledge of the locality. This began the process of their empowerment within the project.

In further group discussion we considered the purpose of the research, the teachers', researchers', and students' roles in it, and how we could make each other's participation more meaningful. We also explored ethical issues including confidentiality, the right to withdraw from the project, and our mutual expectations. Next, eight more children from the original volunteers were invited to complete the research team of eight girls, eight boys, the two teacher researchers, the parent, and two of the university researchers.

The nature of children's participation evolved through the year. As they gained confidence they became more willing to contribute ideas, and more skilled in devising questions and using equipment, for example, using digital video to record the experiences of young people in the community. As they began to trust the adults, the children took on more responsibility. In the early stages, we focused on establishing ethical procedures, identifying participants, and establishing democratic ways of working as a research team made up of people with different interests, experience, and expertise. This involved breaking down some of the traditional power relations between teachers/adults and children. The children wanted to take on a less compliant role than the position they normally adopt in classrooms and with adults. As the project evolved, the children began to take more responsibility and leadership in project planning and implementation. Later, their role became much more proactive as they became skilled enough to contribute more to steering the project and chairing meetings. The following illustrates the characteristics and growth in children's participation in planning and implementing the L2C research design.

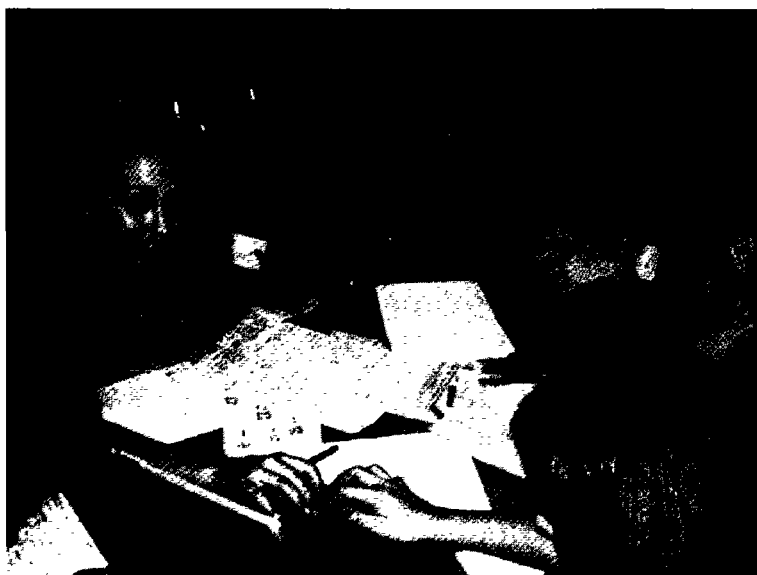


Figure 3-1. Members of the Research Team examine data collected in the local community prior to a whole-group discussion.

Effects, Results, or Impacts

Our early work revealed a number of themes that are important to children about where they live. These include, for example, personal concerns such as health, family, and friends, and the perception of safety or danger posed by people, roads, or vandalism. It was striking to the adults how important the quality of their local environment was to the children.

Most of the children already moved around the community more independently of their parents and wider families. They had detailed knowledge of their local community and could operate safely and successfully in it. Their knowledge of their community however, and how they used it were very different from that of adults, (e.g., their knowledge of the recreation areas, who used them, and how safe they were). This knowledge was gained through exploration and play, exchanges with peers and families through stories, and by renewed contact with each other, with older children, with adults, and with the community. Despite this detailed knowledge, the children felt they had limited access to the community and particularly to the places dedicated for the recreational use of young people, and that there were not enough appropriate places for them to go. They felt that the community serves younger and older children and adults more effectively than it does their age group. The children also perceived a number of barriers that prevent them from making the most of their local knowledge and contributing to local improvement, for example, their lack of knowledge about local community forums and decision making processes and lack of access to decision making forums.

In short, there is a gap between what children know about and want for their local environment, and the extent to which they are able to take action to achieve this. The children had a strong desire to be involved in local improvements. They were concerned, for example, about environmental quality, and they wanted to see more wildlife habitats. They felt that school could support their involvement, but that the gap between their own knowledge and that favored by the school works against this happening.

There is also a gap between children's own local knowledge and the knowledge favored by the school through its curriculum and teaching methods. Indeed, it seems that children's local knowledge is mostly unknown by schoolteachers and curriculum developers—and hence not used.

An Environment Curriculum Council (ECC) evolved from the research team and was chaired by a girl and a boy elected by members of the team. The goals were to reduce the gap between children's own knowledge and that taught in school, and to break down the barriers to children's involvement in the community. The ECC focused on ways of bringing project findings into the life and curriculum of the school by exploring:

- How children's local knowledge can be used in the school.
- How children can become involved in the community, possibly leading to action.
- How the research process can be integrated into school life in order to sustain a concern for children's local community and environmental perspectives.

A significant outcome of the project was a Children's Conference that gave all the children in the year cohort opportunities to reflect on their school and local community experience and ask questions of a panel including a police officer, the local authority parks committee member, and the head teacher.

Success Factors

Some L2C children had previously experienced difficulties engaging with life in school, yet all children approached this project with commitment, energy, and enthusiasm. Why did this project have so much meaning for children? Three questions were posed to children at the outset: Would you like to participate? Why would you like to participate? And, how can we make your participation meaningful? In this project children were willing to share their very sensitive local community knowledge and consider this in relation to the school curriculum. This may have been possible only because the project researchers and teachers acknowledged that it was important to involve children in agreeing to the research design and process. This starting point established children's trust and belief in the goals of the project and, most importantly, its relevance to them as young citizens.

At the end of the project, the children were overwhelmingly positive about their experience and its impact on them and their school experience.

"In lessons we're told what to do, in L2C we do the talking."

"In the beginning of year seven there was no L2C, then I volunteered and [school] changed a lot for me."

They welcomed the opportunity to share their views about the local community and the school curriculum.

"I've learnt that not everyone thinks we're being taught enough that's relevant outside school and for us later on, so it's great to give our views."

... and the opportunity to learn more about the views of others.

"I've learnt about other children's ideas, they think that a lot of things need to be changed in Kingswood like the parks."

The children also acknowledged change as a positive outcome of their involvement in L2C...

"You feel you're changing something.... I didn't think the project would go this far...it's gone onto much bigger things because it helped the school, me, and lots of other children."

... which made students think more about the future and the positive contribution they could make to the community.

"I'd like [L2C] to keep going...but we should try to get even more involved with our community.. try to get a new way of doing it like kids maybe building something inside the school like composting and show it to the adults...so we can bring change into the community."

Children enjoyed and benefited from exploring the expertise of their peers, and the teachers welcomed knowing more about this, describing the best part of the project as...

"... the increased connection with pupils. I've managed to speak to pupils on a personal level about things that genuinely matter."

...adding...

"I've learnt about where pupils come from and what's important to them. I don't know enough about our local community and the way our pupils perceive school."

The teachers wanted to sustain the L2C approach by continuing to explore with children their local experience and build on this in the Humanities curriculum.

"We do it to them rather than let them own the curriculum and I would like to see more contextualized curriculum material and more ownership of approaches and strategies in curriculum planning."



Figure 3-2. Members of the Management Group discuss the work of the project with Professor Andy Dobson (Keele University) who was visiting the school.

Constraints

A number of contextual factors were important in the success of the L2C project: time and space provided by the school to accommodate the project. These include the approval (legitimation) from the senior management within the school, the very active engagement of two teachers, and external support from the University. Without all this, the project would not have been established in the school. However, it is equally clear that these are not enough, and there has been an on-going tension between (a) finding the time or the school structures to do justice to such initiatives, and (b) enabling the children to experience the existing curriculum to the full. This mirrors issues around the incorporation / integration of ESD into mainstream schooling.

L2C suggests that changes need to be made in how the school curriculum is developed, as well as in the content of the curriculum, and pedagogy. The research team thinks that all subject areas would gain some benefit from a consideration of how subjects might bring pupils' everyday experience and community perspectives into their curricula. Publicly funded schools tend to follow a directive approach to the curriculum. Therefore, *how* the sort of curricular change envisaged here will most readily take place is beyond the scope of this paper. In reality, these issues are most likely to be settled on the ground in the context of each school and its unique circumstances and personnel.

Perspectives

Our experience has demonstrated that if children can be provided with appropriate conditions for participation, then the opportunity to establish the groundwork for meaningful change in the school curriculum can be created. In so doing, the apparent gap between children's everyday life and the school curriculum may be reduced. Curriculum initiatives developed in collaboration with children will be more in tune with their own local environmental needs and aspirations. Additionally, such collaborative processes address the challenge of encouraging self-determination and participation, and achieving empowerment.

Such considerations are strikingly absent from government rhetoric on sustainable development education. The government approach tends to emphasize what is to be learned and what experts have determined. Such official attitudes and strategies have singularly failed to engage either the public or youth. The approach outlined here takes seriously the ambitions, interests, and concerns of those whom it seeks to engage. This is a manifestation of what has been termed Type 3 learning.

Type 3 approaches give the learner a central role in setting agenda for learning and action, and value the contribution that differing perspectives bring to this. They are thus inherently educative. By contrast, Types 1 and 2 are not always so, unless, that is, we are happy with the idea that the purpose of education is to ensure implementation of whatever experts tell us. Type 1 approaches see learning as a tool for the achievement of environmental maintenance where people turn objective knowledge into social action. In Type 2 approaches the proposed role of learning is to facilitate choice between alternative future 'end-states' which can be specified on the basis of what is known in the present. Type 3 approaches seem to be essential if the uncertainties and complexities inherent in how we live now are to lead to useful learning about how we might live in the future (Scott & Gough 2004).

If sustainable development really is to be the Brundtland idea that development needs to meet the needs of the present without compromising the ability of future generations to meet their own needs, then we must engage the students of today, who will determine future needs and wants. Our work is one contribution toward facilitating that process. In particular, it has challenged schools and teachers to reconsider the role of the curriculum and how it can be developed *with* children and the local community to bring children's local environmental perspectives into focus. In so doing, L2C has questioned the dominant conception, organization, and transmission of knowledge that many view as a significant barrier to the development of ESD in schools. It is too soon to know what effects this challenge will have.

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4. Department of Women's Studies

Munawar Mirza (University of the Punjab, Pakistan)

Introduction

Pakistan is a country facing rapid depletion of natural resources owing to exploitation and climatic changes. It is also a country at the tail end of human development indicators. Wide gender disparities are deeply rooted in the socio-cultural heritage of the subcontinent in almost all areas. These disparities include education, health, mobility, decision making, social power, and participation in economic activity. Some of the country's laws are also oppressive of women.

