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Critical Education for Environmental Assessment

by

Alan P. Diduck

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A practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfilment of the requirements of the degree of Master of Natural Resources Management.

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ABSTRACT

The general purpose of this practicum was to explore the role of education in environmental assessment (EA) and to determine the effectiveness of education techniques currently employed in EA public involvement processes. The specific objectives were to: i) identify the range of techniques used to conduct education about EA; ii) identify the specific techniques used in a recent Manitoba sample case; iii) evaluate the knowledge about EA held by selected participants in the Manitoba sample case; and, iv) make recommendations for improving EA education.

A review of the literature on public involvement in EA indicated that public education plays a significant, but poorly defined role, in current thinking on public involvement. It also revealed a diverse range of education techniques available for use in the context of EA. A total of 53 techniques were identified in the practical and academic literature and in the legislation of three Canadian jurisdictions.

To clarify the role that education can potentially play in the EA process, aspects of the broad literature on non-formal education were reviewed. Consideration of the theories of critical pedagogy, environmental adult transformation and social learning led to the concept of critical EA education. Encompassing both "education about EA" and "education through EA", critical EA education empowers citizens and animates the community towards social activism. Education about EA is conducted within the participatory framework provided by critical pedagogy. It provides process-related knowledge and facilitates participation in the environmental assessment process. Based on the literature, some elements of critical EA education were identified: process-related information, including how status quo decision making processes and project decisions can be challenged; the substance of dominant and counter discourses offered during any given EA case, including the engineering aspects of a project, ecological and economic analyses of proposed project alternatives and how ecosystems work; skills training including how to make presentations, lobbying strategies and advocacy skills; and, the mechanics of law reform and the basics of judicial review.

Once in the process, participants engage in education through EA. They learn how members of the public work together to define and pursue their own goals. Through the

development of critical consciousness participants evaluate dominant discourses and present credible and forceful counter discourses. Overall, participants are transformed by critical interaction with others. Education about EA and education through EA are codependent. The former provides the foundation for the latter, while the latter gives substance and meaning to the former.

Empirical support for critical EA education was found through surveys conducted in the recent Manitoba EA case involving the Pembina Valley Water Supply System. Nonparametric statistical analysis of variables at work in the Pembina Valley case revealed strong correlations between participant knowledge of process-related information and level of critical consciousness ($r_s = .404$), whether the respondent participated in the public hearings and knowledge of process-related information ($C = .543$), whether the respondent participated in the public hearings and critical consciousness ($C = .394$), readership of dominant documents and critical consciousness ($r_s = .527$), and readership of dominant documents and knowledge of process-related information ($r_s = .777$).

Given the above findings, the education techniques available for use in the context of EA were ranked based on their congruence with the fundamental characteristics of critical methodology. Some of the techniques were found to be well suited to critical EA education, some poorly suited, while others appeared to be neutral. Well suited techniques emphasize interactive learning, are people centred and exhibit many of the descriptors of critical pedagogy. Poorly suited techniques exhibit few, if any, of the descriptors of critical pedagogy. Generally, they focus on the presentation of "facts"; mere information dissemination with little or no interaction with the affected publics. The neutral education techniques involve some degree of teacher-learner interaction, which introduces an element of discretion so that a neutral technique can be applied as a banking tool or as a critical tool.

By using three methods (review of the official case files, formal interviews and a questionnaire survey) the education techniques used in the Pembina Valley case were identified and compiled. Analysis based on the fundamental characteristics of critical methodology indicated that few of the techniques used in the Pembina Valley case were well suited to critical EA education. With this background, analysis of various dimensions of the knowledge of participants in the Pembina Valley case was conducted. It was

revealed that readership rates of the dominant documents were low, the level of knowledge of process-related questions was low ($\bar{x} = 37\%$), respondents were not highly critical of discourses presented in the case, and participation in the public hearing process was relatively low (47% of the sample participated in the public hearings).

Given the theoretical basis for critical EA education, and given the results from the Pembina Valley Water Supply System case, it was concluded that critical EA education has potential to clarify the role of education in the complex of public involvement. It was also concluded that critical EA education has potential to increase the effectiveness of environmental assessment by helping EA participants present credible and forceful counter-hegemonic discourses. For these reasons, it was recommended that a comprehensive program of critical EA education be developed for Manitoba. Other recommendations made deal with education techniques, the substance of critical EA education, the need for further research, a potential service delivery mechanism and a potential funding model.

ACKNOWLEDGEMENTS

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Jeffery (1991) views environmental assessment (EA) as the principal means to ensure an environmentally acceptable solution in matters of development. Meredith (1991) describes EA as a form of minimum regret planning; through assessment we ensure that externalities are identified, evaluated and incorporated into the decision making process. While these and other definitions of EA can be found in the literature, there is little doubt that most treat EA as a process which has the potential to facilitate environmentally enlightened decision making.

A major source of this enlightenment can be the public involvement component found in most EA processes. Public involvement programs, however, can at best be described as tentative. Grima (1985) notes that the "outcomes of public involvement have been uncertain." Schibuola and Byer (1991) suggest further that public involvement is frequently inadequate because of a lack of knowledge: "public groups often lack the knowledge to adequately critique a document or the financial resources to retain an expert to do so". Others have also recognized that education (or the lack thereof) is an integral component of public involvement in the EA process (e.g., Grima 1985, Bush 1990). Education creates an awareness of the process and facilitates an understanding of substantive environmental, economic and social issues. It forms the foundation for fair, effective and meaningful participation (Praxis 1988). Further, critical education has the potential to improve planning and assessment of development activities by helping introduce counter-hegemonic discourses that work to reverse current trends of unsustainable resource exploitation.

1.2 RESEARCH OBJECTIVES

Given the above, this practicum undertook research on education regarding environmental assessment. Its purpose was two fold: to explore the role of education in EA and to determine the effectiveness of education techniques currently employed in EA public involvement processes. The objectives of the research were to: i) identify the range of techniques used to conduct education about EA; ii) identify the specific techniques used

in a recent Manitoba sample case; iii) evaluate the knowledge about EA held by selected participants in the Manitoba sample case; and, iv) make recommendations for improving education about EA.

1.3   RESEARCH METHODOLOGY

1.3.1   INTRODUCTION

Data and methodology are inextricably connected. The character and quality of the data dictate the research methodology that must be employed in the processing of those data (Leedy 1989). This research involves both primary and secondary data. The primary data consist of historical data and normative survey data. The primary, historical data consist of legal sources, such as statutes and regulations. The primary, normative survey data consist of descriptive observations. The secondary data are historical in nature, consisting of government policy documents and published literature.

Given the nature of the data, and given that diverse research methods reveal various aspects of empirical reality, multiple data collection techniques were used in this research. A review of related literature, an analysis of primary and secondary historical documents, questionnaire surveys, and both structured and nonstructured interviews were the techniques employed.

1.3.2   INITIAL SCOPING EXERCISE

To help clarify the purpose and objectives of the research, an informal, normative survey was conducted. The sample population consisted of a select group of six authors and practitioners distinguished for their work in the field of environmental assessment. The sample was selected using a nonprobability, convenience approach.

The survey instrument was a questionnaire/letter distributed on November 12, 1992. The letter provided introductory remarks and posed three questions. Structured interviews, based on the letter, were conducted over the next month. One written response to the questionnaire/letter was received and interviews were conducted with 3 of the 6 individuals surveyed.

The results were very informative and proved to be extremely helpful in focussing the research. Dr. Robert Gibson, Environmental and Resource Studies at the University of

Waterloo, helped clarify the objectives of the research by questioning the nature of the education which is the subject matter of the research. Is it education about environmental assessment processes? Is it education about the assessment of specific projects? Or, is it general environmental education? He also indicated it is imperative to ask who is doing the educating.

Dr. Gibson also indicated that there are many interesting questions about education which are worthy of further study. However, to him the single most interesting question is how the public's understanding of the issues evolves during an assessment, and what are the implications for environmental assessment process design? He proposed a rough hypothesis. At the initial stage public understanding of the issues will be framed primarily within the context of "not in my backyard" (NIMBY). This general focus will evolve as the assessment process unfolds. As the assessment is conducted and hearings are held, people's understanding of the issues will become more sophisticated. They will gain an understanding of the proposed undertaking, the need for the undertaking, assumptions about the purpose of the undertaking, the assessment process itself, complex social, environmental, and economic issues, and the nature of compromises in a democratic system.

Dr. Gibson also theorized that the nature of the assessment process will affect the evolution of public understanding of the issues. He ventured a guess that processes utilizing early and broad education techniques are more effective in facilitating public understanding of the issues than are processes utilizing late and narrow education techniques.

The results were also very helpful with regards to the selection of research methodology. Dr. Virginia Mclaren, of the Department of Geography at the University of Toronto, suggested using a case study approach. She suggested a questionnaire survey to identify public understanding of the issues regarding a particular assessment. The results could then be analyzed with reference to the specific education techniques employed in the assessment. She suggested using either past cases or ongoing cases. She said that very little research has been conducted in this area, particularly using ongoing cases. A key point that she identified was that there are different publics with different needs with respect

to understanding of the issues and with respect to education and information techniques. Dr. Gibson also recommended a case study approach (indicating that ongoing cases would be preferable to past cases) and identified the issue of multiple publics as a key concern.

Another area in which the results of the scoping exercise offered some guidance is with regards to the identification of logistical issues. Dr. M. Husain Sadar, of the Federal Environmental Assessment Review Office, was enthusiastic about the proposed research but he provided a warning not to be unrealistic in the scope of the research. He recommended that the research be restricted to the Canadian federal process and one or two provincial processes, such as Manitoba and Ontario.

1.3.3   GAP IN THE LITERATURE

As reported in chapters two and three, a review of the related literature provides background information on environmental assessment, public involvement, critical pedagogy, adult education and specific education techniques. In the last twenty years the literature in these fields has burgeoned and includes valuable information about:

- the emergence of EA (Jeffery 1991, Jeffery 1993, Rees 1981, Couch 1988);
- the importance of EA (The World Commission on Environment and Development 1987, Canadian Council of Resource and Environment Ministers 1987);
- the nature of EA (e.g., Meredith 1991);
- the rationale for public involvement (Grima and Mason 1983, Gellhorn 1972, Fox 1979, Gibson 1988, Hazell and Osberg 1991, Oakley 1991, Lenny 1976, Chapin and Deneau 1978);
- the temporal dimension of public involvement (Grima 1985, O'Riordan 1976, Bush 1990);
- frequency of use of public involvement techniques (Burton 1979, Wood 1978);
- evaluating public involvement (Arnstein 1969, Parenteau 1988, Sewell and Phillips 1979, Grima and Mason 1983);
- critical pedagogy (Freire 1970 and 1985, West 1993, McLaren and Leonard 1993, Aronowitz 1993, Shor 1993, hooks 1993, Gibson 1994);
- adult education principles (Kirkwood and Kirkwood 1989, Lankshear 1993, Knowles 1980 and 1984, Apps 1991, Pratt 1988 and Imel 1993); and,

- transformative learning (Mezirow 1991, Cranton 1994, Finger 1989, Alexander 1994);
- environmental education (Convergence 1975 and 1977, Usang 1992).

The literature also offers a variety of perspectives on public involvement (Praxis 1988, Amer 1980, Kure 1978, Grima 1977, Creighton et al. 1980, Burdge and Robertson 1990, Emond 1975, Regier et al. 1980, Westman 1985, Glasser et al. 1975, Grima 1985), as well as a range of inventories of involvement techniques, including education techniques. There is also a substantial literature on the rationale for critical education (see, for example, West 1993, Freire 1985, Ellis 1993, Yamaguchi 1993, Marja 1993, Okech-Owito 1993, Gleazer, Jr. 1993, Proulx 1993, Alderson 1992, Thompson 1989, Elliott 1991, and Bregman and Mackenthun 1992).

The literature review did not, however, provide a great deal of information on the evaluation of education techniques used in EA public involvement processes. Evaluations of public involvement processes invariably focus on the amount of power given to the public in the decision-making process, not on the nature and quality of the education dimension of the involvement process. It is often argued that to be effective, efficient and fair, public involvement processes should lean towards a greater degree of citizen power in decision making - rungs 6 to 8 of Arnstein's ladder (Arnstein 1969). What has been largely ignored, however, is that to achieve higher degrees of citizen power, citizens must have a firm understanding of the decision making process of which they are a part. The cliche, "knowledge is power", has a significant element of truth to it.

Schibuola and Byer (1991) deal with the evaluation of a specific technique, the knowledge-based system. A number of authors have written about techniques used in other environmental contexts (Fortner and Lyon 1985, Oduaran 1989, Mcleod 1987, McCallum 1991). Glasser et al. (1975) attempted a comprehensive evaluation of public involvement techniques generally, but have been criticized for their choice of evaluation criteria and for their choice of evaluation methodology based on subjective opinions of experts (Grima 1985).

As a result, this research evaluates education techniques used in the specific context of public involvement in EA. It also introduces the concept of critical EA education and presents an analysis of EA education techniques within the framework of critical education.

1.3.4 LITERATURE REVIEW

The first objective of this research was to identify the range of techniques used to conduct education about EA. This was accomplished through a review of the literature including academic works, government documents, practice-oriented handbooks, the Internet, reports published in the non-profit sector by community activists and EA legislation in three Canadian jurisdictions. All source documents were collected and reviewed to identify the range of techniques used to conduct education about EA. Techniques identified are presented in tabular format.

The literature review also provided background on critical pedagogy, transformative learning and environmental education. These concepts were used to introduce critical EA education and provide a framework with which to analyze EA education techniques.

