Paper Presented at the AARE Annual Conference, Melbourne, 1999
Australian Association for Research in Education

BRA99625

Bringing Community Pedagogy into the 21st Century: Electronically Enabling Community Learning

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The role of environmental education is to increase understanding of the environment, augment concern for the environment and stimulate willingness to act constructively within it. Historically community education interventions aimed at influencing environmental values, attitudes and behaviour have been restricted to formal and informal face-to-face education sessions; the use of mass media techniques such as television campaigns, films, videos, posters and pamphlets; and informal word-of-mouth networks of family and friends.

Environmental Message Delivery

The impact of newspapers, television and other forms of mass media on the successful diffusion of environmental knowledge has been the focus of a number studies over the last decades (e.g., Atwater, Salwen and Anderson 1985; Fortner and Lyon 1985; Bowman 1978; Bowman and Hanaford 1977; Rubin, Harris, Jones and Sachs 1977). Despite an environmental information explosion in the 1970s and a spectacular rise in public concern for the environment, the leading mass circulation magazines did not typically offer readers access to in-depth environmental information (Bowman and Hanaford 1977).

In the 1980s researchers suggested that print and television were, and would continue to be, the most frequently used media to obtain environmental information (Ostman and Parker 1986/1987; Fortner and Lyon 1985; Sharlin 1985). Many of the environmental information providers utilising mass media did, however, not have an adequate understanding of the information needs of their target audience (Weis and Knudson 1980) and few studies provided environmental educators with useful directions as to which medium had the most impact.

In Australia, statistics indicated that 86 per cent of the population used the popular media as their most common source of environmental information (The Australian Bureau of Statistics 1992). Data were not correlated on a community basis, nor was an analysis undertaken on the impact of popular media on environmental knowledge and actions. Contemporary environmental communication research suggests that the more a person depends on mass media for information, the more important mass media will be in forming that person's environmental policies and actions (Arcury 1990; Pierce, Lee-Salmos, Steger and Lovrich 1990). Subsequent studies began focusing on news production in relation to knowledge of and attitudes about environmental issues (Smith 1993; Corbett 1992; Daley and O'Neill 1991; Rossow and Dunwoody 1991).

Little research on effective diffusion of information has been based on educational needs within or between local and global communities. Yet education plays such an important role in transforming people's values and lifestyles. There is consensus within the environmental education literature that information campaigns are usefulness in building community awareness of environmental issues (Ostman and Parker 1987; Ostman and Parker 1986/87; Ostman and Parker 1985, Cohen 1986). In a meta-analysis of research conducted since 1971 on the variables that shape environmental conduct, Hines, Hungerford and Tomera (1986/87) identified knowledge of issues, knowledge of action strategies, and locus of control among the main variables influencing environmental behaviour.

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Fien (1993) suggests that education *for* the environment must be contrasted with education *about* and *through* the environment. Information campaigns inform*about* the environment. Education *for* the environment actively engages learners to resolve environmental questions and issues. Geller (1995) affirms that community-based intervention is needed to achieve pro-active environmental behaviour and it would appear that voluntary environmental education strategies are preferable over coercive education methods (Karp 1996).

Much emphasis is being placed on the need for environmental education to keep communities environmentally intact. Despite the growing acceptance of the Internet, environmental educators still tend to employ conventional mass media to disseminate environmental information. The transitory nature of these media necessitates information campaigns to be repeated on a regular basis to maintain impact and influence enduring behaviour change (De Young 1993). As none are optimal in durability, there is a compelling need for new environmental dissemination techniques (De Young 1993). In the electronic age it is imperative to link local communities to global concerns through durable and cost-effective education networks.

The Internet and the Community

The Internet is leading a paradigmatic information transformation. These media have interactivity at their heart. As the Internet has grown, so has the interest in access to both local and global information. The first community network system developed in the 1970s in Berkeley, California, was a model to facilitate free exchange of information placed on the network for and by community members to promote community-oriented information (Schuler 1994).

In the years to follow, community network experiments were held across America. A medical bulletin board constructed in 1986 led to the creation of the first Free-Net, a gathering of community organisations in one electronic city site (Schuler 1994). This model was quickly copied by communities around the globe and led to the establishment of the National Public Telecomputing Network (NPTN), a non-profit organisation that serves as a loose-knit parent company for free-net community networks in locations throughout Europe, America and the Pacific Rim (Schuler 1995). In the late 1980s the city of Santa Monica established a Public Electronic Network (PEN) providing access to city government information, city council agendas, reports, and the library's online catalogue (Schuler 1995).