The world march towards sustainable development requires that people in each part of the world be properly educated and trained to become effective managers of the ecosystem and supporters of human rights. The department of Women's Studies at the University of the Punjab was established in 2001 to prepare a catalyst mass of properly educated people well versed in issues of sustainability. To progress, Pakistan needs people who can devise and actively engage in sustainable development activities. The country also needs professionals with a strong commitment to human rights, faith in the potential of women, and complementarity of gender roles. The same year, the Department launched its master's degree program in Women's Studies. The program is open to men and women in recognition of the fact that change will be possible only when both shoulder the struggle. The program is a combination of theory, research, and practical experience. The theory courses are taught by the faculty and professionals from multidisciplinary fields within and outside the University. A 10-week internship for each student is arranged at government departments and at a large number of well-respected multinational nongovernmental organizations (NGOs), which support the care and advancement of women. We are proud to say that many of our students undertake research on issues that many professionals would hesitate to touch upon in the current socio-cultural milieu. The master's program enrolls more than 150 students. This year we have introduced a Ph.D. in Gender Studies comprising course work plus research. Eight students have been admitted and enrolled out of a good number of applicants.

The department also organizes seminars and awareness campaigns such as seminars on topics such as 'women rights are human rights,' 'women empowerment in the new millennium,' and 'the girl child.' Students of the department also organize such activities during their internship. The department has recently launched a refereed journal, the *Journal of Gender and Development*. The contents of the first issue are available on the University website (<http://www.pu.edu.pk>) and the website of the department (<http://www.pu.edu.pk/departments/default.asp?deptid=4>).



Figure 4-1. Awareness Walk on International Women Day

The Program

The Department of Women's Studies is the pioneer in Pakistan in this discipline. The University of the Punjab is the first university in the country to introduce Women's Studies as a discipline and to offer a master's degree in the subject. It has also pioneered to institute a Ph.D. program in the subject in 2006. We started our advocacy work in 1997, when the concept of Women's Studies as a discipline was unfamiliar and least assented. With persistent persuasion, the department was established in 2001 under the leadership of the present Vice-Chancellor, Lt. General Arshad Mahmood, with minimal funding and a bare minimum of borrowed physical space. It was certainly a humble start. But the commitment and devotion of concerned colleagues helped to overcome the resource constraints to prove its worth. Recently the Higher Education Commission has provided funds for the construction of a new building for the department and the construction work is in progress.



Figure 4-2. Ground breaking ceremony for the Department of Women's Studies building

Innovative Aspects

In Pakistan, small, segmented initiatives have been undertaken on human rights, women's development, child rights, and environmental issues. Recently, the government has also included women's development in its policies and plans. Equality of access to education is on the agenda. NGOs have mushroomed to discuss and encourage dialogue on women's rights. A limited number of micro-credit schemes have been launched as a poverty reduction strategy allowing women to seek credit. But two of the most important pre-requisites of change have remained missing: (1) activities aimed at change in the socio-cultural belief system, and (2) a cohesive multi-sectoral and trans-sectoral approach towards development. These two conditions can take shape only with the help of professionals trained for such purposes.

The Department of Women's Studies was the first formal institution to provide all such knowledge and skills under one degree program aimed at preparing change agents, professionals, and practitioners to work in development organizations. The ultimate goal is to contribute to the realization of a sustainable and just present and future for the inhabitants of this country and the planet. The following quotes are views and opinions of some of the stakeholders about the establishment of the Department.

At the outset, I congratulate you on taking this wonderful initiative of establishing Department of Women's Studies in the University of the Punjab. I think it is a right step in the right direction. Development objectives can only be achieved if we are able to study and analyze gender-related issues. As a development professional, I feel this is the most neglected area where a substantial amount of work needs to be done especially with reference to women empowerment, as this is the key towards the social

and economic uplift of the entire society. (Dr. Muhammad Amjad Saqib, Regional General Manager, 2001, Punjab Rural Support Program)

Nearly half of the population of the country are women who are generally disadvantaged and oppressed. An academic institution was needed to prepare professionals equipped with strategies for women empowerment, and to produce and compile the requisite database. Establishment of the Department of Women's Studies at the biggest and oldest university of the country has fulfilled this need. The graduates of this department can contribute usefully in government and other organizations working towards sustainable development. (Justice (R) Nasira Javed Iqbal. The first women judge of High Court in Pakistan)

Citizens Commission for Human Development very much appreciates the establishment of the Women's Studies Department in the Punjab University, as present and future times require qualified young persons to get actively engaged with gender issues as professionals. (Executive Director)

Effects, Results, or Impacts

Only a decade ago, Women's Studies was not even considered a discipline of study. Even the mention of the possibility of its introduction was set aside by many with a smile demeaning its importance. But over time, it has gained recognition among the educated community, development organizations, and educational planners and implementers. It is now being offered at the Master's level in at least five other universities in Pakistan and some affiliated colleges of the University of the Punjab. At the recommendation of the department, the University has decided to offer it as an elective subject at the bachelor's level in its 153 affiliated colleges for women.



Figure 4-3. Student involved in gender role play. (Student artwork in the background shows aspects of culture.)

The department has created a significant body of knowledge on gender and development related issues in the form of student theses. (See Annex 1.) We have decided to disseminate this information along with other research articles through our recently launched bi-annual journal, the *Journal of Gender and Development*.

Graduates of the Department of Women's Studies are welcomed by the professional world. They are employed in university and college teaching jobs, and in executive and research positions in large multinational and other well-respected NGOs (e.g., Action-Aid, Pakistan Institute of Legislative Development and Transparency [PILDAT], Child Right Protection Bureau, Small and Medium Enterprise Authority [SMEDA], Sustainable Development Policy Institute [SDPI] Pakistan, Shirkat Gah, and Simorgh). Some graduates have established

their own consultancy firms such as Innovation Alliance, which advises private enterprise, governments, and NGOs on how to achieve and foster growth through innovative solutions.

Demand for an advanced degree in the subject is another indicator of its value and impact in response to which the Ph.D. program was instituted this year.

Following are some extracts from the statements of stakeholders about the performance and impact of the program.

"We are pleased to inform you that the interns of your institution performed very well at Fatima Memorial System. They were very helpful to our patients, and staff members They worked with community outreach schools and patients in our primary health care centers in rural areas 2006."

"Since 2002, we have been getting interns from your department. I find them to be truly interested in women, minorities, poverty, development, and social issues. Some of them took interesting topics for their thesis, such as sexual harassment at the workplace, violence against women in domestic life, etc."

It was good to see that young men are also studying gender studies. Last year I had two such interns who said that gender studies are important to them as they wish to improve lives of Pakistani women folk. Indeed your department is making headway in a fast manner." (CCHD)

"The program enabled me to understand the practices and techniques whereby gender sensitization can be streamlined with every aspect of development." (Maliha Azeem at PISDAC, 2006)

"After completing this degree, I feel more confident as a women of a third world country. I was able to get a good job in a renowned NGO which has further increased my level of confidence and faith in myself and my abilities to work for development" (Nazia Hassan at Simorgh)



Figure 4-4. A graduate of the Department of Women's Studies employed by SMED explains the NGO's function to the Governor of Punjab during his visit.

Success Factors

During the initial period of the program, unfamiliarity of the concept coupled with limited resources, stopgap accommodations, and the absence of specifically trained professionals were the major constraints. The first three did not cause concern because our strength was the adjunct faculty of highly respected professionals and educators from the relevant disciplines. For example, the first female judge of the high court joined the faculty to teach the course 'Gender and Human Rights.' Mr. Javed Anjum a renowned environmental lawyer taught the

course 'Women and Environment.' The managing director of SMEDA taught 'Women in Business.' Professor Akram of King Edward Medical College and Dr. Humayun, chairperson of Community Medicine of Allama Iqbal Medical College, taught the course 'Women and Health.' Similarly the principal of the Law College at the University of the Punjab has agreed to teach a course to the doctoral class.

Our second strength was our work with NGOs and government departments relevant to women's development. Feedback from the stakeholders about performance of students working with them as interns opens job opportunities for our graduates. It also benefits in remolding the curriculum of the program. Sometime students identify areas of mutual interest for research for NGOs and student collaboration.

The support of the administration, the Vice-Chancellor, has always been of great help to improve and strengthen the activities of the department. Sometimes the vision of the Vice-Chancellor helps us to open new vistas and introduce new courses. His willingness to invite, listen, and accept the suggestions of the stakeholders to improve the program has always been helpful.

Over and above all, our students and we consider this discipline as a movement. Our students envision themselves as change agents. The policy of open admission based on merit for men and women has made it possible to involve men in gender issues. Participation of men and women in the program helped us to expand the boundaries of the program to include all development issues.

The relevance of the course to the needs of society brought rapid acceptance and recognition of the program. The approach of this program is strategic, liberal, and evolutionary. Moreover, the government has recently shifted its focus to higher education, and the program of Gender Studies has also got its share as a newly emerging discipline.

Constraints

In spite of coming a long way ahead, we still work under a number of constraints.

- (1) The discipline of women's studies was either unfamiliar or it was ignored just like the opinion of a woman in a patriarchal society. It was also rejected on the pretext of a radical activity synonymous with the women's liberation movement, unaccepted in a conservative society like Pakistan's. We used a multi-pronged evolutionary approach to counter such attitudes and mindsets. First, we used concept clarification and advocacy campaign. Second, we coined course titles as less threatening but more convincing and appealing to individuals and the society. Third, we placed our scheme of studies and course outlines on the Web for open access. Last, we worked with organizations and agencies to create relevance, acceptance, and demand for the subject.
- (2) Because of the nascence of the discipline, there is a lack of specifically trained professionals. The inter-disciplinary nature of the subject allowed us to benefit from highly trained professionals and practitioners in relevant fields. Efforts are underway to contact and invite professionals from other countries for durations convenient to them. Three faculty members of the department have enrolled in the Ph.D. program.
- (3) The program was initiated under heavy constraints of physical and human resources. Our fulltime and adjunct faculty, and the students, willingly accepted to work under these constraints. The new building, which we intend to expand further, is now under construction.
- (4) The subject is not only nascent in Pakistan; it is in its infancy even in the developed world. Books and literature are scarce. Moreover, the titles given in publishers' catalogues are not available in Pakistan, and booksellers show reluctance to import because of the comparatively higher cost for a smaller number of books. We try to explore other sources to identify and purchase material, but we still face a shortage of print material.
- (5) Because of limited finances, the Director of the Institute of Education and Research and a senior professor in the University volunteered to work as chairperson of the department in addition to her regular duties. She tried to spare the maximum possible time for this new department. However, since January 2006, she has taken it as a full time responsibility.

Perspectives

The newly established discipline has not only been accepted but is recognized for its contribution and catalytic role in the attainment of developmental targets, poverty reduction, and reducing gender disparities. The challenges before us are to make a more meaningful contribution for sustainable development of the society by generating high quality research, disseminating knowledge to the stakeholders, and having close liaisons with organizations engaged in the realization of millennium development goals. We envision our role beyond the realization of Millennium Development Goals, which, in fact, will be the beginning of a desired future and a requisite for the survival of humankind. The challenge is also to enhance the quality and relevance of the programs to make them compatible with the international standards.