1.3.5 CASE STUDY

1.3.5(1) INTRODUCTION

Informal interviews with officials of Manitoba's EA authority (Manitoba Environment) were conducted for the purpose of selecting an appropriate EA case. Once the case was selected, surveys were conducted to collect primary, normative data. The source of the data was the experiences of the assessment participants. Participants were defined to include a variety of "publics" such as individuals who were peripherally involved, individuals who made the formal record, interveners, the proponent and the EA authority. All participants were surveyed but a non-random sample emerged through a self-selection process. The precise survey methodologies used were informal interviews, structured interviews and questionnaires.

1.3.5(2) INFORMAL INTERVIEWS

Informal interviews with Manitoba Environment officials were conducted for the purpose of selecting an appropriate EA case. The interviews were held in February and March 1995 with three officials: Larry Strachan, Director, Environmental Approvals, Manitoba Environment (February 21, 1995); Dan McNaughton, Manager, Environmental Land Use Approvals, Environmental Management Division, Manitoba Environment (February 21, 1995); and, Bruce Webb, Water Development and Control Assessment

Officer, Environmental Approvals, Manitoba Environment (March 9, 1995).

The interviews did not follow a structured schedule. They were informal in nature, focussing on the overall research objectives and on the task of selecting an appropriate case for study. In selecting the case the following criteria were used:

- the recency of the case, with recency being valued positively;
- the number of participants in the case, with greater numbers being valued more positively (generally speaking);
- the nature of the participants in the case, with diversity being valued positively;
- an initial assessment of the range of education techniques used in the case, again with diversity being valued positively;
- whether the entire EA process was applied in the case or whether the case ended in mid process, with higher value being placed on cases in which the entire process was invoked; and,
- the first language of the majority of participants in the case, with higher value being given to cases involving participants whose first language is English; and,
- the accessibility of the majority of participants in the case, with higher value being given to cases involving participants located in southern Manitoba.

A number of fairly suitable EA cases were canvassed during the interviews but the Pembina Valley Water Supply System emerged as the most appropriate case for study.

1.3.5(3)   STRUCTURED INTERVIEWS

Once the case was selected, structured interviews were conducted with a non-random sample of individuals and organizations who participated in the case. The objectives of the interviews were to identify the specific education techniques used by each of the interview subjects during the environmental assessment of the Pembina Valley Water Supply System (Manitoba Environment File No. 3269.00) and to solicit opinion on improving education about EA.

The interviews were organized and conducted based on a modified version of the protocol suggested by Leedy (1989). Letters of introduction were mailed, follow-up phone calls were made, appointments were booked and questions were distributed beforehand. The point of departure from Leedy's protocol is that the interviews were not recorded.

The interview questions and the covering letter are included as Appendix A. Of course, each letter and interview were personalized for the subject of the interview. Foddy (1993) was followed in the design and construction of questions. The checklist in Appendix B was used as a guide to eliminate or mitigate major sources of variability in how respondents interpreted the questions. More detail on question design is provided in section 1.3.5(5).

The interview subjects were selected after reviewing documents from the Pembina Valley case and consulting with Bruce Webb, Water Development and Control Assessment Officer, Environmental Approvals, Manitoba Environment. In making the selections, consideration was given to those key participants who might reasonably have engaged in public education activities. Consideration was also given to ensuring some degree of balance in the points of view presented during the interviews. In the end, interviews were conducted with the proponent (the Pembina Valley Water Supply Cooperative), a consultant retained by the proponent, the provincial EA authority (Manitoba Environment), an interested federal agency (the Prairie Farm Rehabilitation Administration) and two key interveners (Central Plains Inc. and the City of Winnipeg) (Table 1).

Table 1: Particulars of the Structured Interviews of Selected Case Participants

Interview Subject	Organization	Role in Assessment	Date of Interview
Bruce Webb	Manitoba Environment	provincial EA authority	March 22, 1995
Manfred Samp	Prairie Farm Rehabilitation Administration (PFRA)	lead federal initiating department	March 29, 1995
Sam Schellenberg	Pembina Valley Water Cooperative Inc.	proponent	March 29, 1995
Ron Roteliuk Ken Arundel	Central Plains Inc.	intervener	April 11, 1995
Hugh MacKay	Private Consultant	retained by the proponent	April 12, 1995
Mike Shkolny	City of Winnipeg	intervener	May 17, 1995

1.3.5(4) QUESTIONNAIRE INSTRUMENT

Upon completion of the interviews, the questionnaire survey was conducted. The objectives of the survey were to identify the education techniques used in the Pembina Valley Water Supply System case, assess participant knowledge about environmental assessment and the Pembina Valley Water Supply System case and explore respondent views on EA education.

The questionnaire instrument included a combination of open and close-ended questions. The document was entitled 'SURVEY OF VIEWS OF PUBLIC EDUCATION ON ENVIRONMENTAL ASSESSMENT (EA) IN THE PEMBINA VALLEY WATER SUPPLY CASE'. The first 12 questions dealt specifically with the case and divided the EA process and the case into a number of stages, working back in time from the most recent stage (Report on Public Hearings) to the earliest stage (Proposal). The case was divided like this to provide structure to the questionnaire but the entire case was of interest, from beginning to end. The second part of the instrument was entitled 'QUESTIONS ABOUT EA EDUCATION' and consisted of 7 questions.

The distribution protocol included using an introductory letter, questionnaire document, self-addressed, stamped, return envelope and a reminder letter (Leedy 1989). Again, Foddy (1993) was followed in the design of the questions. Copies of the introductory letter, the questionnaire instrument and the reminder letter are included as Appendix C.

The questionnaire was pretested on a small population in a pilot study. The pilot population consisted of a small number of government and private sector officials, academics and citizen participants. Each item was quality tested for precision of expression, objectivity, relevance, suitability to the problem situation and probability of favourable return. Members of the pilot population were also asked to comment on what other questions they would be interested in seeing included in the questionnaire.

As indicated earlier, the surveys were sent to all individuals who participated in the EA case being studied. Sample data was obtained from 34 individuals who responded to the survey through a non-random, self-selection process. Table 2 provides details about the population size, sample size and response rate.

Table 2:   Population, Sample and Response Details of the Questionnaire Survey

population size (N)		111
# of questionnaires mailed	108	
# of questionnaires returned unopened	8	
effective mailout (eN)	100	100
# of questionnaires returned	33	
# of phone interviews	1	
sample size (n)	34	34
return rate (n/N)		0.31
effective return rate (n/eN)		0.34

The questionnaire survey results were compiled, analyzed and evaluated. The education techniques used in the case were analyzed in the context of critical EA education. The knowledge of individuals who were peripherally involved was compared with that of individuals who were more intimately involved. Knowledge of EA process was assessed against the statutory and regulatory bases of the process. In addition, levels of knowledge of EA generally, the Manitoba EA process in particular and the specific case at hand were analyzed in relation to the education techniques employed.

1.3.5(5)   QUESTION DESIGN

With regards to both the structured interviews and the questionnaire survey, this research adopted Foddy's (1993) symbolic interactionist approach to question design. Symbolic interactionists claim that individuals in any social situation constantly negotiate a shared definition of the situation. They take one anothers' viewpoints into account and interpret one anothers' behaviour. They construct alternatives for interaction before ultimately selecting lines of action. Symbolic interactionism offers a model of question-answer behaviour that incorporates methodological assumptions underpinning past survey research. It also incorporates criticisms made of the stimulus-response survey model and the major criticisms of both qualitative field research and survey research.

The key assumption in the symbolic interactionist model of question-answer behaviour is that successful communication cannot occur unless a question is understood

by the respondent in the way the researcher intended, and the answer is understood by the researcher in the way the respondent intended. Respondents are not viewed as passive agents. They are seen as actively negotiating a shared definition of the situation with the researcher; the two parties exhibit a "reflexive intelligence" as they negotiate the meaning of both questions and answers (Foddy 1993).

The symbolic interactionist view of question-answer behaviour has clear implications for the construction of questions for interviews and questionnaires. The most basic implication is that it is crucial for the researcher to clearly define the research situation. If this does not occur, respondents will search for contextual clues and will even make guesses to help them understand the situation. Similarly, the researcher should indicate precisely what kind of information is required. Again, if this is not done, the respondent will turn to contextual clues. Finally, the researcher needs to express the question in a clear and concise manner and if he or she does not do so, respondents will do their best to clarify the question for themselves.

If respondents are forced to search contextual clues to gain an understanding of the research situation and of the questions being posed, different respondents may turn to different clues. This can become a significant source of variability in how respondents interpret research questions. The matter is exacerbated by other sources of variability such as when researchers fail to specify which dimensions of the research topic they want the respondents to address. Or, when they fail to indicate whether responses should be made in individual or collective terms.

Significant variability in how respondents interpret questions negates the validity of comparing answers across respondents and can undermine the validity of a research project. Foddy (1993) advocates a number of measures in the design and construction of questions to eliminate or mitigate major sources of variability.

Appendix B presents a comprehensive checklist of rules to help in the formulation of questions. The checklist is an amalgamation of lists prepared by a number of authors cited in Foddy (1993): Cantril and Fried (1944), Selltiz et al. (1965), Hunt et al. (1982) and Belson (1986). The checklist proved to be of great use in this research; a summary of the measures adopted is presented below.

Attention was paid to clearly defining the information required. The topic, education regarding environmental assessment, was defined and respondents were instructed to orient themselves to the topic in terms of specific dimensions. Also, the kind of information required about the topic was explicated to ensure the data collected would satisfy the reason for the research. Filter questions, both middle alternatives and pure filters, were used to establish the relevance of the questions to each respondent and to emphasize that it was acceptable for the respondent to not answer the question.

The research followed the general rule of thumb that one should not ask respondents to recall fine details about highly salient events that occurred more than a year in the past or events of low salience that occurred more than one month in the past. In addition, steps were taken to facilitate accurate recall. Every attempt was made to use cues in preliminary questions to help elicit answers in subsequent questions. As well, respondents were asked to recall events starting with the most recent and working back in time. To alleviate short-term memory failure and to avoid comprehension difficulties, concise questions were presented in a slow, methodical fashion.

Every attempt was made to avoid structural complexities such as an overabundance of informative or substantive words, hidden or implied questions, extraneous clauses, phrases and instructions and double or complex single negatives. Attention was paid to using language that is understandable, specific, concrete and free of ill defined evaluative terms. The reasons for asking the questions were fully explained. Leading questions were avoided to minimize the risk of forcing explicit or implied presuppositions on the respondents.

Efforts were made to ensure that response options were complete, balanced and relevant to the respondents. In addition, the number of response options per question was chosen with a mind to mitigating primacy and recency effects. Finally, attention was paid to ensuring that when scales were used they were congruent with the respondents' experiences.

Gallup's (1947) quintamensional plan of asking the most general questions first was followed. This mitigated the problem associated with previous specific questions influencing the way respondents interpret subsequent general questions. Whenever

possible the question specified the perspective that respondents should have in mind when giving their answers. This provided a response framework which "assists the respondent in assessing the quality and type of information sought" (Briggs 1986:54).

In an attempt to address question threat, measures were taken to increase the respondents' trust, to emphasize the social significance of the answers and to stress confidentiality. A combination of open and closed ended questions were used. Open questions were used during qualitative interviews preceding the formulation of fixed-choice questions. They were also used at later stages to interpret responses to the closed questions. Special attention was paid to questions measuring attitudes. The relevance of each item to the respondent was established through the use of a filter. Labels were included for both the end categories and the middle category. The respondents were explicitly instructed to provide respondent centred responses.

1.3.5(6)   CASE STUDY SUMMARY

The second and third objectives of this research were to identify the specific techniques used in a recent Manitoba sample case and to evaluate the knowledge about EA held by selected participants in the Manitoba sample case. These were accomplished by using three methodologies: informal interviews with officials of the provincial EA authority to select an appropriate case for study; structured interviews with selected participants from the EA case; and a questionnaire survey of the rest of the participants from the case. The objective to identify the specific techniques used in a recent Manitoba sample case was also furthered by reviewing relevant documentation from the sample case.

1.3.6   RESEARCH METHODOLOGY SUMMARY

By using four methodologies viz. literature review, informal interviews, structured interviews and questionnaire surveys, data were collected from key players on the EA public involvement stage. The analysis and synthesis of this data, leading to a set of recommendations concerning education about EA, fulfil the general purpose and four objectives of this research. The general approach and major steps of the research are summarized in Figure 1.

```
┌─────────────────────────────────────────────────┐
│  INITIAL LITERATURE REVIEW  &  SCOPING EXERCISE   │
│            ⇨ provide background                   │
│            ⇨ focus the research                   │
│            ⇨ identify the gap in the literature   │
│                        ⇩                          │
│              LITERATURE REVIEW                    │
│   ⇨ identify the range of techniques used to      │
│      conduct public education about EA (objective i)│
│   ⇨ provide background for the concept of         │
│      critical EA education                        │
│                        ⇩                          │
│  CASE STUDY: case file review, informal and       │
│     structured interviews, questionnaire survey   │
│   ⇨ identify the specific techniques used in the  │
│      sample case (objective ii)                   │
│                        ⇩                          │
│                   ANALYSIS                        │
│   ⇨ evaluate participant knowledge (objective iii)│
│   ⇨ use critical EA education to analyze EA        │
│      education techniques                         │
│   ⇨ make recommendations for improving education  │
│      about EA (objective iv)                      │
└─────────────────────────────────────────────────┘
```

Figure 1:   The General Approach and Major Steps of the Research

1.4   BOUNDING THE RESEARCH

1.4.1   DEFINITIONS

EA and the notion of public involvement in the EA process are recent developments in the field of natural resources management (Jeffery 1993). Consequently, fundamental principles are rapidly evolving and key terms are often not clearly defined. The same term used by different authors sometimes refers to similar but not identical concepts. Therefore, to avoid confusion, it is essential to present clear and concise definitions of the key terms and concepts which were explored in this research. Indeed, according to Mitchell (1979), presentation of standardized definitions for key concepts is a necessary condition of clarity.