Whether labelled community networks, civic networks or public access networks, they successfully spawned "electronic communities of interest", generating community identity through their core objectives of facilitating interaction on issues of mutual community concern. Community access networks and bulletin board systems (BBSs) were de facto forerunners of later localised information networks on the Internet (Stoll 1996).

There is a rapidly growing interest in accessing community information via the Internet. Several studies (Vandermeulen 1995; Yang, Kubicek and Redder 1995; Hecker 1994; Guthrie 1991) have addressed the use of the Internet for public information delivery. These studies unanimously suggest that information networks should be made available to meet the growing demand from citizens for access to information on community matters and to increase communication among citizens about community affairs. The studies further indicate that the emergent information technology can sharply increase the amount and quality of information available to the public and demonstrate that the provision of online access to community-specific information can help residents to participate effectively in local government and community planning processes. Spender (1995) describes access to and

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equity in online information production essential in the formulation of a community identity and its decision-making process.

Information technology is now an intrinsic part of every day life and it is the role of governments and educational institutions to act on information technology initiatives and encourage public participation. It follows that the next phase of development is electronically enabling community learning via the Internet.

Study Aims and Method

This study had two aims. First, to identify community interest in accessing environmental information online. Second, to investigate the potential benefits of utilising computer-mediated communication for pedagogical community purposes.

The study was divided into three phases. The first phase of the study focused on the collection and analysis of benchmark data to determine a community's environmental information gathering methods; satisfaction level with the environmental information flow; knowledge of and attitudes towards environmental issues; computer literacy and online interest. Utilising survey findings, cognate literature and design parameters, a framework for a prototype website was formulated in phase two of the study. Upon the completion of the design, effectiveness of the website was field-tested in phase three.

Phase I - Community Survey

The North Queensland community of Townsville/Thuringowa was selected as its proximity to The Great Barrier Reef offered relative environmental intactness; heightened environmental attention both locally and globally; yet an environmental spectrum ranging from conservation and wilderness areas to manufacturing and industry. Estimated 1996 population at survey time numbered 134,149. To maximise both environmental and online potential two sample groups were assembled. A 'print group' (n=1100) of members of The Great Barrier Reef Aquarium and an 'online group' (n=1050) of members of various Internet service providers.

A closed-ended questionnaire provided the framework for the data collection on the community's prevalent environmental attitudes, current environmental information sources, computer literacy level and online interest. A Likert-type measurement scale was applied. The print group received a printed version of the questionnaire, the online group an electronic one. A follow-up participation inquiry was added for website evaluation purposes.

Findings

In the print group the respondents were predominantly female (69.6 per cent). Since only 38.7 per cent of print females indicated that they were employed, this may account for the fact that print females were the most active in environmental information gathering, membership in environmental groups and tasks such as responding to environmental surveys. In the online group the vast majority (80.8 per cent) was identified as male. The latter figure was consistent with 1996 online user trends which identified Internet users as predominantly male (Cyberatlas 1996).

All surveyed had a reasonably strong desire to obtain environmental information, substantiated by 64.2 per cent of the print group and 61.1 per cent of the online group indicating awareness of environmental issues. Further establishing community interest in environmental education was both groups' strong agreement that awareness is essential for a sustainable future and that informed individuals can make a difference. Most claimed they made at least some efforts to encourage family and friends to be environmentally aware.