The department also plans to launch two Master's degree programs in subjects that can empower women and men inside and outside the home and enable them to contribute most effectively towards the economy of the country and enrichment of the social fabric. The proposed Master's programs are: 'Textile and Fashion Designing' and 'Human Development and Family Studies.' With the introduction of these two programs the department will be elevated to the Institute of Gender and Development Studies. We also want to reach out to the masses to create awareness through short courses on ecology, parenting, etc.

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Annex 1 - List of Selected Student Theses Topics

- (1) A study on the role of NGOs in promoting female education
- (2) A study of differential treatment of male and female children in families having different socio-economic status
- (3) Gender differential causes and effects of drug abuse
- (4) A study of growth and survival of women entrepreneurs in Pakistan
- (5) Comparative study of the reproductive health of married women below 16 and above 20 years of the age
- (6) A study of harassment of women: nature and effects
- (7) A study about the portrayal of women in mass media
- (8) A study of married women's awareness about their legal and Islamic rights
- (9) Gender in multinational business environment
- (10) Causes of domestic violence against women by their husbands
- (11) Role of women in local government
- (12) A study of AIDS Victims

5. The ACES Network: Greening the Curriculum of Higher Education

Mercè Junyent (University of Girona, Spain)

Introduction

One of the objectives of higher education is to train students to enter the labor market equipped with the latest advances from research in each field. This objective is tempered with a holistic perspective of knowledge and a commitment to present and future generations. The university, therefore, must offer high quality teaching related to specific social contexts and in step with trends that orient the future of humanity towards sustainable development. For this paper, sustainable development is understood as economic development that also fosters the interdependence of social equity, justice, and ecological sustainability.

Incorporating the concept of environmental responsibility into the professional education of engineers, architects, and other graduates will play a key role in the evolution of society towards sustainability. Training in their respective fields will need to include environmental and sustainability criteria and values so that, in the future, graduates can approach their professional activities from the point of view of sustainability (Tilbury 2004).

The university is a potential driving force of change towards sustainability. The great challenge of the 21st century for institutions of higher learning is to train professionals who are critical of, and capable of acting in favor of, sustainable development.

It is not possible, however, to achieve objectives of sustainability in a vacuum. It is necessary to work in a diversity of contexts and build real progress in specific fields of knowledge. At the same time, it is necessary to find answers and strategies that are adaptable, and valid, in a variety of social contexts with a high level of transferability among different contexts: social, cultural, natural, institutional, etc. Local action and research are crucial, but it is time to put these into a broader, more permeable perspective.

Program Presentation

It is in this framework that the ACES network (the Spanish acronym for Curriculum Greening of Higher Education) was created. ACES works in cooperation with universities that are aware of the concept of curriculum greening and that have previous experience in tasks related to this issue. Since 2000, the University of Girona in Spain has coordinated the ACES network of five European and six Latin-American universities.³

This network carried out the project "*Orienting Curriculum of Higher Education Studies towards Sustainability: Designing interventions and analyzing the process*" (ALFA Programme, European Union, 2001-03). This multidisciplinary, interdisciplinary, and integrative project involves a diversity of disciplines—teacher education, geography, pedagogy, economy, biology, agricultural engineering, tourism, and planning and management of protected areas. This project deals specifically with European and Latin American realities and contexts.

The universities and institutions that make up the ACES network are united by their willingness to share knowledge, compare contributions, and create a solid base from which to progress towards greening models of university curriculum. This collaboration depends on the new sustainability paradigm. The collaboration also allows joint projects to be carried out among institutions with diverse challenges and encourages progress towards shared, though not always uniform, teaching models and proposals.

Objectives of the ACES network project. In 2001, the main goal of the ACES network was to create a model of curriculum greening of higher education with features that will orient university curriculum towards sustainability. To that end, the work focused on defining the concept of curriculum greening, characterizing a university curriculum that is oriented towards sustainability, applying these characteristics to experimental studies to gain insight into the effectiveness of the changes, and designing and applying practical actions oriented toward incorporating sustainability in higher education.

³ Participating institutions were: National University of Cuyo (Argentina) (UNCuyo); National University of San Luis (Argentina) (UNSL); State University of Campinas (Brazil) (UNICAMP); State University of Paulista – Rio Claro (Brazil) (UNESP); Federal University of Sao Carlos (Brazil) (UFSC); University of Pinar del Rio (Cuba), (UPR); Technical University Hamburg-Harburg Technology (Germany); Sannio's Studies University (Italy) (USannio); University of Aveiro (Portugal) (UA); Autonomous University of Barcelona (Spain) (UAB); University of Girona (Spain), network coordinator. (UdG)

Methodology. The methodology applied in the project was based on action research as well as the participatory process. This methodology was selected because the ACES network believes that is the best option for democratizing the project. This means assigning the same role and value to all the institutions, carrying out projects among different disciplines, and incorporating diversity into the construction of knowledge (i.e., diversity of culture, perspectives, and context). Indeed, the representatives of the different institutions of the network had different training and backgrounds as diverse as biology, economics, geology, pedagogy, architecture, and philosophy. The team members therefore were able to approach a problem from different perspectives and produce knowledge that was sounder, yet more adaptable to diverse realities. The unified goal was to construct knowledge useful to all members of the network and applicable to the different realities of the institutions.

Each participating university selected a few of their experimental programs representing several fields, including education, science, geography, economics, tourism, philosophy, and engineering.

With the participation of 22 representatives from these 11 universities, four meetings were held during 2002 and 2003 in Hamburg, Germany; Mendoza, Argentina; Sao Carlos, Brazil; and Girona, Spain.

After the general sessions, the teams from each university met to compare the documents and materials in an effort to adapt them to each respective university. This work involved at least 70 researchers across the ACES network. Each institution then selected and applied those characteristics that were more appropriate in their contexts.

The revisions adapted by each university allowed the soundness of the model to be tested in different settings and revealed the flexibility of interpretation and application necessary to facilitate dialogue among different cultures and university contexts.

This dynamic work to design the model of curriculum greening—alternating the general meetings of the ACES network with teamwork at the university level, and including subsequent testing and adaptations to the practice of different universities—demonstrated the consistency and flexibility of the model.

Innovative Aspects

One of the more relevant results of the work was to establish a framework of characteristics to orient the greening of the curriculum at different levels: institutional dynamic, programs of studies, individual courses, research, and outreach/extension.

The 10 ACES model characteristics are:

- (1) Integrating the paradigm of complexity in the curriculum. A greening curriculum should incorporate complexity as an interpretative paradigm of context and thinking.
- (2) Introducing flexibility and permeability among disciplines. The complexity of environmental and sustainability issues requires a multidisciplinary approach among different knowledge areas and professional specialties.
- (3) Contextualizing the curricular project. Each project must be considered in the context of local and global space, and in the context of time past, present, and with a view to the future, in an integrated and holistic manner.
- (4) Taking into account the disciplinary construction of knowledge. The teaching/learning process in university studies should consider a number of parameters: curricular and individual adaptations, ways of defining the subject matter, teaching methodologies, assessment methodologies and criteria, participation of students in projects, daily schedules, student participation in course assessment, teacher/student ratio, course scheduling, and individual and group attention given to the students.
- (5) Considering the cognitive, affective, and action aspects of people. Giving pedagogical and psychological support to students means understanding different learning styles, different ways of interpreting perceptions and interpretations of current events, and different ideologies and cultures.

The university should tailor its intervention in the social and environmental context based on a multicultural perspective. It should favor a comprehensive development of people as individuals and as a part of the community.

- (6) Trying to find a balance between theory and practice. Teaching for sustainability means to implement practical actions aligned with theoretical dimensions.
- (7) Working with future orientations and perspectives and alternative scenarios. A view of the future that considers the evolution of technology and its effects on the development of different professions is crucial. This perspective should favor critical thinking and responsible decision making for the present and the future.
- (8) Adapting new teaching and learning methodologies. A teaching methodology that facilitates environmental learning is based, essentially, on reflection, participation, and action applied to local and global problem solving. Fieldwork and collaboration with business and industry and other organizations facilitates the learning process under a teaching methodology applied to real-world applications.
- (9) Creating space for reflection and democratic participation. To achieve sustainability, this space should lead to actions for change towards sustainability, involving all the groups of the university community. The effort must involve all sectors of the university community, from the administration to faculty and staff to students.
- (10) Reinforcing the commitment to transform relations between society and nature. The university must devote special attention to sustainability and become involved with the environment through specialized research areas in environmental issues. The university must also find the appropriate funding to promote environmental teaching as well as political proposals that promote better relationships between humans and the environment. This commitment means evolving towards sustainability and addressing social equity, economic development, and ecological balance.

Effects, Results, or Impacts

It is important to underline that there is no prioritization among the 10 characteristics. To explain them clearly, the ACES network agreed to illustrate the model as a circular diagram (see Figure 5-1) in which the lines separating these characteristics are broken in order to give the idea of unfixed, unlimited characteristics with connections to all the others. The circular diagram was one of the contributions of the Autonomous University of Barcelona (UAB) and was accepted by the network (Machado, Bonil, Rodrigues & Arbat 2003).

Each institution seeking its own specific adaptation to its particular contexts has reinterpreted the ACES model. This has meant a few specific changes in some cases, but the philosophy of the model remains constant. Some participants, for example, have fused two characteristics or changed some words without altering the overarching model.

The ACES model has become an effective instrument to assess the level of curriculum greening in higher studies (Geli, Junyent & Sánchez 2003). This process requires collaborative and cooperative work among professors, students, and institutional staff.

After completion of the diagnostic process, the universities of the ACES network addressed their efforts to specific greening practices and actions. Practical intervention on a case-specific basis helps orient the students towards a future with a perspective of sustainability (Geli, Junyent & Sánchez 2004).

The institutions worked at three levels of action: subject matter, syllabus design, and institutional participation.

At the subject matter level, participating universities worked to add a sustainability component to existing fields of study and to promote dialogue on sustainability issues. In addition, several participants applied theory and practice in real community situations. For example, the State University of Campinas in Brazil led a project in which students carried out research into the sensations, feelings, and sensitivities of people who live in, work in, or pass through neighborhoods around the Mata Santa Genebra.

At the syllabus level, some of the participants also added new topics and themes in environmental education and education for sustainability and also revised existing postgraduate courses and designed new ones. For example, the Federal University of Sao Carlos, Brazil, introduced the subject "Enseñanza e Investigación Ambiental" (Environmental Teaching and Research) into teacher training. The Teacher Training Studies program of the University of Girona, Spain, introduced a practicum on institutional design into the practicum for students in the Faculty of Education and Psychology.