EA: Environmental assessment is often used synonymously with environmental impact assessment or E.I.A. A variety of definitions are proposed in the literature and used in the legislation (e.g., Jeffery 1991, Meredith 1991, Sections 1(d) and 5(3) of The Environmental Assessment Act, R.S.O. 1980, c. 140, Section 2(1) of The Canadian Environmental Assessment Act (CEAA), S.C. 1992, c.37). Generally, the definitions offer variations on one fundamental theme, the essence of which is captured by the Canadian Environmental Assessment Research Council (1988): EA is a process that requires and facilitates the incorporation of environmental concerns into the planning of an undertaking that has potential significant impacts on existing socioeconomic and biophysical conditions. The Council's definition of EA is adopted in this research with the following proviso: that "planning" is broadly defined to include consideration of the need for and alternatives to the proposed undertaking.

Public Involvement: Used synonymously with public participation. There is a wide range of opinion regarding the nature of public involvement (Oakley 1991, Amer 1980, Kure 1978, Grima 1977). For the purposes of this research the definition offered by Praxis (1988), with one slight modification, captures the essence of the notion: public involvement is the process by which the views of all parties interested in an agency's decision are integrated into the planning and decision making process.

Critical EA Education: This research introduces the notion of critical EA education. Based on the theory of critical pedagogy, critical EA education encompasses the codependent concepts of "education about EA" and "education through EA". The former provides the foundation for the latter, while the latter gives substance and real meaning to the former. Taken together, they compose critical EA education the main goal of which is empowerment and social action. These concepts are explored more fully in Chapter three.

1.4.2   BASIC CONCEPTS (OR ASSUMPTIONS)

There are two fundamental concepts (or assumptions) that provide the foundation for this research. They are briefly discussed below and more thoroughly examined in the review of related literature. The first is almost a truism: EA is an integral component of effective natural resources management. The second is also well established in the literature: public involvement is an integral component of effective EA.

A third concept that is related to the first two is that critical EA education is an integral component (in fact, a precondition) of effective public involvement. This assertion is not well established in the literature but is central to the primary thesis of this research. The interrelationships of these concepts are illustrated in Figure 2.
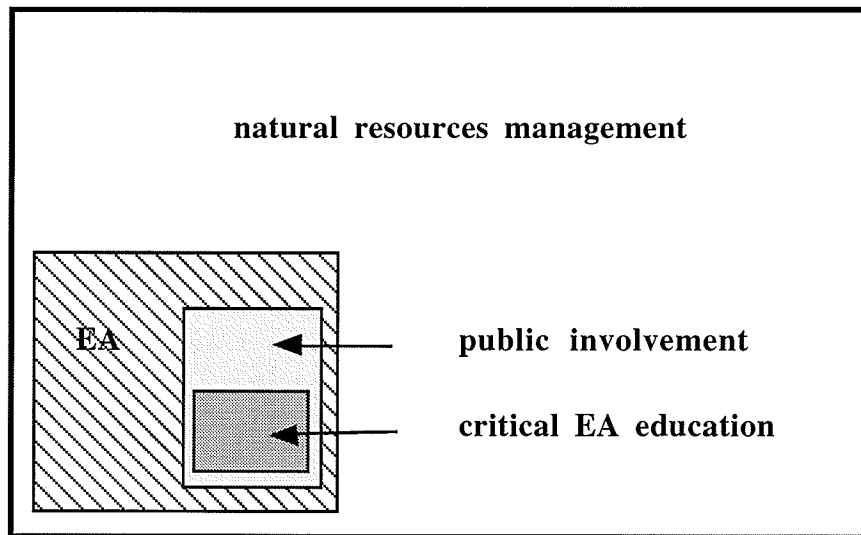
Figure 2: The Interrelationship of Natural Resources Management, EA, Public Involvement and Critical EA Education

1.4.3   LIMITATIONS

Significant limitations affecting this research relate to the size of the population (N = 111), the size of the sample (n = 34), and the nature of the sample (non-random, self selecting). These characteristics made it impossible to conduct inferential statistical analysis or to test the significance of the correlations determined using nonparametric statistical analysis. Another significant limitation relates to the representativeness of the sample case studied. The case was selected using the criteria listed earlier, therefore, it is not known how representative the sample case is of all EA cases conducted in Manitoba.

1.5   ORGANIZATION

This practicum is organized into six chapters. Chapter one provides an introduction, states the research objectives, presents the research methodology and sets the bounds of the research.

Chapter two begins the review of related literature. It provides background on the emergence and importance of EA, the rationale and nature of public involvement in EA and the evaluation of public involvement processes.

Chapter three continues the review of the related literature. It sets the stage for critical EA education by reviewing the theory of critical pedagogy, basic adult education principles and related aspects of environmental education. It introduces critical EA education by examining the nature of the concept, its basic elements and dynamics and its rationale. Chapter three also includes a catalogue of education techniques available for use in EA process and a critical analysis of those techniques.

Chapter four introduces the Pembina Valley Water Supply System case. It explains how the case was selected and summarizes the facts and outcome. It also presents the education techniques used in the case and a critical analysis of the techniques.

Chapter five continues the analysis of the Pembina Valley case. It presents an assessment of participant knowledge with a focus on four crucial variables: readership rates of "dominant documents", knowledge of process-related information, critical consciousness and level of participation in the public hearing process. It also examines respondent views on EA education.

Chapter six concludes the practicum and formulates recommendations based on an analysis of participant knowledge, having reference to the theoretical basis of critical EA education.

The appendices include the interview questions and covering letter, the checklist used to aid the formulation of questions and the questionnaire instrument with both covering and reminder letters.

CHAPTER 2: EA AND PUBLIC INVOLVEMENT

2.1   THE EMERGENCE OF EA

In the 1960's the predominant method of environmental management in North America was the regulatory approach. This approach focused on the regulation of injurious environmental impacts by means of enforcing legislated environmental standards (Jeffery 1991). Towards the end of the decade it became apparent to legislators that this approach was only effective in terms of abatement. Policy makers began to realize that the regulatory approach was essentially restorative in nature rather than preventative (Jeffery 1993).

This issue was first addressed in the United States in 1970 with the passage of the National Environmental Policy Act, 83 Stat. 852, 42 U.S.C.A. §4321 (Couch 1988). This statute introduced preventative measures to the environmental management regime by incorporating the notion of environmental assessment. In terms of both methodology and purpose, EA represented a fundamental departure from the regulatory approach; with the focus changing from regulation and control to planning and prevention (Jeffery 1991).

EA first appeared in Canada at the federal level with the issuance of a series of Cabinet directives in 1972 and 1973 (Rees 1981). The directives were amended twice in the late 1970's and promulgated in 1984 by Order-in-Council as the Environmental Assessment Review Process Guidelines Order, SOR/84-467. The Canadian Environmental Assessment Act (CEAA), S.C. 1992, c.37, which replaced the Guidelines Order, came into force in 1994.

The first province to enact comprehensive EA legislation was Ontario, which passed The Environmental Assessment Act, R.S.O. 1980, c.140 in 1975. In Manitoba the Provincial Cabinet, rather than enacting legislation, issued a policy statement, the Environmental Assessment and Review Process, on November 12, 1975. This was in effect until it was replaced by The Environment Act, S.M. 1987-88, c.26, Chap. E125 on March 31, 1988. At the present time Manitoba's EA process is based on the Environment Act and four regulations. By the 1980's most Canadian jurisdictions had either enacted some form of EA legislation or had issued EA policies supported by effective and integrated procedures (Couch 1988).

2.2   THE NATURE OF EA

2.2.1   SIGNIFICANCE

The World Commission on Environment and Development (the Brundtland Commission) (1987) recognized the vital link between environmental and economic survival. It emphasized that environmental matters must be at the centre of decision making, integrated into all questions of economic development. Without such an approach the present generation will limit or deprive future generations of the freedom to choose their preferred lifestyle. Among its recommendations for change, the Commission expressly identified EA as a valuable decision making tool.

The importance of EA in Canada was confirmed by the Canadian Council of Resource and Environment Ministers. The report of the Council's National Task Force on Environment and Economy endorsed the principles enunciated by the Brundtland Commission and articulated a number of recommendations, among which was a call for the use of EA as a tool to attain sustainable development (Canadian Council of Resource and Environment Ministers 1987).

2.2.2   DEFINITIONS

A variety of definitions for EA are proposed in the literature and used in the legislation. An interesting and rather comprehensive definition can be found in Ontario's, The Environmental Assessment Act, R.S.O. 1980, c. 140. According to sections 1(d) and 5 (3), an EA is a description of the following:
- the project in question and its rationale;
- the purpose of the project;
- alternatives to the project and their rationales;
- alternative means of carrying out the project and their rationales;
- the environment that might reasonably be affected;
- the environmental effects that might reasonably be expected to be caused; and,
- mitigative actions necessary to prevent the environmental effects.

The legislation also provides a comprehensive definition of environment, which is a key term in the definition of EA. According to section 1(c), "environment means, (i) air,

land or water, (ii) plant and animal life, including man, (iii) the social, economic and cultural conditions that influence the life of man or a community, (iv) any building, structure, machine or other device or thing made by man, (v) and solid, liquid, gas odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities of man, or (vi) any part or combination of the foregoing and the relationships between any two or more of them,...".

As stated in Chapter one, the definition used in this research is an amended version of the the one proposed by the Canadian Environmental Assessment Research Council (1988). This definition reflects a broad and anticipatory approach: EA is a process which is intended to require and facilitate the incorporation of environmental concerns in the planning (including consideration of need and alternatives) of an undertaking that has potential significant impacts on existing socioeconomic and biophysical conditions.

2.2.3   DESIGN PRINCIPLES

Based on the evolution of environmental assessment, Gibson (1993) identifies eight interdependent principles for the design of effective EA processes in Canada. The principles are based on a broad, anticipatory view of EA and cover a variety of considerations such as encouragement of open environmentally sound decision making, administrative manageability, cultural sensitivity and encouragement of methodological improvements in assessment studies.

The principles, which the author suggests should be considered as a single package, reflect expectations that EA will:

* be consistent with the objectives of sustainable development;
* be applied across the board to all environmentally significant undertakings;
* include an assessment of alternatives rather than just acceptable proposals;
* be mandatory and have requirements that are clearly specified;
* facilitate public participation and open decision making;
* meaningful enforcement and monitoring provisions;
* permit efficient implementation; and,
* be integrated with a broader regime of environmental management and regulation.

It is important to note that few, if any, current EA processes in Canada respect more than two or three of these principles (Gibson 1995).

2.2.4   BENEFITS

Proper assessment methods are meant to minimize the costs associated with achieving what is taken to be necessary. Through EA we ensure that externalities are identified, evaluated and incorporated into the decision making process and thereby ensure that the total social costs of any particular development activity are not unacceptable (Meredith 1991).

According to Sinclair (1992), EA is an exercise in environmentally enlightened decision making. A source of this enlightenment is specific research on the existing environment and on how it could be affected by proposed undertakings. A benefit, therefore, of proper assessment processes is that our existing base of scientific knowledge is increased. Assessment enriches understanding of ecological systems, natural resources and resource use and development.

EA also has a number of benefits for environmental quality. It reduces the probability of unforeseen negative consequences arising from project development. It facilitates the identification of needs to prepare for predicted negative effects. It allows for the project to be implemented in a way that will avoid or mitigate predicted negative effects. If the EA is sufficiently broad and anticipatory, it can also illuminate environmental factors for consideration in project design or in selection among alternative project designs. It can also inform consideration of various alternative ways of responding to a perceived need or opportunity and possibly encourage reevaluation of the perceived need. Finally, it encourages government authorities and developers to take actions that promote sustainable development (Sinclair 1992).

As described earlier, this research accepts that public involvement and critical EA education are integral components of environmental assessment. Given that critical EA education embraces both education about EA and education through EA, it becomes evident that environmental education for certain segments of the population is another potential benefit of EA.

2.3   THE RATIONALE FOR PUBLIC INVOLVEMENT

A significant literature exists regarding the rationale for public involvement in EA. Grima and Mason (1983) have identified four basic positions which help synthesize the diverse views expressed by a range of authors.

The first position may be classified as "political-philosophical". This position states that public involvement is consistent with the concepts of government in the public interest and citizen participation in the governing process. According to Gellhorn (1972), these concepts are firmly embedded in the principles of democracy. Indeed, a consideration of legitimate public concerns represents the most basic means of strengthening the precepts of democracy (Fox 1979).

Related to the "political-philosophical" position are arguments based on justice or fairness. According to Gibson (1988), one of the key criteria for evaluating an EA process is fairness and according to the Canadian Environmental Assessment Research Council (1988), a requirement of fairness is that all stakeholders have equal opportunity to influence a decision before it is made.

The second position may be labelled as the "improved planning" position. This is a pragmatic view which holds that public involvement is an *effective* technique for improving decision making. This may be at the heart of the proposition that significant public involvement is one of the essential elements for an effective EA process (Hazell and Osberg 1991).[1] It also appears to be at the heart of Oakley's (1991) view that arguments for greater public involvement should not be based purely on idealistic, humanitarian or egalitarian grounds. Greater involvement is important to increase project efficiency and effectiveness and to increase the numbers who potentially can benefit from development.