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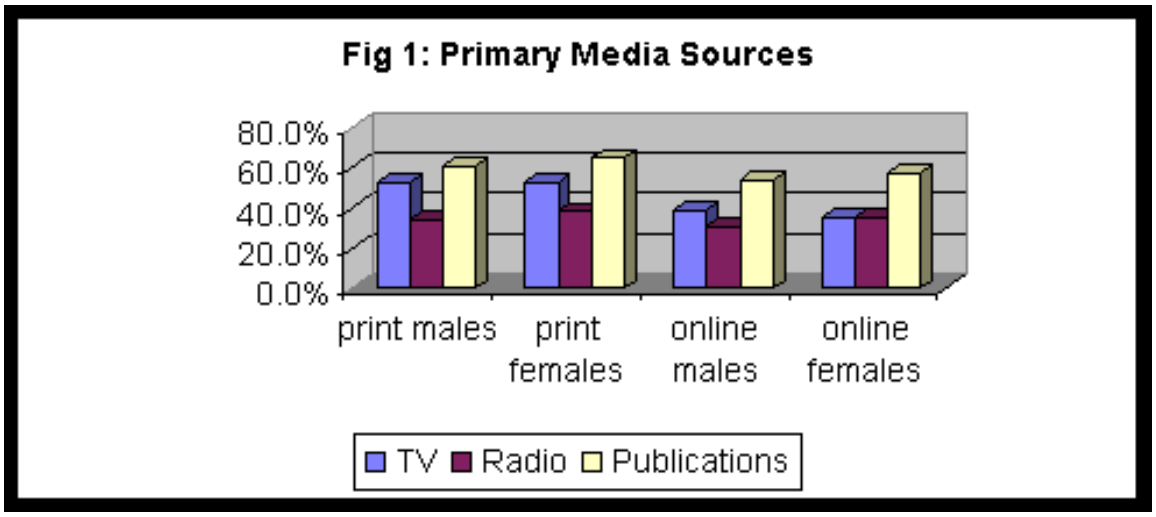
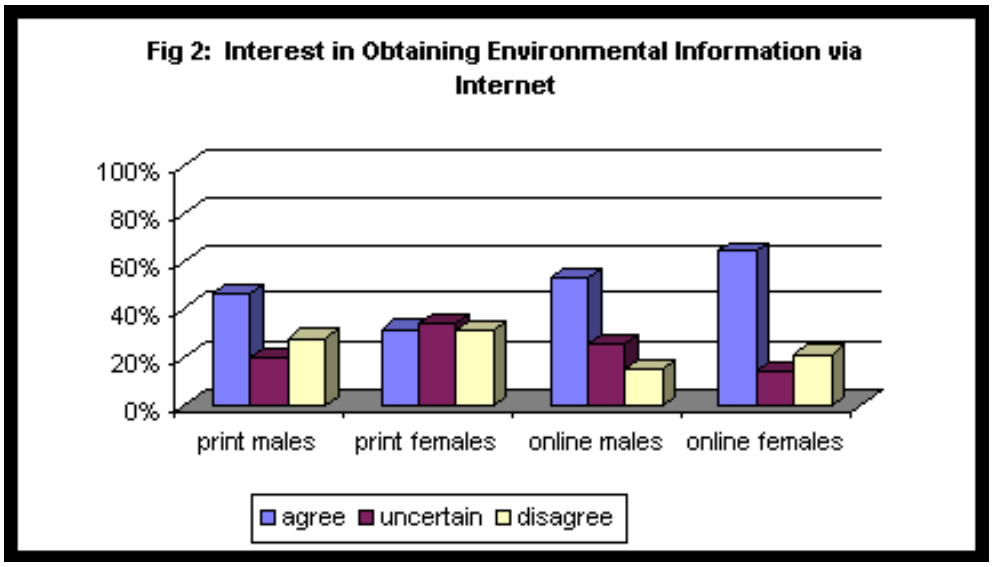
To obtain environmental information all participants preferred publications to television (Figure 1). It should be noted that on average the online group utilised conventional media up to 20 per cent less than the print group, which indicated a significant shift in media use from conventional media to online media.



Of sixteen environmental issue listed (e.g., hazardous waste disposal; energy and water conservation; air, water and noise pollution) to gauge the community's satisfaction level with the environmental information flow, the majority of respondents agreed that more environmental information was needed on all but two issues: recycling and the marine environment. Recycling is one of the dominant environmental issues likely to be covered by local government and environmental agencies. Given the sample community's proximity to The Great Barrier Reef and its various reef management agencies, increased awareness of the region's marine environment and subsequent information availability on the latter may also be expected.

The survey indicated a very high degree of computer literacy and a low level of computer fear. Not surprisingly, there was substantial support for computers as information retrieval and organisational tools. While only approximately 15 per cent of the print group stated that they surfed the Internet at survey time, a considerable percentage (41.2 per cent) indicated that they were comfortable with the Internet and half the print group anticipated that they would go online within a year.