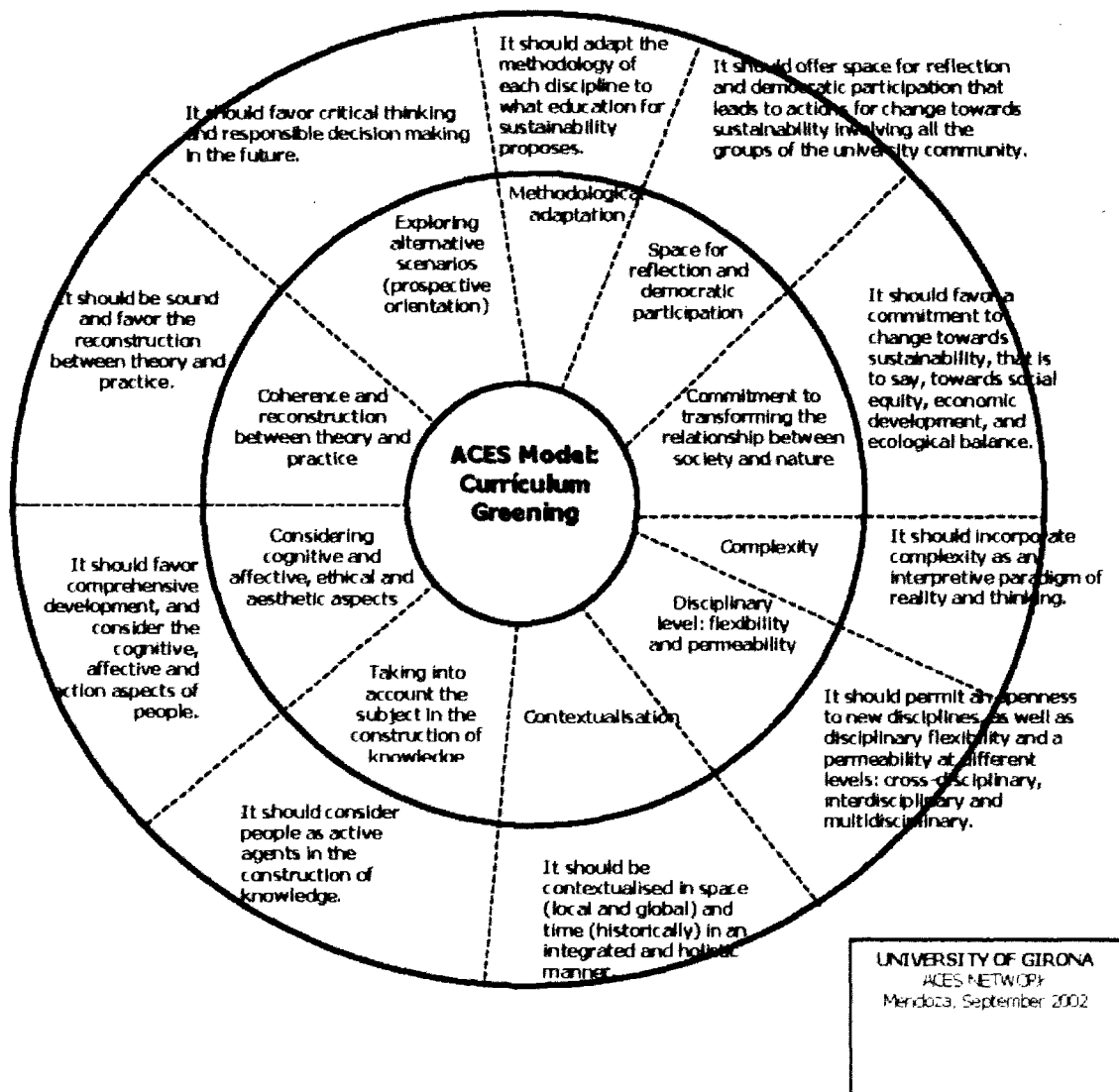


Figure 5-1. The ACES Model

At the institutional level, some of the university participants launched new social development and cooperation projects. The National University of Cuyo, Argentina, for example, introduced curriculum greening through a community development project between the Faculty of Elementary and Special Education and an Adult Education Center. Another participant approved an institutional redesign of its teacher education practicum. Others promoted interdisciplinary dialogues through workshops and seminars. The University of Pinar del Río instituted a Chair of Education for Sustainability. All the participants promoted networks with other institutions of higher education and created partnerships with local and national governments, businesses, and university administrations.

This work continues at each institution at different levels and scales.

Success Factors

This type of research carried out through cooperative efforts, which incorporates diverse fields of knowledge, presents working difficulties distinct from those experienced by more homogenous groups. Nevertheless, the knowledge generated is consistent in its response to environmental issues and problems and reflects the need for collaboration among all areas of knowledge to preserve and improve environmental conditions.

The ACES network allowed a multi- and interdisciplinary research approach to greening the curriculum. From beginning to end of the project, a key value was respect for all the cultures involved and for different perspectives that could arise in very different circumstances. At the end of the two-year project, all participants recognized the value of respect as essential to achieving solid results.

Each institution looking for its own adaptation to particular contexts has reinterpreted the ACES model. This has meant a few changes in some cases, but not in the philosophy of the model.

The ACES model was applied through a process of participatory action research that involved all the teaching staff, lecturers, and students in the network of the pilot studies of each university.

It is important to emphasize the ACES members' capacity for action in their universities. During the process, they influenced colleagues, students, and social agents, provoking changes in their thought, knowledge, methodologies, human relationships, and academic structures. This required educating about sustainability and promoting the concept of sustainability among students and colleagues.

Constraints

Much remains yet to be done to spread awareness of the importance of education for sustainability within the institutions. A major challenge is to involve all university sectors, not just those we traditionally think of as being involved in sustainability.

An indispensable element for developing curriculum greening strategies consists in communicating the proposals effectively to the university community and negotiating a consensus among the groups involved. It is also necessary to include the greening process in institutional policies for curriculum design and human resources, such as policy for staff incentives (e.g., institutional acknowledgement, official accreditation, assessment, dedication, selection, and training).

Although the ACES members consider that there is a general desire to make a more flexible syllabus, they have also recognized that it is difficult to overcome the traditional disciplinary fragmentation based on the autonomy and management of the university departments. Carrying out an interdisciplinary and flexible curriculum is still a challenge.

The institutions involved in the project have supported the ACES network process and reorientation of studies towards sustainability, but more work is needed to take into account some contradictions between acceptance of the proposals and the difficulties of implementing it. Curricular innovations require a major effort, which often is concentrated in a few faculty members.

All university sectors must work together towards improving education for sustainable development.

Perspectives

The ACES model is the first step in a long process for orienting higher education towards sustainability. The network has shared its model for greening the curriculum in conferences and seminars held in Latin American and Europe: in Brazil, Mexico, Cuba, Portugal, Italy, Hungary, and Spain.

To promote a common vision for the future, the ACES Network hopes to involve new institutions that have expressed interest and willingness to work to develop a green curriculum. Our message is simple: to develop a broad university network, based on cooperation, to promote environmental literacy. Our purpose is to define an interuniversity project that promotes environmental literacy in developing countries.

Environmental literacy relies on an education that allows citizens to understand the importance of integrating an environmental dimension in their everyday life and in the sustainable development of their community and countries. Environmental literacy should give all citizens an adequate level of training to facilitate responsible decision-making about their own sustainable development. Specific objectives include:

- Creating an extended network to carry out projects rooted in the ACES network.

- Defining the theoretical framework and initiating action to promote environmental literacy.
- Offering postgraduate programs with specific organizational characteristics offered to students of different countries.
- Promoting research projects and doctoral theses to create a body of knowledge on environmental literacy specific to each individual situation.
- Designing pedagogical materials about environmental literacy that are flexible enough to facilitate their applicability at different contexts.
- Promoting student and teaching staff development through practicums, cooperative projects, and volunteer programs.
- Facilitating meetings, seminars, and conferences in order to share experiences and knowledge and go forward on the project.

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Other aspects of this work can be found in four volumes noted in the reference section of this case study.

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6. Sustainable Campus Initiative

Tzuchau Chang (National Taiwan Normal University, Taiwan)

Introduction

The Taiwan Sustainable Campus Program (TSCP) is a government-supported, nationwide endeavor launched in 2002, to reform school campuses—K-12 as well as universities—to be learning spaces that foster safety, health, education, and sustainability. The Sustainable Campus Program provides funds for schools to renovate their campus through a variety of initiatives. They can purchase and use energy-saving appliances and implement water recycling and reuse systems. Outdoors, schools can increase permeable ground surface and create artificial wetlands. They may create multi-layer plantations for carbon dioxide reduction and biodiversity and composting foliage and kitchen waste. In addition, they may plant educational organic farms or construct eco-ponds.

Program Presentation

In addition to campus infrastructure reform, the TCSP emphasizes implementing education for sustainable development (ESD), which consists of the core development of ecological thought, humanistic concern, and active learning. A whole school approach is adopted through four domains:

- Administration: environmental commitments and resource coordination.
- Facilities: pollution reduction, ecological friendliness, and educational functions.
- Curriculum: local educational content highlighting life, land, and student-centered pedagogy as well as encouraging outdoor, hands-on learning programs.
- School Life: appreciation of lifestyles that are more in tune with nature, as well as fostering responsible behaviors to protect the environment, including energy conservation, pollution prevention, and efficient use of resources to benefit society.

National Taiwan Normal University (NTNU) has a long history of involvement in developing environmental education (EE) and promoting ESD in Taiwan. As the leading teacher preparation university in Taiwan, NTNU also has actively involved and provided consultation to the Ministry of Education (MOE) for the TSCP. Since 2003, NTNU has also implemented the TSCP on its own campus.

To create a platform for first-hand teaching and learning experiences for sustainability at NTNU, the project has launched a series of efforts. Since 2004, an old administration building and the surrounding school garden at the College of Sciences have been converted into a Sustainable Campus of NTNU. Transforming the old campus facilities to better ones, which address sustainability, was financially supported mainly by the MOE, with additional funding provided by Taiwan's Department of Interior and NTNU.

The Sustainable Campus Initiative has gradually become a demonstration base for teaching a variety of university courses. Moreover, the Graduate Institute of Environmental Education (GIEE) has developed ESD teaching materials and interpretive media for university students, neighboring school students, teachers, and community residents.

Innovative Aspects

The major endeavor of the Sustainable Campus Initiative at NTNU is to implement concepts of sustainability in the immediate surroundings by taking concrete actions. In particular, NTSU transformed the administration building of the College of Science to a model of sustainability.

Four concepts have guided the operation of this project: alternative energy application, water recycling and reuse, ecological conservation, and networking with local communities. A green roof system, a constructed wetland, a water recycling system, and an alternative energy system are major components of the project.

From the start, the faculty members and students of the GIEE have been involved in establishing a sustainable campus. From the beginning, they brainstormed, planned, and designed with architects. They also worked with contractors on modifications in building designs. Finally, they are currently engaged in maintaining the facilities. Local communities

have also been invited to offer insights during the construction process, and they have formed a volunteer group that currently takes care of the green roof system.

The Sustainable Campus Initiative at National Taiwan Normal University consists of four perspectives:

(1) *Rainwater Harvesting and Black Water Treatment and Recycling System.* This system drastically reduces the amount of water used from the city water supplying system.