A version of the "improved planning" position has been forcefully presented by Lenny (1976), who argues that public involvement contributes to the success of the administrative decision making process in the following manner:

- public involvement helps prevent "capture" of the administrative tribunal by the industry being regulated, and tends to produce more balanced decisions;

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[1]. Effectiveness is one of the key criteria for evaluating an EA process. The others are efficiency and fairness (Gibson 1988).

- since the administrative tribunal is meant to be fair, it is necessary for the public to become involved so that concerns other than those of the industry will be heard, and therefore traditionally unrepresented interests will be expressed;

- increased public involvement will promote public confidence in the process;

- increased public involvement and scrutiny encourages efficiency and the production of policies and decisions that are responsive to the needs of the public;

- the threat of appeal or review posed by public interest interveners can produce greater accountability; and,

- the capacity of the public to intervene allows for challenge of illegal or invalid actions or decisions before they come into force.

The third position identified by Grima and Mason (1983) may be classified as the "political market" position. Under this view, in a "pluralistic-elitist-equilibrium-democratic" political system, public involvement is a commodity in the political market place where goods are supplied by politicians and demanded by the electorate.

The fourth position is the "political conflict-resolution" position in which public involvement is viewed as a means to help resolve conflicts or to make difficult political decisions more acceptable. Consistent with this view is Richardson et al.'s (1993) observation that theorists affirm the importance of public participation for revealing value conflicts and value diversity. Also consistent is Chapin and Deneau's (1978) comment that public involvement is an irreversible fact in modern societies and,

> "...the only choice facing government at all levels is whether to invite such participation at every stage of the decision-making process, in an atmosphere of cooperation, or whether to encounter participation after the fact, in an atmosphere of hostility.".

2.4   THE NATURE OF PUBLIC INVOLVEMENT

2.4.1   BASIC TERMS

There is a wide range of opinion regarding the nature of public involvement. There is also uncertainty about the definition of the basic terms. Oakley (1991) has suggested that it is impossible to give one definitive description of participation. Kasperson and Breithart (1974) question whether the term has any intrinsic meaning.

The term public presents its own difficulties, although the concept of multiple publics now appears to be generally accepted. According to this view, the public is a constantly shifting multiplicity of organizations, individuals, interests and coalitions. The public can be segmented, i.e., there are many publics, rather than *the* public (Praxis 1988).

2.4.2   GENERAL PARADIGMS

In spite of the uncertainty in the literature, general paradigms respecting public involvement can be discerned. Some view public involvement largely as a form of public relations or a type of communications strategy (Amer 1980).

Others view it as a more substantive and fundamental aspect of administrative decision making (Kure 1978). A proponent of the latter view, Grima (1977) has defined public involvement as an interconnected complex of activities by government, the courts, appointed boards and the public. The four modes of public involvement are: i) the election of representatives to influence legislation and administration; ii) litigation; iii) information dissemination and education; and, iv) public consultation.

Creighton et al. (1980) also take a substantive approach to the issue. They treat the assessment process as a holistic cost-benefit analysis which includes public involvement, environmental assessment, social assessment and economic-demographic assessment. They view public involvement as the framework for the integration of the assessment process by providing the focus for exchange of information between decision makers and affected sectors of the publics.

In a somewhat similar approach, Burdge and Robertson (1990) argue that public involvement is an integral and necessary part of the social impact assessment process. Public involvement provides the assessor with a means to obtain quantitative information about social impact assessment variables. Beanlands and Duinker (1983) see public involvement as crucial in ecological assessment, especially in the identification of "valued ecosystem components".

Some observers are highly critical of participation initiatives: "...without exception it seems, they have been little more than fraudulent deceits, designed to defuse protest, co-opt the public, and enable the government, later, to say that it consulted the people." (Rutkowsky and Russ 1992, cited in Richardson et al. 1993:19). This view is consistent

with Ashforth's argument that governments create commissions of inquiry and similar forums to placate the public by making people believe they have power they do not really have (Ashforth 1990, cited in Richardson et al. 1993). It is interesting to contrast this view of public involvement with the view often held by representatives of business interests that public participation prolongs an already tedious and cumbersome environmental approval process.

2.4.3   ANALYSES OF FORMS OF PUBLIC INVOLVEMENT

Parenteau (1988) argues that analyses of forms of public involvement may be divided into those that proceed by analyzing the way the public is brought into the process and those that distinguish the types of decisions reviewed under the process. He cites (Grima 1977) as an example of the former and Emond (1975) as an example of the latter.

Emond identifies three types of decisions on a continuum: i) policy making; ii) administrative decisions regarding regulatory checks; and, iii) policy implementation. Each of these types of decisions requires a different type of public involvement. In the case of policy making decisions, the legislature offers the best forum for public involvement because it enables the public to participate through its elected representatives. With respect to administrative decisions, Emond argues that formal quasi-judicial procedures offer the most effective means of public involvement. Finally, in the case of policy implementation decisions, which deal with technical and economic matters, public involvement should be general and decisive for generating alternatives and reaching the final decision.

2.4.4   INVENTORIES AND TAXONOMIES

Some authors, in the course of their analyses, have listed and described a wide range of specific involvement techniques and a variety of involvement taxonomies. Praxis (1988), presents a comprehensive inventory classified according to the degree of public influence or power inherent in each technique (Table 3).

Regier et al. (1980) present their own catalogue, classified according to degree of administrative formality. Westman (1985) offers a classification framework founded on the extent to which the technique provides power to the public over the ultimate decision (Table 4). This approach is based on Collins (1978) and Lang and Armour (1980).

Table 3: Public Involvement Techniques Classified According to the Degree of Public Influence/Power Inherent in Each Technique

- public education/information: the use of information dissemination and general instruction to create an awareness of an EA process and related issues

advertising	brochures	citizen training programs
contests/events	direct mail	exhibits/displays
news conferences	newsletters	newspaper inserts
news releases	political previews	position papers
publications	publicity	public service announcements
reports		

- information feedback: the distribution of information on a policy position and the request for public input regarding the position

analyzing public involvement data	briefs
community or social profiles	computer based participation
content analysis	focus groups
interviews	policy profiling
polls	questionnaires
written submissions	

- consultation: the use of two way communication based on initially established mutually accepted objectives

brainstorming	coffee klatches	conferences
Delphi Process	dialogues	field offices
large meetings	nominal group process	open houses
panels	participatory television	phone lines
public meetings	simulation games	technical assistance
town meetings	trade off games	workshops

- extended involvement: where the public is given a voice on decision making bodies and has an influence on the decision;

  | advisory committees | charrettes | task forces |

- joint planning: shared decision making, i.e., processes where the public agrees to the decision

  | arbitration | conciliation | mediation |
  | negotiation | Niagara Process | |

(After Praxis 1988)

Table 4:   Inventory of Public Involvement Techniques Classified According to the Extent
to Which the Technique Provides Power to the Public Over the Ultimate
Decision

Techniques	Public power in decision making	Advantages	Disadvantages
Information Feedback			
slide or film presentations, information kit, newspaper account, notices	nil	informative, quick	no feedback, subject to bias
Consultation			
public hearing, ombudsman, representative	low	allows two way communication, allows limited discussion	does not permit ongoing communication, time consuming
Joint planning			
advisory committee, structured workshop	moderate	permits ongoing input and feedback, increases public education and involvement	time consuming, dependent on information provided by planners
Delegated authority			
public review board, public planning commission	high	permits better access to relevant information and better control over options and timing of decisions	long-term time commitment, difficult to include wide representation on small boards

(After Westman 1985)

Westman also suggests that an important way to view involvement techniques is by the sector of the public that will be encouraged to participate by each technique.

Glasser et al. (1975) present a catalogue divided into six operational groups including large group meetings, small group meetings, organizational approaches, media, community interaction and legal mechanisms. Finally, Grima (1985) proposes classifying

techniques by distinguishing between: i) the objective of building community consensus and informing the public about issues; and, ii) the objective of enhancing adequate representation of conflicting interests in some adversarial process.

2.4.5   FREQUENCY OF USE

The literature also reveals data regarding frequency of use of public involvement techniques. In a Canadian study Burton (1979) examined 96 cases and reported that the most common technique used was the public meeting (about 66% of the cases). Advisory groups and task forces were used in about 35% of the cases (see Table 5). It is interesting to note that an American study (Wood 1978) also revealed that the most often used technique (43%) was the public hearing/information meeting.[2] Wood examined 901 cases of public involvement efforts in highway planning in the United States.

Table 5:   Frequency of Use of Involvement Techniques

Technique	Number of Cases
public meetings	54
advisory groups/task forces	38
technical/professional advice	34
telecommunications	32
workshop/seminar	24
surveys	13
public hearings	9
petitions	5
votes/plebiscites	3
litigation	2
direct confrontation	1
role playing/gaming	1
expert panels	0

(After Burton 1979)

2.4.6   THE TEMPORAL DIMENSION

An interesting aspect of the nature of public involvement is the temporal dimension. According to Grima (1985), public opinion may vary widely depending on the time of involvement. Traditionally, involvement programs are designed to end at the point when a

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[2.] According to Westman (1985), these are techniques involving low levels of delegation of power and low levels of representativeness.

decision is made rather than to be carried through to the implementation stage (O'Riordan 1976). However, recent research has indicated that there is merit to the notion of post-approval public involvement (Bush 1990). With regards to the precise timing of specific involvement techniques in both the pre- and post- approval phases, there appears to be a need for further research.

2.5   EVALUATION OF PUBLIC INVOLVEMENT

Any discussion respecting theoretical frameworks for the evaluation of public involvement must begin with Arnstein's (1969) seminal work which proposes an analytic grid to evaluate forms of public participation and to examine the power the public can exercise over decision-making processes. Her grid, or "ladder", consists of 8 rungs. Levels 1 and 2 are aimed at educating or "civilizing" the public and do not represent true forms of public participation. Levels 3 and 4 involve information sharing. Participation at these levels may have no effect since the public gives information or advice only and cannot monitor whether its input had an effect on the decision. At level 5 the public may comment on the final decision but it still does not share in the decision-making power. Levels 6, 7, and 8 involve some degree of citizen power. At level 6 the public may negotiate and bargain over the effects of the decision. In level 7 public representatives are in the majority on decision-making tribunals or committees. Level 8 grants citizens full administrative control. Figure 3 summarizes Arnstein's ladder of real public power over the decision in participatory processes.

8)	Citizen Control	{	
7)	Delegated Power	{	*Degrees of Citizen Power*
6)	Partnership	{	
5)	Placation	{	
4)	Consultation	{	*Degrees of Tokenism*
3)	Informing	{	
2)	Therapy	{	
1)	Manipulation	{	*Nonparticipation*
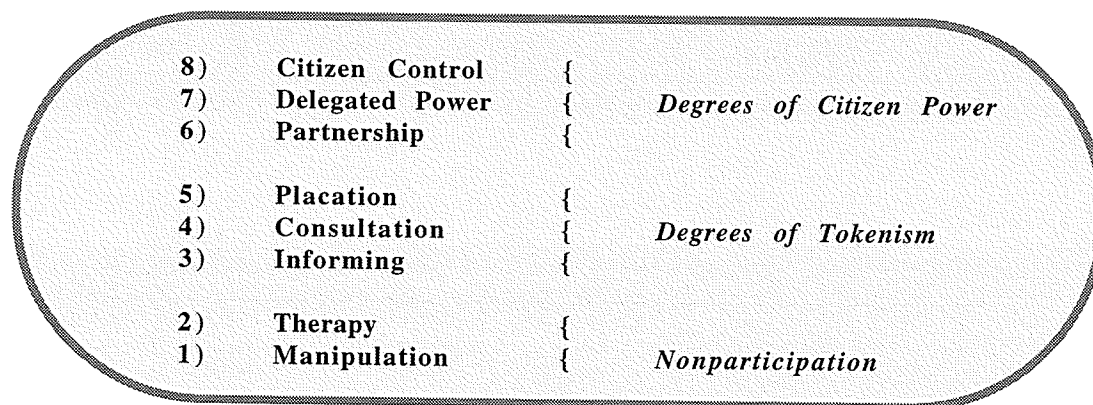
Figure 3:   A Ladder of Public Power Over the Decision in Participatory Processes
(After Arnstein 1969)

In a more recent analysis, Parenteau (1988) proposes an evaluation schema for public involvement in EA procedures, developed to measure the degree of citizen control. It involves the analysis of the procedures using five criteria: i) position/location in the process; ii) form of participation; iii) openness of the procedure; iv) control over the procedure; and, v) thrust and style of the process (Figure 4).

Position/Location in the Process
Public participation procedures may extend further into the project planning stage or further into the decision-making stage.
                         Project Planning ----------- Decision-Making

Form of Participation
At one extreme, the procedure may become a one-way public information exercise, and at the other extreme they may involve shared decision-making and monitoring of compliance of attached conditions.
            Public Information Exercise ----------- Monitoring Attached Conditions

Openness of the Procedure
The internal dynamic of the process may produce a procedure which is restricted to a certain number and a certain type of participant or it may produce a procedure which includes a broad and indiscriminate group of participants.
                Closure/Restriction ----------- Openness/Breadth

Control Over the Procedure
The procedure may tend to be controlled by the proponent and its experts or by the public and its experts. Also, control can swing sometimes towards counter-experts who do not represent the local population, and sometimes towards the affected population.
                      Proponent ----------- The Public
         Informed Public Participants ----------- Community Representatives

Thrust and Style of the Process
At one pole citizens express their views and the proponent tries to persuade them. At the other extreme, the process brings together two partners, one of whom plays the role of opponent.
                Persuasion ----------- Opposition

Figure 4:   An Evaluation Schema Analyzing the Degree of Citizen Control
            (After Parenteau 1988)

Comprehensive reviews of theoretical frameworks respecting the evaluation of public involvement are presented by Sewell and Phillips (1979) and Grima and Mason (1983).