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As expected, the online group indicated the highest level of support for obtaining environmental information via the Internet (Figure 2). In fact, 40 per cent of the online group stated that they already used the Internet to retrieve environmental information. As mentioned earlier, print females recorded the highest level of effort (78 per cent) to obtain environmental information. They indicated considerable interest (66 per cent) in using a centralised environmental database and reasonably high interest (49 per cent) in using a public access terminal to access environmental information. Yet, as reflected in Figure 2, print females indicated relatively low interest in using the Internet to obtain environmental information. As print females were the least familiar with the Internet, they may not have equated ready access to a centralised environmental database or a public access terminal with the Internet.

Conclusions

Given the level of computer literacy, online appeal and established need for access to more environmental education, it may be assumed that an environmental community website would be of interest to a community.

Considering that community members are open to new methods of information diffusion and that online users are already using the Internet to obtain environmental information, there are also strong indications that an environmental community website would be a powerful tool to diffuse both local and global environmental information. As online respondents have verified, if environmental information is available online they are highly likely to access it.

Phase II - Website Design and Evaluation

Since a future user profile was unidentified in the survey conducted in Phase I, the prototype website had be optimised for a broad range of users in terms of platform access, content and graphical user interface (GUI).

Having assembled a broad range of environmental materials for inclusion on the website, community environmental information needs were reviewed and synthesised with local resources. A concept map was constructed, grouping category headings, e.g., *government, home* and *industry,* with pertinent subheadings in a hierarchical flow chart. To keep the site dynamic and ensure continued user learning, appropriate categories were earmarked for regular content update. To facilitate user interaction and contribution, a news and chat forum was established. The interface design offered access via clickable graphics (Figure 3) and/or hypertext and, where possible, popular environmental symbols such as the recycle circle of arrows were used as navigational icons.

Fig 3: Community Website Design

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Phase III - Website Evaluation

Alpha testing through focus groups provided the most efficient website evaluation method in terms of the community population. Focus sessions were conducted with print and online group members who had indicated an interest in follow-up participation as well as with attendees of the 1997 Students and Sustainability Conference which was hosted at the researcher's university at the time of the alpha testing. This conference had a strong emphasis on environmental education and information sharing. Its audience was hence uniquely qualified to evaluate the environmental community website.

The evaluation questionnaire, based on cognate research (e.g., Ciolek 1996; Auer 1996; Smith 1996; Tillman 1996) contained a combination of closed-ended multiple-choice questions with Likert-type measurement scales and open-ended questions. Questions were formulated to reflect the overall stability of information presented online; the scope and structure of the content; GUI and navigational design of the site.

The two evaluation groups were termed the 'student group' and the 'community group'. The mean age was 19 for students attending the conference. Reflecting a cross-section of the community workforce, community participants' mean age was 31, with the eldest participant being 54 and the youngest being 14 years of age. Occupations were broadly based and included teacher, public servant, naturopath, secretary, civil engineer, electrical draftsman and home duties.

rate as webuser	**beginner**	**intermediate**	**advanced**	
student group	43%	43%	14%	
community group	55%	15%	30%	
first impression	**very interesting**	**mildly interesting**	**not very interesting**	**blank**
student group	64%	29%	0%	7%
community group	50%	35%	10%	0%
website content	**very useful**	**somewhat useful**	**not useful**	**blank**
student group	50%	50%	0%	0%

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community group	45%	50%	5%	0%
main interface graphic	**effective**	**adequate**	**inappropriate**	**blank**
student group	50%	43%	0%	7%
community group	35%	60%	0%	0%
navigation & icons	**effective**	**adequate**	**inappropriate**	**blank**
student group	71%	29%	0%	0%
community group	70%	20%	10%	0%
overall design	**exciting**	**useful**	**disappointing**	**blank**
student group	50%	43%	0%	7%
community group	35%	60%	0%	0%
tempted to return	**likely**	**possibly**	**doubtful**	**blank**
student group	64%	36%	0%	0%
community group	45%	25%	20%	5%

Findings

Participants generally expressed appreciation of the site's content despite the fact that the evaluation concerned a prototype with minimal content development. Considering the high approval rate of both the prototype design and navigational structure, it may be assumed that the level of satisfaction with the information flow is likely to increase rather than decrease once actual environmental information is contained within the community website.

Most participants considered the main menu well ordered and the overwhelming majority of participants indicated that they would likely be tempted to return to the website. Repeated browsing suggested that interest in the website is likely to increase upon greater familiarity with the site. Given the playful GUI design and given the median age of the student group, the design appealed more to a younger age bracket.