Due to limited water resources, water conservation has always been a critical issue for the government in Taiwan. As a platform of education for sustainable development, water conservation is an important concept, which cannot be ignored. The process for conserving water designed for the Sustainable Campus Initiative of the University is, first, to collect rainwater, then use it to water vegetables on the green roof and to flush toilets, and finally to recycle the sewage to water a garden by purifying it in a constructed wetland system.

(1a) *Constructed Wetland.* Black water (sewage) is treated first by the septic tank and then by using a specially designed constructed wetland. Both the sub-surface system (see Figure 6-1) and the free water system (see Figure 6-2) are applied in the wetland system. The treated water is fully reused to water the entire garden.

(1b) *Rainwater Harvesting System.* Rainwater collected from the top of the administration building is used for flushing toilets and watering the vegetable garden on the green roof.



Figure 6-1. Constructed wetland (subsurface system)



Figure 6-2. Constructed wetland (free-water system)

(2) *Increasing Campus Biodiversity.* The importance of biodiversity has been internationally highlighted at the Earth Summit in 1992. Located in a densely populated inner city, NTNU is eager to demonstrate its ambition to maintain a well-balanced ecological environment. Major efforts are to offer more green spaces for animals, plants, and people, and to increase the varieties of ecological habitats to attract more creatures and increase biodiversity. A green roof system, constructed wetland, and aquatic ponds are established in this initiative to increase more green spaces and ecological habitats.

(2a) *Increasing and Diversifying the Surrounding Habitat.* This involves using treated water to establish a constructed wetland and aquatic ponds to generate and create more terrestrial and aquatic habitat to attract more flora and fauna (see Figure 6-3).



Figure 6-3. Aquatic pond

(2b) *Green Roof (Rooftop Garden) System.* This initiative uses the rooftop to create a vegetable garden to demonstrate the methods of organic farming and the link with urban life. Installing a green roof also reduces the building's consumption of electricity for air-conditioning during summer (see Figure 6-4).



Figure 6-4. Green-roof system

Learning about the green-roof system

(3) *Energy Conservation System.* The greenhouse effect, global warming, dramatic climate change, and rising oil prices have attracted international attention recently. Energy is the underlying theme that ties all these problems together. Fossil energy has been criticized for its tremendous effects on polluting the environment. Besides, the depletion of oil resources that results in rising oil prices makes alternative energy an important agenda for most countries. The mechanism for conserving energy for the University's Sustainable Campus Initiative includes a passive green roof system, a special sunshade design to avoid direct sunlight, the installation of solar voltaic panels and a windmill to generate energy.

(3a) *Installation of solar voltaic panels, windmills, and a solar hot-water system* on the rooftop to generate electricity and hot water for the building reduces energy consumption (see Figure 6-5).

(3b) *Designing and installing a specially designed sunshade* that blocks direct sunlight and reflects natural light into the rooms of the building decreases demand for indoor lighting energy.



Figure 6-5. Solar voltaic panel and windmill

(4) *Environmental Education and Interpretation System.* The Sustainable Campus Initiative has been recognized as a learning center for ESD. The Initiative has developed materials and interpretation systems for environmental education and ESD. These include opening up the whole site's facilities to University faculty members across all disciplines as the *platform* for their course teaching for demonstrating the possible ways of sustainable living. In

addition, the program has developed *interpretive media*—including eight interpretive panels, one self-guided trail brochure, and a poster—for the public and for schools to improve NTNU's and the neighboring community's insight and interest in the site. The Initiative has also developed an *educational packet* that includes four well-designed ESD teaching modules. Using the sustainable campus site as the base for teaching, the modules were developed to enhance ESD at the primary school level.



Figure 6-6. Conducting a teacher-training workshop for ESD

Effects, Results, or Impacts

The sustainable campus project of National Taiwan Normal University has been an environmental education platform for both formal and non-formal education—and for elementary school students, teachers, and principals—since the beginning stage of planning and design. This project demonstrates how to actualize the concept of sustainability in our surrounding environment by taking concrete environmental actions. Above all, these endeavors for infrastructure improvements, system maintenance, and networking with local communities have been well supported by theory. The entire process was informed by knowledge and theory. This not only ensured the project quality, but has also enriched the teaching and learning of the GIEE. About 1,400 school students and teachers have visited the facility since April 2005, and the number of visitors is increasing gradually, which indicates that the effect of the project is quite positive.

In addition, the University's Sustainable Campus Initiative has been a demonstration site for the Taiwan Sustainable Campus Program. Alternative energy, water conservation, recycling, a healthy environment, and biodiversity are the main features promoted and funded by the

Ministry of Education every year. How to realize these features on school campuses has always been the concern of the MOE and of school principals who may have already gotten MOE funding and who may be interested in requesting funding in the future. The Sustainable Campus Initiative of NTNU presents good answers to these concerns. Workshops funded by the MOE, and field trips organized by schools to visit the Sustainable Campus Initiative, are quite frequent. The Sustainable Campus Initiative has a great influence on Taiwanese schools' implementation of the sustainable campus program.

Success Factors

Since 2003, the implementation of the NTNU Sustainable Campus Initiative has been quite successful. The initiative has achieved improvements in its system maintenance and impacts on TSCP. It has also served as a learning center for ESD and as a model for improving the professional development of faculty members and students of GIEE. The success factors include:

Integration and cooperation. The establishment of the Sustainable Campus at NTNU has been a cooperative process among NTNU faculty members with different academic backgrounds, such as architects, contractors, and local residents. The integration of expertise from faculty members and architects results in good maintenance of the system. The cooperation between NTNU, NGOs, and the local community to form voluntary groups helps the program operation of the NTNU Sustainable Campus Initiative.

Real practices with research support. The NTNU Sustainable Campus Initiative provides many varieties of real practices of energy conservation, water reuse, recycling, constructed wetland, and green roofs. The SCI also offers research possibilities for the underlying theories for these practices. These include natural sciences such as alternative energy, physics, biology, ecology, chemistry, environmental engineering, global change, food, nutrition, and health. Other research opportunities include the social sciences such as urban recreation, community development, urban community health promotion, and urban psychology. Educational research possibilities include ESD, EE, science education, and Earth science education.

Professional development and system management. The NTNU Sustainable Campus Initiative is a new facility for both education and research leading toward improving ESD for NTNU and the surrounding communities. Faculty members and students achieve their professional development by gradually building up their capabilities for managing the system and environment. Moreover, the SCI provides meaningful teaching and interpretation experiences for different target audiences and increases the educational value of the facilities.

Curriculum/instructional materials. The teaching and learning activities for a sustainable campus require good instructional design and practices. Recently, research projects and course assignments for developing instructional materials and teaching modules have been an ongoing process. A set of ESD teaching packets for the elementary level has been developed through the support of an NGO (Southern Taipei Rotary Club), graduate students of GIEE, and selected primary school teachers. The development of curriculum and instructional materials enrich the learning potential of this site.

Individuals/citizens/communities. NTNU is a base within the urban environment to promote the awareness, understanding, concerns, and behaviors of sustainable living to the broader university community. The Sustainable Campus Initiative has always encouraged local residents to attend its ESD activities and join voluntary teams to practice planting agricultural produce on its green roof facility. The NTNU does not limit the benefits to the student body. NTNU is "opening the door" and providing various learning opportunities to nearby communities.

Constraints

The NTNU Sustainable Campus Initiative is a complicated system under the broad term of sustainability, which needs to be clarified and researched further. The underlying mechanism needs to be studied and modeled. The initiative is an excellent platform for ESD; however, the maintenance of the system requires professional assistance. Different disciplines and expertise are needed, such as alternative energy, agriculture, architecture, wetland system, and health environment.

The Ministry of Education, the Ministry of Interior, and NTNU funded the project at the beginning stages of planning and construction. Afterwards, the operation and maintenance

were under funded, but were assigned to the faculty members of the GIEE. The system has been operated moderately well with the help of faculty members, graduate students, and some local community residents. However, to maximize the impacts of the initiative, more personnel and funding are needed. To operate the system as an ESD learning center has been always a goal set by the faculties and graduate students of the Institute. This will require more support for personnel, facility maintenance, and program development.

Perspectives

NTNU contributed resources of faculty members and facilities to establish the Sustainable Campus and hopes to develop a model of ESD for Taiwan's higher education community. Obviously, this endeavor has been and is definitely going to build the capacity of faculty members, graduate students, and local community residents.

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7. Journal of Teacher Education and Training: Deepening Action Research

Ilga Salite & Anita Pipere (Daugavpils University, Latvia)

Introduction

In 2000, the Faculty of Education and Management (FEM) of Daugavpils University in Latvia joined the UNESCO project *Reorienting Teacher Education to Address Sustainability*. FEM also launched an action research project involving teachers, researchers, students, partners of the faculty, and others. Recognizing the need for a forum for large-scale, global dialogue, Dean Ilga Salite suggested that FEM could benefit from publishing an international journal to disseminate and validate the faculty's work experience and research and to network internationally.

In 2001, the *Journal of Teacher Education and Training* (JTET) was launched as a tool for local and global networking. In 2003, the First International JTET Conference "Sustainable Development. Culture. Education" was held, and the European Regional Network of the UNESCO chair was established. The conference has since become an annual event organized by different countries and regional network members.

In 2003, FEM founded the Institute of Sustainable Education (ISE). JTET is the periodical of this institute and JTET staff serves as the facilitator to promote the research education for sustainable development throughout the network.

Program Presentation

The Institute of Sustainable Education (ISE) is part of the Faculty of Education and Management (FEM) at Daugavpils University (DU). The director of the Institute and dean of FEM, Ilga Salite, and the editor of the *Journal of Teacher Education and Training*, Anita Pipere, have taken leadership roles in education for sustainable development (ESD) in Eastern Europe. The Institute helps promote the context of sustainable education and ESD locally and globally and encourages research in these topics. ISE fosters internal and external cooperation; utilizes appropriate resources; engages responsible, active persons to participate; and expands and refines the editorial board. Funding comes from the FEM budget and internal grants from Daugavpils University's Council of Science.



Figure 7-1. 4th JTET Helsinki Conference participants from FEM at Daugavpils University, Tallinn University, Vechta University, and Charles Hopkins UNESCO Chair Reorienting Teacher Education to Address Sustainability in middle with the diploma of Honorable Member of DU after the plenary session of the Conference (June 1, 2006).

Innovative Aspects

JTET strives to reorient research in teacher education to address sustainable development (SD). It is also one of the first academic journals in the Latgale region of Latvia recognized by the Latvian Academy of Science.

Ilga Salite says:

Innovation was a crucial component of JTET as an inspiration for further development of education for sustainable development in teacher education and education per se. Establishing the journal was the first step, which led to the JTET Annual Conferences. The second stage was to use JTET and the conferences to organize regional networks.