With respect to the evaluation of specific involvement techniques, Grima (1985) reports very little empirical research, but ample literature that offers evaluation in a didactic manner. As an example he cites Glasser et al. (1975), who classify 25 public involvement techniques into 6 categories. They evaluate each technique in terms of communication and education. Communication is evaluated according to six criteria: degree of public contact; degree of impact on decision maker; degree of user sophistication; ease of use and preparation; ability to respond to varied interests; and, degree of two-way communication. Education is evaluated according to the following criteria: informing/educating; identifying problems and values; obtaining ideas/solutions; feedback; resolving conflict; and, implementing solutions. Using a matrix with scores ranging from 0 to 3, Glasser et al. give the highest score to attitude surveys and citizen law suits.

According to Grima (1985), there are two serious deficiencies in the Glasser et al. study. First, the functions evaluated and the evaluation criteria were selected arbitrarily. It is difficult not to agree with this point. The choice of education as an evaluation function is a curious one. On one hand it underscores the importance of education in the complex of public involvement, but on the other hand, it offers a confusing portrayal of the objective of the public involvement process. Indeed, it appears to have confused the objective of education techniques with the objective of public involvement techniques generally.

The second of Grima's (1985) criticisms is that the evaluation is based on the subjective opinions of experts about processes which are difficult to analyze quantitatively. As alternatives to the expert opinion approach, Grima suggests two other approaches to evaluating involvement techniques: the opinions of members of the public who participated in the process; and, the objective analysis of some quantifiable characteristic of the involvement. Grima (1980) and Parenteau (1988) present examples of applications of these approaches.

2.6   SUMMARY

In terms of both methodology and purpose, EA represented a fundamental departure from the regulatory approach. With the focus changing from regulation and control to planning and prevention, EA has become an invaluable decision making tool in matters of environment and development. A variety of definitions of EA are found in the

literature and in practice but many writers advocate a broad and anticipatory approach that requires the incorporation of environmental concerns from the absolute beginning of the planning stages.

A significant literature exists that provides a convincing rationale for public involvement in EA. Although the literature reveals diverse opinion on the nature and forms of public involvement, a number of writers have listed and described a wide range of specific involvement techniques. It is apparent from this literature that public education plays a significant part in the public involvement process.

A significant literature also exists on the evaluation of public involvement. Theoretical frameworks have been developed and evaluations of specific involvement techniques have been attempted. However, evaluations of public involvement processes invariably focus on the amount of power given to the public in the decision-making process, not on the nature and quality of the education component of the involvement process. It is often argued that to be effective, efficient and fair, public involvement processes should lean towards a greater degree of citizen power in decision making - rungs 6 to 8 of Arnstein's ladder. What has been largely ignored, however, is that to achieve higher degrees of citizen power, citizens must have a firm understanding of the decision making process. They also must be able to present informed critical opinions concerning the dominant discourses asserted during the process.

CHAPTER 3: CRITICAL EA EDUCATION

3.1 INTRODUCTION

The literature on public involvement techniques clearly indicates that education is an integral component of the public involvement process. As mentioned earlier, Grima (1977) defines one of the four modes of public involvement as information dissemination and education. As well, each of the inventories of public involvement techniques canvassed in Chapter two included a wide range of education techniques.

To recap, in the Praxis (1988) model education is viewed as a separate step in the spectrum of public involvement approaches, and no fewer than 16 education techniques are catalogued. Regier et al. (1980) treat media and public education as a distinct subcategory of public involvement and include 11 separate education techniques in the subcategory. Glasser et al. (1975) also treat media as a distinct subcategory of involvement and catalogue 9 different techniques. In addition, they include education techniques (i.e., public meetings, presentations to community groups and workshops) in other subcategories of involvement. Finally, in Westman's (1985) model, the *Information Feedback* category contains education techniques.

In spite of this, education has been somewhat undervalued in the literature. Praxis (1988:7) considers education to be low in the continuum of public involvement approaches, although they do recognize that education is "important in combination with other approaches." Bush (1990:3) states that education is "often an integral part of public participation, but it is not sufficient in itself." According to Grima (1985:34), education does not constitute public consultation or participation by itself, but "…information and education have a valid place in the whole complex of involvement." While these statements, and similar ones found in the literature, are valid, they tend to undervalue the importance of public education. One of the ideas explored in this research is that education is a necessity; a precondition to advanced levels of public involvement.

3.2 CRITICAL PEDAGOGY

3.2.1 INTRODUCTION

The type of education explored in this research is *critical education*. At its

foundation is the theory of critical pedagogy developed by Paulo Freire (1970). Freire's work has been described as a "world-historical event for counter-hegemonic theorists and activists" (West 1993:xiii) and Freire has been called a "revolutionary educator of pivotal significance to the project of liberation and social transformation" (McLaren and Leonard (1993b:1). More importantly, the theory of critical pedagogy has linkages with leading adult education theories and has methodological implications congruent with well accepted adult education guidelines and environmental education practices.

Freire's pedagogy takes a humanist approach, presenting a kind of "secular liberation theology" (Aronowitz 1993:12). His theory is based on the conviction that every human being is capable of critically engaging the world in a dialogical encounter with others. He believes in the transformative possibilities of willed human action, both on an individual and a social level. His are the "politics of liberation", which deal with human action based on the language of hope (McLaren and Leonard 1993b).

Critical pedagogy defines education as a locus where the individual and society are constructed, a social interaction which can either empower or domesticate the pupil (Shor 1993). A premium is placed on democratic dialogue which shifts the centre of the learning process from the teacher to the student. This shift signifies a change in traditional power relationships, not only in the classroom but in the broader social order (Aronowitz 1993).

3.2.2   CRITICISMS

A significant criticism of Freire's work is the sexism of his language and his androcentric concept of liberation. It is interesting to note, however, that bell hooks, a well-known Feminist theoretician, has defended Freire's writings by placing them within an historical perspective and by stressing the importance of his work for people of colour and other traditionally marginalized groups (hooks 1993). Freire himself has responded to the criticism by stressing the substance of his views rather than the form. He argues that his position has always been that a pedagogy of liberation must be based on an equal partnership among men and women free of hierarchical control and patriarchal assumptions (Freire 1993).

Freire's theories have also been attacked by structuralists, who propose the fallacy of humanism (Aronowitz 1993). For his part, Freire responds by positing that the main

body of his work is in line with critical post-modern thought. He argues that many aspects of his work can be appropriated into and extended by critical post-modernist thought. Moreover, he counters by criticizing post modernism's lack of political will and its failure to value human narratives of liberation and social justice (Freire 1993).

3.2.3   METHODOLOGICAL IMPLICATIONS

Although Aronowitz (1993:10) argues that Freire's theories present a "truly revolutionary pedagogy" and should not be domesticated into mere methodology, the instructional implications of Freire's work should not be ignored. Nor should Freire's explicit analysis of countervailing methodological approaches. In Chapter two of *Pedagogy of the Oppressed*, he describes the banking method of instruction. To this he counter poses a different approach namely, problem-posing, dialogical education.

Shor (1993) examines both of these approaches and also discusses how resistance to problem-posing may be overcome and how the questioning of power and knowledge is central to the development of critical consciousness. According to Shor (1993), in the banking approach students are viewed as empty vessels to be filled with facts from an official syllabus. In Freire's words, such education becomes:

> "...an act of depositing, in which the students are the depositories and the teacher is the depositor. Instead of communicating, the teacher issues communiques and makes deposits which the students patiently receive, memorize and repeat. The more students work at storing the deposits entrusted to them, the less they develop the critical consciousness which would result from their intervention in the world as transformers of that world" (Freire 1970:58).

In contrast to the banking approach, Freire offers problem-posing, dialogical education. In this approach the teacher poses critical problems for inquiry which relate to important features of student experience. This allows the students to see their thought and language reflected in the course of study. That is, academic material is integrated into student life and thought. The dialogical approach invites students to think critically about the course subject matter and doctrines, the learning process itself and society. It also challenges students and teachers to empower themselves for social change and to advance democracy and equality (Freire 1970, Shor 1993).

Shor (1993) identifies 10 descriptors of critical pedagogy:

- participatory - students participate in making their education;

- situated - the course subject matter is situated in student thought and language;

- critical - discussion encourages self-reflection and social reflection;

- democratic - discourse is constructed mutually by students and teacher;

- dialogical - the basic format is dialogue around problems posed in class;

- desocializational - students are desocialized from passivity in the classroom;

- multicultural - cultural diversity of society is recognized and accepted;

- research oriented - the teacher does research into the speech, behaviour, and cognitive development of the students while the students research problems posed by the teacher;

- activist - the classroom is active and interactive; and,

- affective - the dialogue is interested in a broad development of human feeling.

3.2.4   CONGRUENCE WITH ADULT EDUCATION PRINCIPLES

The principles of critical pedagogy have been applied not only in the formal classroom but also in the field of adult education (e.g., Kirkwood and Kirkwood 1989 and Lankshear 1993). In addition, the methodological implications of critical pedagogy are entirely consistent with well accepted guidelines for working with adult learners. For example, Knowles (1980, 1984) promotes the concept of learner-centered instruction because it views learners as mutual partners in the education process. This view is supported by Apps (1991) who discusses the benefits of incorporating learner input into course design. Pratt (1988) adds that even if learners require both support and direction, they can still be involved in designing and directing their learning in meaningful ways. Imel (1993) advocates participative instructional methodologies such as small group work. She also suggests that instructors should support opportunities for individual problem solving by learners.

Critical pedagogy is also congruent with the adult education theory of transformative learning. Transformative learning describes how adult learners construe, validate and reformulate the meaning of their experiences (Mezirow 1991). As in Freirean theory, transformative learning is concerned with emancipation and the development of critical consciousness (Mezirow 1990).

A recent treatment of the subject is offered by Cranton (1994). She describes the process in terms of a range of experiences, from the learner who is merely impressed by a new concept to the learner who undergoes profound personal growth based on new insights. She also relates transformative learning to other developments in adult education and provides a description of the transformative process. She also presents practical strategies for facilitating and maintaining the process. These focus on dialogical and participatory methods such as various questioning techniques, journal writing exercises and diverse experiential activities.

3.2.5   CONGRUENCE WITH ENVIRONMENTAL EDUCATION

The principles of critical pedagogy are also congruent with the goals, objectives and guiding principles of environmental education. The basic philosophy of environmental education can be found in the *The Belgrade Charter: A Global Framework for Environmental Education.* This document provides the goal and objective:

"The goal of environmental education is: To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions to current problems, and the prevention of new ones. The objectives of environmental education relate to helping both individuals and groups to acquire: *awareness* of and *knowledge* about the environment and its allied problems; to acquire new social *attitudes* of concern that will motivate active participation; to acquire the *skills* for solving problems; to be able to *evaluate* environmental measures and education programmes in terms of ecological, political, economic, social, aesthetic and educational factors; and to *participate* in appropriate action to solve problems."

The Belgrade Charter also elaborates the guiding principles of environmental education:

"Environmental Education should:

1. consider the environment in its totality: natural and man-made, ecological, political, economic, technological, social, legislative, cultural and aesthetic;

2. be a continuous lifelong process both in-school and out-of-school;

3. be interdisciplinary in its approach;

4. emphasize active participation in preventing and solving environmental issues;

5. examine major environmental issues from a world point of view, while paying due regard to regional differences;

6. focus on current and future environmental situations;

7. examine all development and growth from an environmental perspective;

8. promote the value and necessity of local, national and international cooperation in the solution of environmental problems" (Convergence 1975:58).

The principal audience for environmental education includes both the formal education sector aimed at young people and the non-formal education sector in all segments of the population (Convergence 1975:58). According to Convergence (1977:71), "Environmental education should be provided for all ages, at all levels, and in both formal and non-formal education."

Usang (1992) suggests the relevance of Freirean theory to environmental education. She introduces the concept of green literacy, defined as "...the skill of transmitting and receiving information in an intelligible manner with sustainable environmental elements built in" (Usang 1992:51). She argues that three main strategies exist that can be used separately or together to enhance green literacy: the Freirean method; the functional method; and, the organic method. By using the Freirean approach, adults can begin to question the condition of their environment and to find answers to their problems. "Questions like why do we have poor harvest and worsening soil erosion? What can we do to cut down our family size? Where can we get help? How can we go about it?" (Usang 1992:51).

3.3   TOWARDS A RATIONALE

3.3.1   INTRODUCTION

The literature reveals a fairly convincing rationale for applying critical education to environmental assessment. Three dimensions to the rationale can be identified:

- critical education contributes to human liberation and fundamental democratic principles;

- there is a clear public need for environmental education (including EA education); and,

- critical EA education has potentially far reaching and profound benefits for the planning and assessment of development activities.