Although there was disparity in online familiarity and GUI exposure, the evaluation process revealed a desire for technological accoutrements such as sound and animation, indicating that community members were more sophisticated in their knowledge of technology than had been anticipated. The more technologically aware community members become, the more they will expect the latest technology, e.g., streaming audio/video, Java and Shockwave. Hence, in order to keep users engaged in a community site and cater to the rapidly increasing level of computer and online sophistication, community website design must address market expectations while retaining the capacity to provide access to a broad range of computer platforms and users.

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Summary and Discussion

Aligning burgeoning online user trends with the findings of this study, a shift in environmental information gathering from conventional media to online media seems a likely outcome.

Online learning systems are uniquely qualified to enable durable and cost-effective education. They are neither time, pace or place dependent. The nature of the medium allows for dynamic and hence current information dissemination and retrieval. Locus of control rests with the user. User and demand driven, knowledge of local environmental issues can be obtained, existing materials can be sourced, links to community groups can be established and an open forum can be created to bridge any environmental gaps which may exist. As such, online community sites can enable community awareness of environmental issues; facilitate knowledge of action strategies; and foster involvement in local and global environmental learning.

The evaluation process foregrounded such issues as the depth of environmental content sought by community members. Like many communities, the sample community encompassed a broad range of environmental consumers ranging from 'deep green' to 'environmentally aware' to 'environmentally inactive'. When an environmental database is tailored to community environmental information needs, it is potentially a powerful means of diffusing local and global community information. For the technology to be effective, however, information diffusion needs to be demand driven. Identification of a community's information needs are essential as community members expect the site to be a source for both readily and not so readily available environmental community information. Environmental educators would hence be well advised to establish environmental attitudes and knowledge levels prior to embarking on online environmental education.

It is clear that the market expectations of sophisticated website users will need regular evaluation against the comparative lack of online sophistication of other community members. More effective search methods are essential in order to alleviate laborious online surfing. Depth of information will need to be offset against breadth vis-à-vis the need to make a community website a learning database par excellence. In addition website users will need to be provided with the online access, knowledge and tools to act locally which in turn will enable them to think and act globally. The latter will require the formulation of educational methodologies to assist community network content users and providers in such tasks as the creation of new online content, retrieval and uploading of content, and/or the repurposing of existing content for the new medium. Implementation of such methodologies are likely to facilitate information dissemination, learning and wider participation in the medium.

Online learning systems have the potential to encompass and synthesise a fragmented information base. There are a number of potential benefits in creating centralised niche information environments tailored to local community needs. Firstly, it can enable the Internet platform to function as a genuine community network, effectively upgrading online community networks from local bulletin board status to a global level. Secondly, such an online location is ideally suited to contain and link local communities to global issues, which can help to eliminate information fragmentation and lead to more efficient information gathering. Thirdly, and perhaps most importantly, such an online niche environment has the potential to foster responsible environmental lifestyles on a municipal level.

Quality of learning via online systems can best be achieved through the establishment of a collaborative process between government, industry and the public. Linking together communal government and city agencies, educational institutions, non-governmental organisations and other environmental information resources in a public electronic database

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has a number of potential advantages. Firstly, information can be utilised by a much wider and more diverse audience. Secondly, duplication of information can be eliminated. Thirdly, the cost of information generation and dissemination can be reduced. Fourthly, by establishing a regional consortium, IT skills and resources can be shared, effectively maintaining the online centre at technological market standards while empowering the entire community to participate in a sustainable future. Finally, by synergising regional efforts, whether it be on an information, communication or transaction level, a significant regional online presence can be secured.

Many communities are still a long way from universal online access, preventing any Internet-based niche learning environment from becoming a genuine community network until such time as it is freely accessible for all members of the community. A hybrid delivery platform is hence essential and communities should be assisted in making the Internet accessible and affordable. Free public access points can help fill the gap between the information-rich and the information-poor by functioning as an interim public delivery platform until a more complete infrastructure is in place.

This study offers but an initial contribution to knowledge in the area of pedagogic community information delivery. Issues such as audience sophistication, diversity of information, tentacularity (to coin an appropriate term) and hybridity emerged from this study as important considerations in designing community online systems. Additional research is critical in order to establish the processes involved in the reciprocal nature of online community learning. IT is a community issue. Thus the development, implementation and analysis of online learning systems offer an important outcome potential for further research on the cusp of a new millennium in which information technology will play an increasingly integral role.

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