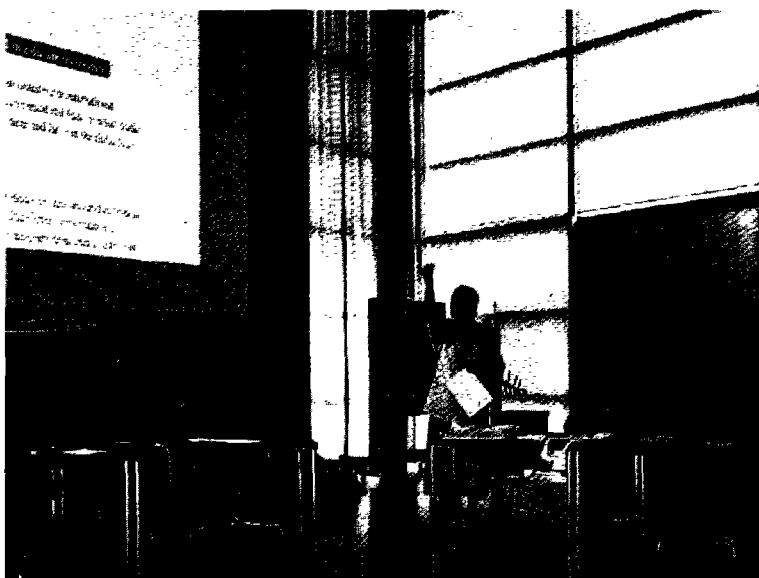


Figure 7-2. Beginning of the Baltic and Black Sea Circle Consortium in Educational Research (BBCC) during the preconference of JTET, 3rd Conference, in Vechta University (Germany) on May 22, 2005. From left to right: Members of the Editorial Board from Vechta University Detlev Lindau-Bank, Ilga Salite, Anita Pipere, member of the Editorial Board from Joensuu University, Ulla Härkönen.

JTET was also promoted to students pursuing doctoral studies in pedagogy at FEM as a possible outlet to publish their research results and improve their academic writing skills. Graduate students improved their writing skills through the cooperation of reviewers and the editor of the journal Anita Pipere, who also taught classes on academic writing for journals. Doctor of Pedagogy Rudite Grabovska says that "JTET's publication process helped me meet the requirements for the defense of my doctoral dissertation, '*Implementation of the principle of sustainability in teacher education*'."

The articles of JTET embrace a wide range of topics and research methodologies and encourage contributions from local scholars. The authors attempted to introduce the ideas of ESD and SD in such topics as teacher pre-service/in-service education, teacher professional development, and teacher involvement in primary, secondary, and tertiary education. Other topics included subject didactics, curriculum issues, teachers' views and attitudes toward environmental education, ESD, SD, organizational management, and psychological aspects of teaching. Qualitative methodology dominated over the quantitative research designs, but sometimes the blend of both methodologies was applied. Research methods used by the authors included case studies, action research descriptions, phenomenology, ethnography, a feminist approach, critical theory, and narrative analysis. Smaller numbers of research approaches were based on tests, surveys, and correlation of data.

Out of 64 JTET articles, 16, or 25 percent, were written by doctoral students or academic staff members from Daugavpils University. JTET partners from other universities—Debrecen, Tallinn, and Helsinki—have also attracted a large number of their doctoral students as participants in JTET Conferences and networks.

Effects, Results, or Impacts

Through its publications, annual conferences, and networks, JTET is a forum for researchers in teacher education and ESD throughout Europe. JTET also hosts the Baltic and Black Sea Circle Consortium in Educational Research (BBCC). The consortium was established in 2005 as an initiative in international cooperation between educational research and development institutions from the countries around and near the Baltic Sea and the Black Sea. The main focus is the issue of reorienting education towards SD.

The task of BBCC to serve the U.N. Decade for ESD is undertaken on two activity levels: (1) the general level where the philosophical background of sustainable education is acknowledged in the research, and (2) the specific level where SD as a cross-curricular issue is implemented and evaluated in teacher education. Up to now, the BBCC Executive Presidents and National Coordinators from seven leading countries of the consortium have been appointed and will soon start their work. Altogether, more than 15 European countries have shown interest in participating in this consortium.

Ilga Salite says that "JTET and these networks can be viewed as an integral developmental framework allowing participants to embrace all possible approaches to encourage sustainable university and faculty development, providing a global context as well as connections with individual needs".



Figure 7-3. Group work during the 1st JTET Conference at Daugavpils University (May 11-14, 2003). Participants: Gloria Durka (USA), Uladimir Slabin (Belorus), Ilga Salite (Latvia), Klaus-Dieter Scheer (Germany), Charles Hopkins (Canada), Dzintra Ilisko (Latvia).

The Editorial Board for the JTET is international. The first volume of JTET, for example, involved 12 referees from nine countries. The fifth volume involved 30 referees from 16 countries. Altogether, the first six volumes of JTET represented participants from 18 countries: Australia, Belarus, Brazil, Canada, Estonia, Finland, Germany, Hong Kong, Hungary, Jamaica, Latvia, Malta, New Zealand, Norway, South Africa, The Netherlands, the United Kingdom (UK), and the United States of America (USA).

Of 63 articles published so far in JTET, 20 came from Latvia, 14 from Estonia and seven were written in Lithuania. The journal has published four articles from Finland. Authors from Germany, Hungary, USA, and UK provided three articles from each country. Authors from Norway have been published twice, and authors from Brazil, Malta, and Australia provided one article each.

Nearly 95 percent of authors have participated in at least one JTET Conference. All members of the Editorial Board are included in the Baltic and Black Sea Circle Consortium and regularly receive invitations to the JTET Conferences.



Figure 7-4. Ilga Salite discusses the prospects of partnership with Professor Gyula Lakatos from Debrecen University (Hungary) during the 3rd JTET Conference at Vechta University. Prof. Lakatos is the Conference President for the 5th JTET Conference at Debrecen University (2007) and executive president of BBCC from Hungary.

Success Factors

To ensure a high quality of publication, the initiators of JTET began by analyzing examples of similar journals such as the *Australian Journal of Environmental Education*, the *International Journal of Sustainability in Higher Education*, and *Lifelong Learning in Europe*. The launch of the journal coincided with a significant increase in the number of important and valid research publications written by researchers at DU since 2000.

When the Vice-rector of Science, Professor A. Barshevskis was elected, he noted, “The appearance of JTET was not an accident. Extensive international cooperation, purposefulness, understanding of trends in scientific development, and the quality of the research team led by Professor Salite created the objective grounds for a high level scientific journal.”

Dean Ilga Salite, a scholar with excellent language skills and communication and scientific expertise, has devoted a great deal of effort and personal time to this project as editor. She was also able to ensure financial support for the journal on a yearly basis, which is a very important factor for the long-term success of the project.

Ilga Salite notes:

The policy of the Faculty of Education and Management—to foster intensive international cooperation and great attendance rates at international conferences on education—allowed us to reflect on and to evaluate the world experience. We invited the members of the Editorial Board interested in teacher education, education for sustainable development, and sustainable development to promote further progress in these research areas. In addition, UNITWIN/UNESCO chair leaders were interested in publishing JTET articles and proceedings of JTET Conferences, thus promoting the validity and global recognition of the Conference.

Editor Anita Pipere says:

A network of universities emerged using the ‘snowball’ approach within the JTET Conferences. We also sought to identify selfless, devoted, and committed scholars interested in teacher education, education for sustainable development, and sustainable development. The international team of members of the Editorial Board for many years has been extraordinarily responsive and ha provided outstanding support for this project. Cooperation among universities and scholars has been maintained continuously over the years.

In addition, from hosting yearly workshops and meetings, ISE has moved to a single yearly conference at which joint projects are discussed and reported upon. A range of papers and symposia is presented. Members of ISE have participated in several Pacific Circle Consortium (PCC) conferences. These members have three years experience of cooperation with PCC in comparative research projects about teachers' views on educational aims.

In cooperation with PCC, a new collection of articles *Education and Sustainable Development: First Steps Toward Changes*, edited by Anita Pipere, was published in 2006. The collection consists of two parts: (1) articles by educational researchers from different countries oriented toward education and sustainable development, and (2) the PCC project of pilot research led by William Greene from Southern Oregon University, *Teacher education for the future project: A collaborative study of diverse perspectives from Fiji, Korea, the United States, and Latvia*. Researchers from the United States, Fiji, South Korea, and Latvia investigated perceptions about future directions for teacher education and compared these internationally.

The collection reflects the interdisciplinary view of researchers from different countries and disciplines on the theoretical and practical problems of education and SD. It is inspired by the complementary approach and modeling the frames of reference for practical work toward the holistic integration of sustainability in education in Latvia and all over the world. It is an attempt to put together the fragments of a mosaic constructing both the awareness and understanding of this complex issue in the mindscape of educational scientists. At the same time, the presentation of the study results in the context of sustainability. The collection is an international, peer-reviewed edition and also the first publication of the BBCC.

Articles by educational researchers come from eight countries. The collection of 24 articles starts with the subsection, which introduces the concepts of 'sustainability' and 'sustainable education.' Researchers analyze the perception of these concepts in society, discerning the strengths and weaknesses of these perceptions. Subsequent articles picture the bonds between education and sustainable development in the context of teaching and learning. These articles recognize the challenge both for the form and content of these processes.

The next subsection takes a glance at the possibilities of sustainable development in preschool education, thus supporting the idea of ESD at all levels of education. A very important aspect of education and sustainable development is connected with teacher education and training, which offers the possibility for extensive dissemination of this idea among the different generations.

The last group of articles focuses on the social and economic context of sustainable development. The Editorial Board assembled especially for this collection consists of highly professional experts from 14 countries.

Constraints

The academic writing skills and proficiency in English of authors from Baltic and other Eastern European countries need to be improved. Extra work with these authors through academic writing workshops, higher requirements for article submission, and proofreading of articles carried out by native English speakers could improve the situation.

In addition, though the journal announced its orientation toward sustainable development and education for sustainable development from the start, since JTET was launched, the overall number of articles devoted to these topics has comprised approximately one third of all published manuscripts. The Notes for Contributors have already been changed asking for definite content of articles. The Editorial Board could work with the authors to focus articles more specifically toward the announced aims of journal.

FEM still has relatively short-term experience in managing an international network, and there is no clear commitment yet to self-initiated and regular research work in ESD from the participating institutions. We need to select types of activities that will ensure that the newly formed networks will flourish in the future.

Specifically, we need to encourage exchanges of experience between the newly created BBCC and the older and more experienced PCC in Educational Research. The PCC was established in 1977 as an initiative in international cooperation between educational research and development institutions in the Pacific Region. Membership was initially drawn from OECD countries. Australia, Canada, Japan, New Zealand and the United States (mainland and Hawaii) were represented at the first meeting. Membership has since been extended to other countries

from within this region and from Asia. The focus has also changed from one of collaboratively produced curriculum materials to broader issues of policy development and educational research.

A further challenge is that, in Latvia, JTET has yet to gain the recognition from the wider community of educational researchers that could be garnered through national advertising of the project and its networks. Daugavpils University could host a conference and invite key players in educational research and sustainable development in Latvia. The Festival of Science, for example, scheduled for November 6-10, 2006, could be a model for further events.