3.3.2   EDUCATION, LIBERATION AND DEMOCRACY

Adult education, including critical education, has direct links to human liberation and precepts of democracy. The entire Freirean approach to education constitutes "pedagogical politics of conversion" in which passive objects of history reinvent themselves as active subjects capable of profoundly changing the quality of their lives (West 1993). Freire (1985) goes so far as to argue that the primary purpose of education is to further human liberation. He also argues that the centrepiece of the struggle for human liberation is the struggle for democracy (Freire 1993).[3]

The education-liberation-democracy connection is supported by a number of post-Freirean analysts (e.g., McLaren and Leonard 1993a). It is also supported by a variety of writers who do not necessarily take a Freirean approach to education. For example, Ellis (1993) takes a broad perspective that encompasses not only Freirean analysis, but also other conceptual approaches such as popular education, experiential learning, social movements and human resource development. In the end she argues that "...there is no question as to whether adult education has a role to play in achieving the ideal of truly democratic societies..." (Ellis 1993:31) (See also Yamaguchi 1993, Marja 1993, Okech-Owito 1993, Gleazer, Jr. 1993 and Proulx 1993.)

Further support can be discerned in literature on the rationale for public legal education. This body of literature is relevant because education about EA is, at least partly, a form of public legal education, inasmuch as it deals with EA legislation and regulations, government policy, public hearings, and administrative proceedings. The theoretical rationale for public legal education has been explored by a number of writers, most recently by Alderson (1992) in a paper commissioned by the Department of Justice Canada. In a document prepared for The Manitoba Law Foundation, Thompson (1989) summarised the

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[3.] Freire avoids a Eurocentric perspective by recognizing that democracy has different meanings in different cultures throughout the world. In his typical colourful and bold style, he puts it in the following manner: for some people democracy ..."is synonymous with capitalism, the proposition of acquisitiveness and greed, the barbaric practices of colonialism and conceptually opposed to socialism. For others it is a process of achieving equality of social justice for all people through popular sovereignty." Freire (1993).

literature in the following manner:

- legal awareness creates a more orderly and law abiding society;
- legal knowledge facilitates recognition of legal problems when and if they occur, which permits individuals to seek appropriate professional assistance;
- *citizens' knowledge of law and access to legal services are critical to the administration of justice and to the functioning of an equitable and democratic society; and,*
- *awareness of law empowers citizens who are socially and economically disadvantaged allowing them to take a more active part in the political process* (emphasis added).

The Freirean triad of education, liberation and democracy is further supported by findings from a recent study on learning in citizens' groups (Alexander 1994). Participant observation and interviews were used to reveal what members of citizens' groups learn and how they learn it. This was done in the context of a land use planning exercise. The resultant findings were put in the form of 25 propositions. Within this set, seven subcategories were identified, one of which, "What is Learned? Empowerment", pertains to the education-liberation-democracy connection. According to Alexander (1994), group members developed "citizenship skills" which meant that for them democracy ceased to be an abstraction. They discovered not only the merits of social activism, but also their ability to effect change. As well, group members sometimes became interested in fostering these values in others. Finally, members of citizens' groups developed an appreciation for the complexities of issues and the validity of other points of view.

3.3.3   THE NEED FOR ENVIRONMENTAL EDUCATION

The literature reveals a fairly clear public need for environmental education including some form of education relating to EA. As early as 1972 the Minnesota Environmental Education Council had been created and had recognized the need for comprehensive education programs to help counter mounting environmental crises. According to the Council (1972), "What is needed is a continuous stream of information to inform the public about environmental matters in general. Then when a crisis does arise the people will have a background of knowledge to use in dealing with it."

Environmental education was prominent on the international stage in 1975 with the organization of the UNESCO-UNDP International Workshop on Environmental Education. In a paper presented at the workshop Emmelin (1975:45) states that, "A reasonable degree

of consensus exists on the need for an environmentally literate citizenry...". This sentiment was supported by a majority of workshop participants who adopted *A Global Framework for Environmental Education*, also known as The Belgrade Charter. The Charter calls for a reordering of national and regional priorities in the interests of economic growth that does not have harmful repercussions for the environment. It further calls for environmental education as the primary vehicle for this fundamental restructuring of priorities (Convergence 1975).

The need for environmental education was again discussed on the international scene in 1977 at the UNESCO Conference on Environmental Education held in Tbilisi. At the conference Mostafa Tolba, Executive Director of the United Nations Environmental Programme, told the delegates that, "In the long run, nothing significant will happen to reduce local and international threats to the environment unless widespread public awareness is aroused concerning the essential links between environmental quality and the continued satisfaction of human needs" (Convergence 1977:70). The delegates supported this view and the conference resulted in a Declaration that, "Education, utilizing the findings of science and technology, should play a leading role in creating an awareness and a better understanding of environmental problems" (Convergence 1977:71).

Support for the proposition that there is a need for EA education can be found in a report prepared by the Saskatchewan Environmental Assessment Commission, which contains 162 recommendations for improvements to Saskatchewan's EA process. The report has a section specifically devoted to education. According to (Elliott 1991),

"A comprehensive programme in environmental education must be incorporated into formal curricula, as well as undertaking informal environmental education throughout Saskatchewan. Industry, Government and interest groups must begin and/or continue environmental outreach programmes within the community. ...Proponents shall be responsible for educating the public regarding their specific proposal as part of their public consultation plan. Environmental assessment education must ensure that the people of Saskatchewan are made aware of the mechanics of the EA process and their rights and opportunities for involvement".

The report also deals with the special information needs of members of First Nations. The section of the report dealing with education provides that, "Special consideration should be given to providing opportunities for education in the North, bearing in mind the cultural and geographical diversity in the region." The section on public consultation further provides that, "Translators and translations of public hearings shall be available for those people who speak the first languages. Comprehensive summaries of the environmental impact statement (EIS) should be available to those directly affected individuals who speak in the first languages." (Elliott 1991).

Bregman and Mackenthun (1992:44) support the call for EA education. They recognize that "...members of the public may have had little experience with public participation exercises and may need help in overcoming language, cultural, or economic barriers." They conclude that public participation mechanisms must not only seek public input but also provide public education.

3.3.4   IMPROVED PLANNING

3.3.4(1)   DISCOURSE ANALYSIS

The position asserted here is that critical education fosters critical consciousness. Critical consciousness, in turn, will enable members of the public to evaluate dominant discourses and present credible and forceful counter discourses. This will challenge the status quo and has the potential to make EA a truly effective planning mechanism that can help reverse current trends of unsustainable resource exploitation. The potential for positive gains increases when EA is truly open, broad and anticipatory and members of the public are given the opportunity to influence fundamental issues such as need, purpose and alternatives.

Discourse analysis of the type conducted by Richardson et al. (1993) is helpful in presenting the argument. Social power is created and justified through discourse, both verbal and symbolic (Anderson 1988, cited in Richardson et al. 1993). Discourse also supplements force, often obviating the need for coercive force and transforming simple power into legitimate authority (Lincoln 1989, cited in Richardson et al. 1993).

In the EA context there is a significant power imbalance between project proponents (and an often supportive local or regional government) on one hand and members of the public on the other hand. Proponents and governments present the dominant discourses of big business, the democratic state and the scientific establishment. Members of the public present counter discourses, often motivated by environmental protection, transformation of the political process and community control over matters of development (Richardson et al. 1993).

Using literary tools Richardson et al. discuss the mechanics of critiquing and countering authoritative discourses. First, they discuss the deconstruction of binary oppositions. A binary opposition is a device which places two ideas or things in a hierarchy to ensure that one is favoured over another. An example is jobs v. the environment. This particular opposition suggests that one cannot make jobs by protecting the environment. Binary oppositions undermine the credibility of one position and support that of the other. In the end they prove to be adversarial since they heighten political differences rather than facilitate resolution of a common problem. Richardson et al. suggest that breaking through the dichotomy presented in binary oppositions opens up environmental issues to greater scrutiny. Doing so redefines the debate by bringing new and often nontraditional issues into the discussion.

Richardson et al. also discuss the analysis of rhetorical metaphors and argue it is essential in developing counter discourses to identify, challenge and displace metaphors that support pro-development discourses. Examples of metaphors used in dominant discourses include:

- trees are weeds;
- effluents from pulp mills are contributions;
- chlorine used in the pulp mill bleaching process is an element of table salt;
- logging is harvesting;
- pollution is the price of progress and,
- nature is infinite.[4]

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[4]. The first four metaphors referred to above are real life examples used in the Alpac pulp mill assessment that was the subject matter of the study by Richardson et al. The last three are identified as "sacred truths" that have been adopted in western culture (Gordon and Suzuki 1990).

It was stated earlier that counter-hegemonic discourses have the potential to transform EA into a truly revolutionary or subversive planning mechanism that will reverse the trend of resource exploitation and environmental destruction. Such counter discourses cover a range of disciplines and topics including education, economics, ideologies of science and theories of human nature (Adkin 1992). Three examples are presented below that illustrate how counter discourses can challenge ideologies and principles at the very foundation of western pro-development philosophies.

3.3.4(2) COOPERATION

Pro-development, dominant discourse is often founded on an individualistic and competitive view of human nature. This view holds that resource users cannot cooperate toward their common interests, i.e., collective action to escape a social trap is impossible.[5] However, recent theoretical developments, supported by case study research, challenge the conventional view. Berkes (1989a) cites numerous examples of societies around the world in which natural resources are used in a sustainable, adaptive and cooperative manner. As well, Peck and Feldman (1986) (cited in Berkes 1989a) have developed a credible theory on the evolution of cooperation. They suggest three general processes to explain the phenomenon of cooperation, within the individualistic and competitive framework of the theory of evolution. These processes are: i) kin selection in individuals living in genetically related populations; ii) reciprocity in individuals who are likely to experience repeated contact with one another; and, iii) cultural group selection. Gadgil (personal communication cited in Berkes 1989b) believes that all three processes can act in concert with regards to populations living in territorial, extended kin groups, but they may not apply at all to mobile, urban-industrial populations.

A promising application of the reciprocity concept at the level of the individual is the Prisoner's Dilemma game (Berkes 1989a). The game is an "embodiment of the problem of achieving mutual cooperation" (Axelrod and Hamilton 1981). The rules of the two player version of the game are that two individuals can each either cooperate or defect. Regardless of what the other one does, the selfish choice of defection yields a higher payoff than

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5. A social trap is any situation in which short-term local reinforcements affecting an individual are inconsistent with the long-term global best interest of the individual and society (Costanza 1987).

cooperation, except if both players defect. Then both do worse than if both had cooperated. The payoff to a player has an effect on its survival and fecundity. The game is defined by the following relationship:

$$T > R > P > S \text{ and } R > (S + T) / 2$$

where:

T = payoff to the player which defects when the other cooperates

R = payoff when both players cooperate

P = payoff when both players defect

S = payoff to the player which cooperates when the other defects

Axelrod and Hamilton's (1981) mathematical proof and their empirical research with a computer tournament indicate that when interactions between players have a sufficiently large probability of continuing, a cooperative strategy is evolutionarily viable, robust and stable. This means that cooperation can evolve from small clusters of individuals who base their cooperation on reciprocity or, perhaps kinship. Once established, it can thrive in a variegated environment and can resist invasion by a mutant strategy.

An indication that the Prisoner's Dilemma model may account for the evolution of cooperation in human populations is found in results from a workshop attended by the writer on Friday, November 19, 1993. Four rounds of the basic two player version of the game were conducted with 10 pairs of players. Each round consisted of 6 moves and was independent of earlier rounds. In the first round the players were ignorant of the consequences of their choice (i.e., cooperate or defect) and there was no communication between players. In the second round the players became aware of the payoffs associated with their choices, i.e., they became aware of the dilemma. In round three the players could communicate but only at the beginning and end of the round, not between moves within the round. In the fourth and final round the players were allowed to communicate and verify their partners choice between moves.

The results indicate an increase in cooperation from round to round. Mean scores per round increased from 15.4 and 15.2 in rounds one and two, to 19.2 and 23.2 in rounds three and four. (The payoff matrix gave a score of 24 for a perfect round, i.e., one in

which the players maximized their joint payoff by cooperating for all 6 moves.) The results also indicate that cooperation may be related to communication and verification. The average score per round remained unchanged from round one to round two, but when communication was permitted in round three an increase in the average score is witnessed. Another increase, almost reaching perfect cooperation, was seen when verification was implemented in round four.

Dominant discourses in EA tend to assume that resource users cannot cooperate toward their common interests. However, counter-hegemonic discourses can be developed based on the recognition that cooperation is manifest in some resource communities around the world and on recent theoretical developments in the field. Critical EA education can facilitate the development of such counter discourses by fostering critical consciousness in resource communities.

3.3.4(3)   ECOLOGICAL ECONOMICS

An extension of Western society's bias towards individualism and competition is its reliance on neoclassical economic theory. Neoclassical analysis is often at the heart of dominant discourses offered in EA. However, since environmental mismanagement and resource exploitation can be justified under neoclassicism (Goodland et al. 1989), it is obvious that effective counter discourses are required. A growing literature on alternative economic models provides the foundation for such discourses. One such alternative to neoclassical analysis is the paradigm of ecological economics. Key characteristics which define the ecological economics approach are summarized by Berkes (1993): a holistic view of the nature-economy relationship; treating the economic system as a subset of the whole environment; a primary concern with natural capital;[6] and, accounting for a greater diversity of values than those normally considered by economists.

The basic world view of ecological economics implies significantly different dimensions than those found in mainstream economics and ecology. The time frame used in ecological economics is vast (days to eons) with a synthesis of the various scales used.

[6.] Traditional economic theory treats natural resources as "free gifts of nature" (Grima and Berkes 1989). Ecological economics rejects this position and gives natural resources the same status as human-made capital (Berkes 1993).

In mainstream economics it is short (usually 1-4 years) while in mainstream ecology it is vast but with little synthesis of scales. The space frame utilized in ecological economics is local to global. In conventional economics it is local to international while in conventional ecology it is local to regional. Finally, in terms of the breadth of the species considered, ecological economics includes the whole ecosystem including human beings. Traditional economics typically ignores non-human species while traditional ecology typically ignores humans (Costanza 1991).