At the Festival of Science, lectures by invited guests from different countries, discussions, round tables, fairs, and presentations in relation to science and its further development will be organized. FEM and ISE will contribute, with the event dedicated to the UNESCO Decade for ESD. Other activities will include the signing of a Cooperation Agreement between ISE and the local UNESCO Committee, a presentation by JTET, presentation of the ISE/BBCC collection of articles and the ISE publication *Students on Sustainability*. These activities reflect action research on the gradual development of university students—who will be the future teachers presenting their understanding of sustainability and ESD within university studies.

Perspectives

Since the Faculty of Education and Management (FEM) of Daugavpils University joined UNESCO's *Reorienting Teacher Education to Address Sustainability* in 2000 and launched the *Journal of Teacher Education and Training* in 2001, the project has accomplished many of its goals. Future initiatives to ensure the viability, and momentum, of the project include the following tasks.

- Establish the journal as an indexed peer-reviewed publication, included in major publication databases;
- Continue organizing and monitoring JTET Conferences in BBCC network countries, for example at Debrecen, Hungary, in 2007 and at Anadolu, Turkey, in 2008;
- Launch the cross-cultural research project on education for sustainable development through the cooperation of BBCC countries and to publish the results of the research;
- Reorient the content of JTET articles more clearly toward topics of teacher education, sustainable development, and education for sustainable development;
- Increase the number of contributions for JTET coming from the doctoral students of Pedagogy at Daugavpils University.

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8. Schools and Sustainability in South Africa: Piloting a Reflexive Model for Accredited In-service Teacher Education

*Heila Lotz-Sisitka, Ingrid Schudel, Rob O'Donoghue & Pat Irwin
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Introduction

Since the first democratic elections in South Africa in 1994, South African society has been engaged in an extensive project of social transformation. The South African Constitution enshrines environmental protection, sustainable utilization of natural resources, principles of sustainable development, and a healthy environment in its Bill of Rights. A key project of the post-apartheid era has been the transformation of the education system and the development of a new curriculum.

In accordance with its Constitution, South Africa now has a National Curriculum Statement (NCS), which includes principles of environmental sustainability, human rights, social justice, and inclusivity in all learning areas and subjects for all phases and grades in the schooling system. This focus within the curriculum responds to the many sustainable development challenges experienced by South Africans. Key among these is the need to address the impacts of HIV/AIDS and poverty, and to provide equitable access to water, sanitation, and other services while addressing environmental degradation and loss of biodiversity.

The NCS is an outcomes-based curriculum. It allows for contextualized learning processes guided by national assessment standards. It specifies environmental and sustainability oriented content (e.g., biodiversity and energy issues) and supports the development of investigative and critical thinking and problem-solving skills. It also clearly articulates a *normative framework that supports critical citizenship and values such as human rights, social justice, and respect and care for the environment and the health of others.*

This curriculum framework creates a platform for schools to engage with environmental and other sustainability issues at local, national, and global levels, giving policy effect to UNESCO's (2005) objectives of re-orienting education towards sustainability. The environmental and sustainability focus in the National Curriculum Statement is new to most teachers in South Africa, and it has created numerous challenges to implementing policy, including the need for re-oriented teacher professional development programs.

Program Presentation

The Rhodes University Environmental Education and Sustainability Unit (RUEESU) has participated actively in the educational policy transformation process outlined above and its associated implementation. Our interest has been the praxis of new environmental and sustainability education policy in the context of the NCS. To that end, we have piloted and established new models of teacher professional development that are consistent with the transformational objectives of the NCS and the re-orientation objectives of the UN Decade of Education for Sustainable Development (ESD).

One such initiative is the teacher professional development course, 'Schools and Sustainability.' This course developed in the context of the RUEESU Community Engagement Program to strengthen participation of local teachers and pupils in curriculum-centered environmental learning and change processes. The course has allowed us to pilot a reflexive model of in-service teacher professional development, which articulates with and is integrated into a fourth year accredited qualification for teachers at Rhodes University.

In the 'Schools and Sustainability' course, we worked with teachers from schools that were previously disadvantaged under the unequal and separate development policies of the apartheid education system. Teachers involved in the project were from the Makana District, our local district, and we worked with them to develop lesson plans and classroom activities with an environmental and sustainability focus. Most of the teachers participating in this course were in the past subjected to a technically oriented education system and poor quality teacher education programs devised in the apartheid era. They had little experience putting new curriculum policy objectives into the context of learner-centered education, contextualized lesson planning, and outcomes-based assessment. Previous experience and qualifications

have left many teachers under-prepared for implementing the many complex and ambitious objectives of the educational transformation project in South Africa

Innovative Aspects

To respond to the challenges of implementing the environmental and sustainability objectives within a new curriculum framework, the 'Schools and Sustainability' course was designed to allow for ongoing action, reflection, and change in schools and classrooms. The following five features characterize the course curriculum.

(1) Participation and professional relationships

A *cluster-based professional development* approach was modeled in the program. This required attending regular meetings, sharing ideas and experiences, and providing ongoing support for teachers. Teachers attended 10 bi-weekly cluster meetings over a one-year period. The clusters consisted of a core group of teachers who met regularly and who were consequently able to form strong relationships with each other. This model encouraged professional collaboration and collaborative learning and enabled the use of social constructivist strategies such as group work, dialogue, and professional deliberation. The model assumes that by establishing professional relationships, teachers would be more equipped to continue networking and interacting with each other on questions of education for the environment and sustainability education after the program, thereby effectively establishing a community of practice. We have noticed that teachers who have been part of the 'Schools and Sustainability' course have continued to participate in environmental education activities in the Makana district *after* they completed the course. For example, a large group of 'Schools and Sustainability' teachers volunteered to contribute to the strategy development process of the municipalities' environmental education and training, which was not part of their course work.



Figure 8-1. A Makana teacher cluster with their portfolios. With them is the Rhodes University support staff and a local Department of Education official who became an integral member of their 'community of practice.'

(2) Reflexivity and a process orientation

The cluster-based approach to professional development used in the 'Schools and Sustainability' course was informed by research undertaken in the Rhodes University Environmental Education and Sustainability Unit (Janse van Rensburg and Le Roux 1999; Lotz 1999) and in an earlier *Learning for Sustainability Project* (Janse van Rensburg and Lotz-Sisitka

2000; Squazzin and Du Toit, 1999) which aimed to encourage reflexive approaches to professional development and active and resource-based approaches to learning (O'Donoghue 2001; Timmermans and Gon 2004; Lotz-Sisitka and Raven 2000). This research influenced the model of professional development used in the Makana *Schools and Sustainability* cluster.

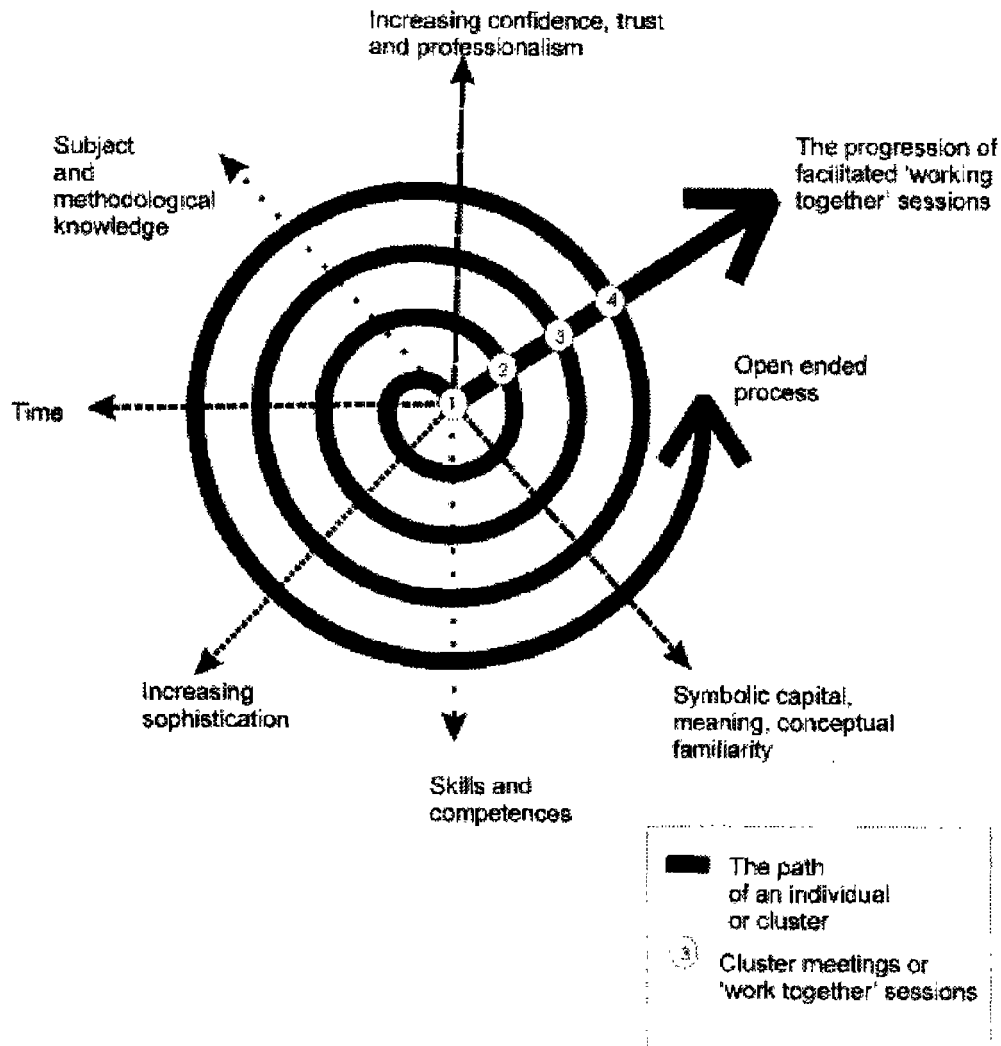


Figure 8-2. A reflexive model of professional development (from Squazzin & Du Toit 1999)

A key feature of this model is its *reflexive process approach*, involving a series of work-together, and work-away tasks. Working together took place during the cluster meetings described above, while the work-away tasks were done by individual teachers in the classroom and school context, where they sometimes worked with other colleagues in the school. These activities encouraged teachers to:

- Work through ideas, such as active learning approaches, introduced in the cluster meetings;
- Apply or extend this learning to their own teaching context;
- Engage in inquiry in their own contexts through reporting back on work done and discussion of issues arising in the next work-together activities in cluster meetings.

This system encouraged teachers to reflect on their changing practice over a period of time, while trying out new ideas. This is markedly different from most teacher professional development programs, which normally focus on simply introducing new concepts and technologies to teachers, who are then expected to implement them when back in their

classrooms. Through this *reflexive process approach* and ongoing opportunities for meaning making, supported through the discussions and reflection on practice, teachers were encouraged to document their reports on teaching experiences and lesson plans in professional development portfolios. The *reflexive process approach* introduced an element of flexibility in which program facilitators could respond to emerging issues or teacher questions that needed clarification. This allows for responsiveness to teacher needs and to the 'real life' experiences of teachers engaged with innovation and change at classroom level.