The ecological economics approach also implies new macro and micro systems goals. The traditional, primary, macro-economic goal is growth of the national economy while the traditional, primary, macro-ecological goal is survival of the species. The primary macro goal in the ecological economics paradigm is sustainable development (Costanza 1991). The primary micro goal from the ecological economics perspective is rather innovative but it is not fully defined. It appears to adopt the traditional micro-economic goals of maximum profits and maximum utility but it also recognizes that these goals are sometimes myopic and must be adjusted to reflect system goals. The means to accomplish necessary adjustments are to be found in "social organizations and cultural institutions at higher levels of the space/time hierarchy" (Costanza 1991).

Ecological economics is more than the sum of conventional economics and conventional ecology (Berkes 1993). It presents a fresh perspective which takes a holistic approach and expands the dimensions found in conventional economics and ecology. It aims for sustainable development, quite probably making use of a broad range of social organizations and cultural institutions (Costanza 1991). For those involved in EA, ecological economics presents an innovative and fascinating alternative to the dominant economic discourse.

3.3.4(4)   TRADITIONAL ECOLOGICAL KNOWLEDGE

Another of the basic elements of dominant discourse in EA is conventional western science, which is based on a dualistic world view in which humans are viewed as being apart from and above the natural world. The ideals of science are generally reductionist in focus and have led to a disintegration of the unity of the Western world's theoretical knowledge and intellectual framework. According to Kockelmans (1979:146), this

"dangerous fragmentation of our entire epistemological domain" has contributed to a crises in Western society. He argues that there is a tension between the world which our sciences describe and the world in which we actually live.

This tension is evidenced in the difficulties that modern science has had in furthering human understanding and manipulation of complex ecological systems. According to Gadgil et al. (1993), science-based societies have tended to over-use and simplify complex systems, resulting in resource depletion and environmental degradation. Striking examples of this can be found in Holling and Bocking's (1990) analysis of "successful" Western resource management systems. In this analysis a paradox is revealed in which successful resource management leads to increasing fragility of the ecosystem.

Given Holling and Bocking's conclusions, it is apparent that counter discourses offering alternative management systems are necessary. Fuel for such counter discourses is offered by traditional ecological knowledge (TEK). TEK, according to Gadgil et al. (1993), is a cumulative body of knowledge and beliefs about the relationship of living beings with one another and with their environment handed down through generations by cultural transmissions. Within certain bounds TEK regarding habitat preferences, life histories and behaviour patterns of prey species can be extremely detailed.

TEK is usually intricately linked to a belief system which stresses respect for the natural world. The belief system often takes a holistic perspective which recognizes the place of humans within the natural system (Gadgil et al. 1993). Consequently, TEK has potential to contribute to the unification of our intellectual framework and to the reduction of tension between science and society. A reduction of tension, in turn, implies an increase in social trust, which is one of Holling and Bocking's (1990) "constant foundations of sustainable development".

Staying with Holling and Bocking's (1990) framework, it is apparent that TEK can also make significant contributions to the protection of the other constant foundations, i.e., soils, biodiversity, environmental health and human knowledge. The authors cite an example from Kenya that demonstrates the contribution of TEK to soil protection. With respect to human knowledge, Ruddle (1991) argues that TEK has much to offer in terms of providing powerful indicators for focusing scientific research of the Western tradition.

Gadgil et al. (1993) examine the role of TEK and traditional management systems in the context of local biodiversity and environmental health. They cite numerous examples including the apete system of the Kayapo Aboriginals of Brazil, the tambak system of Indonesia and the ahupua system of ancient Hawaii. Their research leaves little doubt that the implementation of TEK has positive implications for enhancing, restoring and conserving biodiversity and environmental health. The importance of this cannot be overstated. Biodiversity not only promotes ecosystem resilience, it facilitates true evolutionary structural change.

McDonald and Fleming (1991) describe a case study from Northern Canada which illustrates some of the contributions that TEK can make to natural resources management. The case involves the development of a community-based management system for commercial harvesting of eiderdown in the Belcher Islands. According to the authors, the case demonstrates that TEK can be incorporated into decision-making processes to develop a workable local management system. The positive implications of this for social trust are obvious. In addition, the authors state that the integration of TEK with the management process formed the foundation for the integration of economic and environmental objectives. In short, the application of TEK significantly contributed to the creation of a sustainable, community-based development.

3.3.4(5)   SUMMARY

Critical consciousness, fostered by critical EA education, will enable EA participants to evaluate pro-development discourses and present credible and forceful counter discourses. Such counter discourses cover a range of disciplines and topics and challenge elements of the very foundation of Western civilization including its models of economic development, its prevailing philosophies and ideologies and its underlying thought structures. Examples of counter discourses include portrayal and theories of cooperation among resource communities, alternative economic models such as ecological economics, and holistic belief systems that respective traditional ecological knowledge. The benefits, in terms of improved planning, will be observed when counter-hegemonic discourses are permitted to reverse current trends of resource exploitation and promote real sustainable development.

3.4 THE NATURE OF CRITICAL EA EDUCATION

Given that a strong rationale exists for critical EA education, it becomes essential to examine the concept in more detail. The position here is that critical EA education should encompass both "education about EA" and "education through EA".

Within the participatory framework provided by critical pedagogy, a range of methods of instruction should be used to provide education about EA. The content should cover both process and substance issues and should include matters such as:

- training to make presentations;
- the engineering aspects of a project;
- ecological and economic analyses of proposed project alternatives;
- how communities and ecosystems work;
- how status quo decision making processes and project decisions can be challenged; and,
- how members of the public can work together to define and pursue their own goals.

It should also include jurisdictional issues such as the mechanics of law reform, a range of lobbying/advocacy subissues and how to file an appeal.

In metaphorical terms, education about EA serves as an on-ramp to the public involvement process. Education about EA is necessary to bring public participants up to speed before they enter the main flow of the involvement process. Once in the main flow, members of the public can critically engage the EA world and challenge the status quo in an informed manner.

Education through EA occurs when participation in the main flow reinforces critical consciousness and, at a more macro level, becomes an educational process in itself. Education through EA provides the means of developing informed, critical, social activists capable of engaging their communities in meaningful and critical dialogue and of mounting efforts for real social change.

Education about EA and education through EA are codependent. The former provides the foundation for the latter, while the latter gives substance and real meaning to the former. Taken together, education about EA and education through EA compose critical EA education whose main goal should be empowerment and social action.

Support for the notion that environmental education can lead to social activism can be found in Ibikunle-Johnson's (1989:14) study of grassroots participation and community action in central Africa: "knowledge, awareness, attitude and perceptions of grassroots people can be mobilized and transformed through participatory environmental education to generate motivations and skills for effective environmental management."

Further support can be found in Finger's (1989) theory of environmental adult transformation. Finger reports on a study from Switzerland which examined the histories of seven individuals in an attempt to discover what, where and how adults learn about the environment, and where the learning process leads them. He takes an approach comparable to that of Paulo Freire's in describing the concept of environmental adult transformation. Environmental adult transformation functions to lead the individual to environmental concern and potentially to act on sociopolitical commitment to protect the environment. The process is generated by three basic generative themes:

i)   fundamental motivations (either social or individual);

ii) sensitization contexts (again, this can either stem from society or from the individual); and,

iii) environmental life experiences (either institutional or non-formal).

The author distinguishes environmental adult transformation from environmental adult learning. The latter is generated by knowledge and information. It is mainly cognitive in nature, leading to understanding of specific environmental issues. The two main functions of environmental adult learning are to make the individual feel safer and more secure and to provide some degree of social and political emancipation. "Environmental adult learning is certainly part of the process of environmental adult transformation, though the precise relation between the two has not yet been established. It draws its energy, its motivations and even its main learning contexts from the latter" (Finger 1989:31). Further research is required but it may be that education about EA leads to environmental adult learning while education through EA leads to environmental adult transformation.

Yet further support for the overall thrust and general dynamics of critical EA education can be found in Alexander's (1994) theory of social learning. Alexander used

interviews and participant observation during a land use planning exercise to address the questions of what citizens' groups learn and how the learning takes place. His findings, expressed in the form of propositions, are congruent with the basic characteristics of Freirean methodology:

- *members of citizens' groups learn through a variety of methods but "hands-on" or action learning and dialogue are particularly important;*
- *members of citizens' groups learn in a variety of situations or settings which contribute significantly to the learning process; these settings include hearings and public meetings, conferences and direct action;*
- *most groups operate on a form of consensus and maintain an egalitarian spirit;*
- small groups are significant for validation, emotional support and social identity and hence provide effective learning environments;
- other contexts provide opportunity for personal and social reflection and hence also are important in shaping learning outcomes (emphasis added).

Synthesizing earlier literature, Alexander also proposes a model of social learning that is consistent with the notion of education through EA. Under this model the prior learning that individuals bring to citizens' groups is classified as attitudes, knowledge and skills. A "disorienting dilemma" interacts with a person's prior learning, activating the person to join a citizens' group. Drawing on their prior learning, members of citizens' group identify their objectives and formulate their strategies. Once this is done, the group takes action. This, in turn engenders experiences. All of this occurs within specific settings, such as the small group context, and uses various modes of learning, such as dialogue and involvement in praxis. The experiences affect prior learning which, in turn, affects group processes and practices. From the constant interplay between action and learning, three broad categories of learning outcomes emerge: empowerment, teamwork and citizenship.

Building on his research findings and on his theory of social learning, Alexander (1994) also presents a model of forums of social learning. He suggests that citizens' groups are merely one type of forum for social learning and presents a spectrum, with participatory education at one extreme and educational participation at the other. The

forums near the education end of the spectrum can be classified into those that emphasize cognitive learning outcomes and those that emphasize affective learning outcomes. The forums near the participation end can be classified into those that are issue-oriented and those that are place-oriented. Figure 5 provides examples of forums and suggests where they may be situated in the spectrum. Education about EA would likely fall near the education end of the spectrum while education through EA would likely be near the participation end.

EDUCATION

↓

study groups and study circles
consciousness-raising and support groups
activist journals and magazines
workshops, retreats and educational centres
folk schools and community schools
participatory research
radio forums
networking conferences
search conferences and "community soundings"
technical working committees
round tables
remedial action programs
citizens' groups and coalitions
town meetings and assemblies
community resource boards

↓

PARTICIPATION

Figure 5:   Forums of Social Learning on the Spectrum From Participatory Education to
            Educational Participation
            (After Alexander 1994)

3.5   SUITABLE EDUCATION TECHNIQUES

Critical pedagogy, and hence, critical EA education, is an approach to education; it is not a prescription for particular instructional methodologies. At the same time, there are clear and well documented methodological implications of the critical approach to education (see Shor 1993, discussed at page 35). Some instructional methods and education

techniques are better suited for use in critical education than others. This section presents a cataloguing of education techniques used in the context of EA and in other environmental contexts. It also presents analysis to identify those techniques that are well suited to critical EA education.

3.5.1   A CATALOGUE

The inventories of public involvement techniques reviewed in Chapter two are instructive for the purpose of identifying techniques used to conduct education in the context of EA. Praxis (1988) and Westman (1985) are revisited below.

The Praxis (1988) model was developed by public involvement practitioners in the specific context of environmental assessment. Westman (1985) also specifically deals with environmental assessment. Overall, some 32 distinct education techniques are identified in these two pieces of literature. A compilation of these techniques and a classification based on format or mode is presented in Table 6.

Table 6:   Techniques Used to Conduct EA Education Found in Praxis (1988) and
Westman (1985), Categorized According to Format

- <u>audio/visual/electronic</u>

slide presentations	film presentations	computerized participation

- <u>traditional publishing (printed) (verbal)</u>

publications	brochures	newspaper inserts
notices	feature articles	position papers
reports	newsletters	information kits

- <u>direct/individualized</u>

direct mail	phone lines	field offices
technical assistance		

- <u>media</u>

advertising	news releases	news conferences
public service announcements		participatory television

- <u>public presentations/events</u>

workshops	conferences	panels
open houses	exhibits/displays	contests
simulation exercises	meetings	town hall meetings
dialogues	coffee klatches	brainstorming

The compilation presented in Table 6 is supplemented by further literature on the subject. Bregman and Mackenthun (1992), two experienced American EA practitioners, offer three additional techniques: organization of a speakers bureau; participation in talk radio; and, distribution of EA documents to central depositories in local libraries.

The experience of the Inter-Church Uranium Committee Educational Cooperative (ICUC), reported by Penna (1993a), further supplements the compilation. ICUC was involved in joint federal-provincial assessments of three uranium mines proposed in Saskatchewan. The projects were the McClean Lake Project, proposed by Minatco Ltd., the Midwest Joint Venture Project at South McMahon Lake, proposed by Denison Mines Ltd., and the Dominique-Janine Extension, Cluff Lake, proposed by Cogema Canada Ltd.

ICUC not only participated in the public hearings, but also facilitated participation by individuals and organizations who massed against the proponents. A function that it performed in this regard was to educate its members and allies about the EA process and about the specific proposals under assessment. ICUC used a variety of the education techniques compiled in Table 6 including press releases, notices, information kits, brochures and technical assistance. It also used a number of techniques that are not contained in the compilation:

- publication of review panel decisions and reasons (Penna 1993b);
- electronic publishing - the Internet was used extensively to publish and distribute key documents such as notices, press releases, technical fact sheets, review panel decisions and appeal procedures (Penna 1993a, 1993b, 1993c, 1993d); and
- direct e-mail and discussion group conferencing - the Internet was also used as a means of communication and information dissemination through the use of e-mail and public discussion group conferencing (e.g., Penna 1993a).