In the 'Schools and Sustainability' course, *work-together* tasks:

- Created opportunities for teachers to articulate and narrate their practices and beliefs regarding environmental learning and sustainability;
- Challenged teachers' assumptions about learning and introduced new teaching and learning strategies;
- Provided opportunities for investigating issues and risks in the Makana District and building knowledge of these issues;
- Modeled strategies for teaching and learning, and lesson plan development;
- Provided informal as well as more structured opportunities for critical reflection on their own and each other's lesson plans and practice.

The *work-away* tasks required teachers to:

- Audit environmental learning opportunities and environmental issues in their schools and communities;
- Design, implement, and assess a series of three lesson plans using active learning approaches in response to these issues.



Figure 8-3. Teachers investigate the biodiversity of indigenous plants during a work-together task in a cluster meeting. This activity stimulated Ms. Hobongwana (2nd from right) to design a lesson plan with her pupils investigating the over-harvesting of the indigenous "African potato" – a plant widely used for its reputation to boost the immune system of HIV positive people.

(3) Responsiveness and active learning

A third feature of the 'Schools and Sustainability' course curriculum is its emphasis on responsiveness and active learning. As indicated above, the work-away tasks involved a contextual auditing process in which teachers and pupils identified environmental issues and

risks that were significant in their school-community. Through this process teachers identified a number of locally significant issues such as:

- Sanitation and associated health risks (many of the community members in Makana are still using a 'bucket system');
- Loss of local biodiversity;
- Alien invasive plants;
- HIV/AIDS, poverty, and care of children;
- Waste management problems;
- Water pollution and water wastage;
- Food security, nutrition, and health.

In response, the 'Schools and Sustainability' course encouraged teachers to plan a sequence of lessons to involve pupils in actively investigating and addressing these issues. Using an active learning framework (O'Donoghue 2001, see figure 4), teachers considered how they would mobilize pupils' prior knowledge and experience of the issue. They explored where they would find and how they would use information on the issue, what investigations pupils could engage in, and how pupils could report on their findings. They also encouraged pupils to participate in action projects to address the issues where this was possible and relevant.

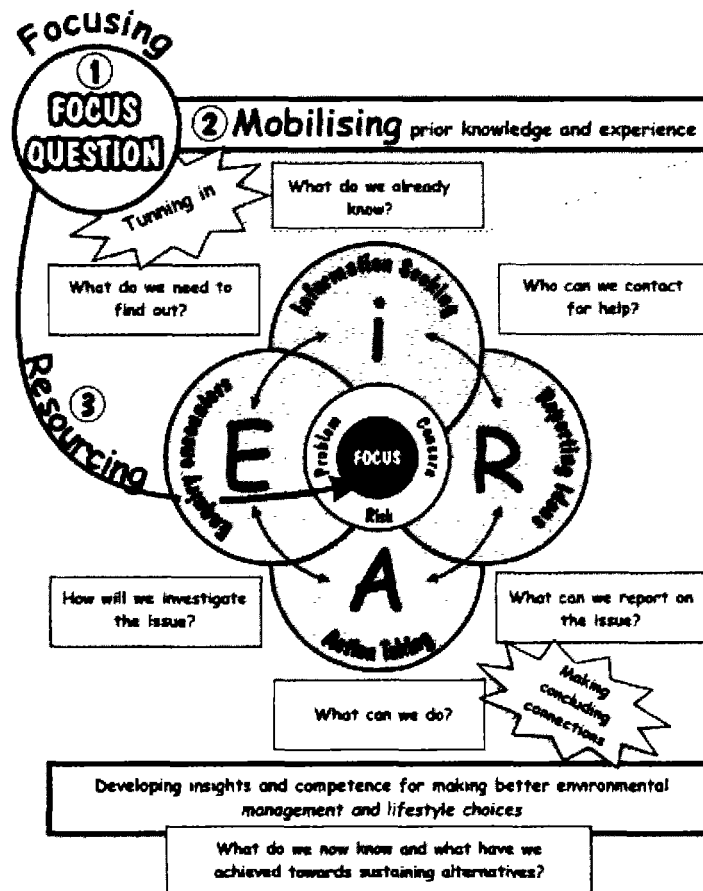


Figure 8-4. Active learning framework (O'Donoghue 2001)

Through these active learning processes, teachers and their pupils were able to engage critically with information from communities, textbooks, and other sources, and to locate that information through investigative activities that contextualize environmental issues in local community settings. They also critically engaged with new ways of knowing and doing in response to environmental issues and risks and sustainable development challenges. Ntombise Ngqezana, a teacher participating in the program, commented on how this active learning approach "... helps teachers and pupils find more flexible and responsive ways of working with knowledge in order to explore and understand their local environment."



Figure 8-5. Peers of Ms. Ngqezana attend a workshop at her school to investigate the variety and uses of wild vegetables. This led to the growing of wild vegetables in the school, and use of these to supplement the school-feeding scheme. School feeding schemes are a central concern for many schools as a significant number of pupils depend on meals provided in schools as the only meal of the day.

(4) Resource-based learning to scaffold classroom activity

To strengthen the active learning approach encouraged in the 'Schools and Sustainability' course, teachers were provided with a range of resource-based learning packs containing a choice of learning support materials. Once they had selected their topic or issue, they used these learning support materials to plan activities for their lessons. They also used the materials in their lessons and reported back on their usefulness or value. Through this approach the 'Schools and Sustainability' course was able to support literacy and other learning processes and to provide resources for teachers who generally work in resource-poor teaching environments. The resource materials also provided knowledge resources to strengthen teachers' own knowledge of the issues they were dealing with.

(5) Portfolio assessments and evidence of reflective practice

Many teachers enroll for the 'Schools and Sustainability' course because it is accredited by Rhodes University. Teachers completing the course are awarded 12 credits toward a 120-credit Advanced Certificate in Education qualification at Rhodes University. This is a fourth-year professional qualification, recognized by the Department of Education for promotion and salary purposes. The award of credits, however, requires an assessment process. To demonstrate their ability to meet the requirements for the course certificate, teachers produce a portfolio in which their work-together and work-away tasks are filed.

Portfolios provide evidence of teachers' abilities to engage with environmental and sustainability issues. They also show how teachers have included environmental and sustainability issues in their curriculum planning. Evidence of planning and learning outcomes are provided through inclusion of lesson plans and pupils' work in the portfolios. Reflection activities on both their own and the pupils' work are also contained in the portfolio. Assessment of the portfolio is qualitative and evidence-based. Assessment is also based on a set of outcomes that guide the professional development program.

Effects, Results, or Impacts

The curriculum design, course orientation, and reflexive professional development process has led to a number of outcomes and useful insights for further ESD teacher education practices at Rhodes University.

Contributions to local knowledge and culture. The process of contextual auditing at the start of the professional development program appears to be a significant element that enables engagement with local knowledge and culture. Once teachers and pupils in schools have

identified the issues, a responsive process of extending and engaging with local knowledge and culture becomes possible. In the 'Schools and Sustainability' course, local partners such as the Albany Museum and various nongovernmental organizations were invited to provide teachers with new knowledge, cultural resources, and learning support materials associated with the issues they had identified.

Through a critical review of teacher portfolios, we have found that strengthening teacher knowledge of local environmental and sustainability issues is an important development challenge for teacher education programs. We found that teachers often engaged superficially with issues and risks, and lessons were often based on incorrect assumptions and poor quality knowledge of the issues. Addressing this requires pro-active partnerships with knowledge institutions at the local community level.

Changes in school and community. By engaging with local issues and risks that are relevant in the school-community context, and through various active learning processes, teachers and pupils were able to contribute to change. For example, in some schools, teachers and pupils were able to stop wasting water and to plant nutritious food plants to address food security issues.

A close examination of the teachers' portfolios revealed that individual teachers tend to have an enhanced ability to contribute to change at the level of pedagogical processes in classrooms. Broader changes at the school and community level appear to require broader structurally defined changes. It was, for example, not possible for teachers and pupils to change the bucket system in the community context, but they were able to write letters to the municipality about the issue. In cases where changes were brought about in the school community environment (e.g. planting a food garden) these efforts were often supported by NGOs and other organizations, indicating that such changes are possible, with external support and if teachers work in teams at the school-community level.

Curriculum knowledge and experience. As we noted at the start of the paper, the National Curriculum Statement poses numerous challenges for teachers not familiar with its underpinning philosophy and orientation. Through the focus on active learning, the 'Schools and Sustainability' course introduced teachers to principles of situated learning and learner-centered pedagogy. Through resource-based learning packs, the course addressed issues associated with resource-poor teaching environments. By emphasizing curriculum planning and assessment, teachers developed professional competence for working with the outcomes-based curriculum framework.

A critical review of the teacher portfolios, however, indicates that teachers' professional development programs need to support curriculum planning and assessment practices more substantially. This need results as teachers struggle to work with the complex new curriculum structure, its knowledge assumptions, and its process-oriented approach to continuous assessment. Of key concern is the quality of teachers' subject-based knowledge and associated knowledge of environmental and sustainability issues in the different learning areas.

Engaging with normative frameworks in education. The above insights provide practical guidance on how to steer the 'Schools and Sustainability' course in the future. Further attention needs to be given to the questions of developing teachers' knowledge and planning for learner-centered and issues-based approaches and their assessment. Valuable insights have been gained on how to situate learning in culture and context and how to foster reflexive and applied competence among teachers.

In addition, our critical review of the teachers' portfolios has provided useful insight into the processes associated with implementing a normative curriculum framework that supports the principles of ESD. We have learned that curriculum expectations for social change are not always directly possible through teaching and learning activities and that change processes were most often pedagogically orientated (i.e., changes in teaching and learning practices). However, some evidence of social and structural change in schools and communities was noted as a result of teacher and learner participation in actively addressing these issues. Addressing longer term and more serious issues appears to require partnerships with those organizations that are more able to finance and practically implement such changes, such as changing sanitation systems and greening schools.

Perspectives

The 'Schools and Sustainability' course has provided a mechanism for supporting local teachers to reflexively engage with the challenges of implementing a new and fundamentally different curriculum. In addition, the course has contributed to the development of teacher competence and confidence. The course has also helped teachers and pupils learn about and address environmental and sustainability issues at a local community level. To take this initiative forward, the RUEESU is currently investigating partnership possibilities with other universities in order to conceptualize how the 'Schools and Sustainability' course could articulate with other *Advanced Certificate in Education (ACE)* qualifications (e.g. the ACE in Social Justice at the University of KwaZulu Natal), and how it could articulate with the new *National Teacher Development Strategy* set to begin in 2008. Most significantly, the 'Schools and Sustainability' course has provided a model of process that allows us to *integrate* the teaching, research, and community engagement functions of a university.

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