Schibuola and Byer (1991) offer yet another technique to the compilation with their report of the development of a prototype of an interactive computer system for use by the public in reviewing EA source documents. The authors evaluated the prototype, which they refer to as a knowledge-based system, using case studies of actual assessments and conclude that the system offers potential as an inexpensive and accessible source of information for the public. In the course of their analysis the authors suggest that the

public review process of EA documents is inadequate since the public lacks sufficient knowledge. They propose that the quality of public involvement in EA will improve if the public can more effectively review EA documents. They also propose that the public will benefit from having specific knowledge needed to perform better reviews.

The methods utilized by Schibuola and Byer and ICUC bring the total to 40 distinct EA education techniques found in the literature. These are techniques identified not only in the academic literature (Westman 1985, Schibuola and Byer 1991) but also in literature prepared by experienced EA practitioners (Praxis 1988, Bregman and Mackenthun 1992) and community activists (Penna 1993). A compilation is presented in Table 7.

Table 7:   EA Education Techniques Identified in the Literature, Categorized According to Format

- audio/visual/electronic
    slide presentations   film presentations
    computerized participation
        - knowledge-based systems
        - electronic publishing

- traditional publishing (printed) (verbal)
    publications   brochures
    newspaper inserts   notices
    feature articles   position papers
    reports   newsletters
    information kits   central depositories
    decisions and reasons

- direct/individualized
    direct mail   phone lines
    field offices   technical assistance
    direct e-mail

- media
    advertising   news releases
    news conferences   public service announcements
    participatory television talk radio

- public presentations/events
    workshops   conferences
    panels   open houses
    exhibits/displays   contests
    simulation exercises   meetings
    town hall meetings   dialogues/coffee klatches
    brainstorming   speakers bureau
    discussion group conferencing

A cursory review of the EA legislation in three Canadian jurisdictions does not add significantly to the compilation of education techniques presented in Table 7. The jurisdictions in question are Canada, Ontario and Manitoba. The processes established by Canada and Ontario were selected because they are often perceived to be highly advanced, epitomizing the state-of-the art in Canadian EA (for example, see Smith 1991). Manitoba's process is of more recent vintage and presents an interesting counterpoint.

The federal process analyzed below is the <u>Environmental Assessment Review Process Guidelines Order</u>, SOR/84-467, commonly known as EARP. EARP was in force, in one form or another, for over 20 years and was recently replaced by the <u>Canadian Environmental Assessment Act (CEAA)</u>, S.C. 1992, c.37.

Ontario's EA process is founded on a rather complex network of four statutes, two regulations and, at least, three explicit policies:

- <u>The Environmental Assessment Act</u>, R.S.O. 1990, c. E.18;
- Environmental Assessment Act General Regulations, R.R.O. 1990, Reg. 334;
- Environmental Assessment Board Rules of Practice, R.R.O. 1990, Reg. 335;
- <u>The Consolidated Hearings Act</u>, R.S.O. 1990, c. C.29;
- <u>The Statutory Powers Procedure Act</u>, R.S.O. 1990, c. S.22;
- <u>The Intervener Funding Project Act</u>, 1988, R.S.O. 1990, c. I.13;
- Environmental Assessment Board and Joint Board Rules of Practice and Procedure Under the Intervener Funding Project Act, 1988;
- Intervener Funding Program General Principles for the Submission of Claims; and,
- Environmental Assessment Board Scoping Procedures.

The principal statute, <u>The Environmental Assessment Act</u>, contemplates a role for public education. Section 31(d) provides that the Minister of the Environment may convene conferences and conduct seminars and educational and training programs regarding EA. Section 31(e) grants authority to the Minister to publish and disseminate information with respect to EA. Under section 31(f) the Minister may make grants and loans for training with regards to the environment or EA.

Not unexpectedly, the techniques most often employed are those used to fulfil notice requirements, namely, personal service, registered mail and advertisements.

Statutory authorization for use of these techniques is found in section 36 of The Environmental Assessment Act, section 22 of The Consolidated Hearings Act, sections 11 and 13 of the Environmental Assessment Board Rules of Practice and section 8 of the Environmental Assessment Board and Joint Board Rules of Practice and Procedure Under the Intervener Funding Project Act, 1988. Concomitant with these techniques are methods which serve to notify the media viz. news releases and news conferences. In certain circumstances the process also authorizes the provision of notice in languages other than French and English (section 25 of the Environmental Assessment Board Rules of Practice).

The process also includes the establishment of a system of public registries and records, which help ensure access to fundamental project-specific documents such as scientific and technical assessments (see section 7(2) of The Environmental Assessment Act and sections 28 and 38 of the Environmental Assessment Board Rules of Practice).

The use of various publications is also part of the process. Naturally, the legislation requires publication of administrative decisions and reasons (sections 18(23) and 23(4) of The Environmental Assessment Act, section 52(6) of the Environmental Assessment Board Rules of Practice, sections 12(4) and 12(5) of The Consolidated Hearings Act). In addition, since 1986 the Environmental Assessment Board has included useful information about board members and the jurisdiction and purpose of the board in its annual report (Jeffery 1993). For years the Ministry of the Environment has also published a brief, informational brochure for the public about the EA process (see, for example, the short booklet entitled A Citizen's Guide To Environmental Assessment, published in 1987). According to Gibson (1995), the Environmental Assessment Advisory Committee also issues informative annual reports.

In recent years the process has incorporated "leading-edge" technologies and concepts. According to Jeffery (1993), the Environmental Assessment Board has recently acquired a computerized, information-retrieval system which provides public access to decisions, reports and other information.

The process also includes statutory provision for media coverage of Environmental Assessment Board proceedings but media access is at the discretion of the Board (section 27 of the Environmental Assessment Board Rules of Practice).

Finally, reform of the process in recent years has included an attempt at plain language legislation. The preamble to the Environmental Assessment Board Rules of Practice states that the intent of the rules is to provide a fair, open and understandable process to enhance public participation. Whether the attempt has been successful is debatable; the rules are devoid of blatant examples of legalese but they are rife with multi-claused, paragraph-length sentences. (For example, section 46(1) is one sentence and it has 109 words. Section 52(6) is even longer, at one sentence and 121 words.)[7]

Manitoba's EA process is based on The Environment Act, S.M. 1987-88, c. 26; Chap. E125 and four regulations: Classes of Development Regulation, Man. Reg. 125/88 R; Joint Environmental Assessment Regulation, Man. Reg. 126/91; Licensing Procedures Regulation, Man. Reg. 163/88; and, Participant Assistance Regulation, Man. Reg. 125/91.

Generally, in terms of the role of public education, Manitoba's process is similar to Ontario's. In fact, the Act specifically contemplates a role for public education. Section 2(3) states that for the purposes of increasing environmental awareness the minister responsible may produce public informational material and may develop education programs for the general public and in the school system. In addition, section 8 requires the minister to appoint the Manitoba Environmental Council with a mandate to promote environmental awareness and provide assistance in the development of education programs.

The techniques employed in the Manitoba process, however, tend towards the passive variety and concentrate on information dissemination. The process includes:

- public meetings (section 6(4) of The Environment Act, section 5 of the Participant

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7. The use of plain language in the area of environmental management presents an interesting study. There have been a number of court cases in the United States that struck down environmental impact statements because they were not written in plain language as required under NEPA (see, for example, Oregon Environmental Council v. Kunzman, 614 F. Supp. 657 (D. Ore. 1985)). The plain language issue took an interesting turn in British Columbia in 1993 with the case of R. v. Village of 100 Mile House (unreported). In that case, Judge T.C. Smith incorporated a plain language requirement into a sentence imposed for a breach of The Waste Management Act of B.C. The sentence included a recognizance order (a type of probation order) with conditions which required the Village to prepare a manual written in plain language to provide a "helpful, concise, and an easily read guide for people tending earthen dams". The Village was ordered to fieldtest the manual and distribute it to the public and to all municipalities in B.C. free of charge.

Assistance Regulation);

- registered or certified mail (section 27(2) of The Environment Act);

- radio or newspaper advertisements (sections 7(1), 10(4)(a), 11(8)(a), 12(4)(a), 13.1(2)

  of The Environment Act, section 2(2) of the Participant Assistance Regulation);

- public registries (section 17 of The Environment Act; section 2 of the Joint

  Environmental Assessment Regulation);

- publication of administrative decisions and reasons (sections 10(7), 10(9), 10(10),

  11(10), 11(12), 11(13), 12(6), 12(8), 18(2) of The Environment Act);

- reports (sections 4 and 6(10) of The Environment Act);

- informational brochures (see, for example, Participants' Guide For Public Hearings);

  and,

- news releases and news conferences.

The process does not, however, include techniques based on computer technologies or plain language concepts. Nor does it specifically recognize the need for translation and interpretation or permit media coverage of key aspects of the process, such as hearings.

When EARP was in force the primary document in the Canadian process was a regulation, the Environmental Assessment and Review Process Guidelines Order (EARP) (SOR/84-467). The process also included a number of policy documents such as Guidelines for Preparing Initial Environmental Evaluations (October 1979) and Environmental Assessment Panels: Procedures and Rules for Public Meetings (1985).

In the context of education in the public involvement process, the EARP process was similar to the processes reviewed above. It contemplated a role for public information programs, but the role was somewhat more limited than the Ontario and Manitoba provisions. Sections 28 and 31(c) of EARP required information programs regarding specific projects and specific proponents. Generally, the same education techniques were employed:

- access to project-specific, technical information is ensured (sections 15 and 29 of

  EARP. Section 34(b) also contemplates translation of review documents into

  languages other than English and French.);

- reports (section 18(d) of EARP);

- publication of administrative decisions and reasons (sections 26(3) and 31(2) of EARP);
- informational booklets (see, for example, Couch 1988);
- presentations at public meetings and hearings (sections 33(b) and 34 (e) of EARP); and,
- techniques required to ensure the provision of notice to the public and to the media.

The EARP process did not, however, include techniques based on computer technologies, plain language concepts or diverse media practices.

The above review of the legislation does not add significantly to the compilation of EA education techniques revealed in the literature. Most of the techniques adopted in the legislation focus on information dissemination and serve to fulfil notice requirements. This is not an unexpected discovery since adequate notice is a requirement of due process and the principles of natural justice. Emphasis is also on project-specific information through the establishment of a system of public registries and records and through the release of information to the media.

There are, however, a number of techniques adopted in the legislation that are not mentioned in the literature. These are found in the Ontario EA process and include the following: translation of key documents to ensure effective communication with affected publics; computerized information retrieval systems; plain language legislation and policies; and, media coverage of hearings.

This brings the total to 44 distinct EA education techniques identified in the literature and adopted in the legislation of three Canadian jurisdictions (Table 8).

Table 8 presents techniques that are used specifically in the context of education about EA. The efficacy of some of these techniques is affirmed by research conducted, not in the context of EA education, but in the context of other types of non-formal environmental adult education.

Oduaran (1989) reports that a community education campaign involving printed educational materials, appropriate translation strategies and radio and television messages was effective in heightening awareness of pollution issues in Nigeria.

Table 8:   EA Education Techniques Identified in the Literature and Adopted in the
            Legislation of Selected Jurisdictions, Categorized According to Format

- audio/visual/electronic
  slide presentations   film presentations
  computerized participation
    - knowledge-based systems
    - electronic publishing
    - information retrieval systems

- traditional publishing (printed) (verbal)
  publications   brochures
  newspaper inserts   notices
  feature articles   position papers
  reports   newsletters
  information kits   central depositories
  decisions and reasons   translation
  plain language legislation

- direct/individualized
  direct mail   phone lines
  field offices   technical assistance
  direct e-mail

- media
  advertising   news releases
  news conferences   coverage of hearings
  participatory television   talk radio
  public service announcements

- public presentations/events
  workshops   conferences
  panels   open houses
  exhibits/displays   contests
  simulation exercises   meetings
  town hall meetings   coffee klatches
  brainstorming   speakers bureau
  discussion group conferencing

Fortner and Lyon (1985) confirm the positive role that television can play as a medium for communicating environmental information to the general public. Their investigation was done by determining the influence of a Cousteau documentary on viewer knowledge and attitudes and to assess changes in those characteristics over time.

Mcleod (1987) conducted a survey of homeowners in two Wisconsin communities which examined the relationship of media use to a set of cognitive, attitudinal, and

behavioural components of energy conservation. The results suggest that energy conservation campaigns ought to make use of the media and should take into account communication patterns and energy use of specific groups of consumers.

Still with regards to the media, McCallum (1991) reports results which indicate that local media provide relatively effective means of disseminating environmental information. The study involved over 3,000 respondents from six communities who provided information about their recall of environmental risk information and sources related to environmental health risks. The results indicate that local media were the most pervasive source of environmental information. Nevertheless, McCallum concludes that more information sources and higher levels of consumer interest are needed to involve the public effectively in environmental issues.

Sutton's (1989:6) observations support the conclusion that popular media are effective tools for environmental education:

"It must be admitted that the ways in which we have learned of the dangers and discomforts of much industrial and urban growth could best be described as informal education, sometimes nonformal but rarely formal. We have learned from the media reporting of the disasters of Seveso, Three Mile Island, Bhopal, Chernobyl and the Exxon Valdez, and in some cases, sadly, from their direct effects. It is the advertising campaigns of environmental organizations against named companies which have made us ask questions about our consumer durables. And the scares over chemical debasement of food and drink have not arisen out of educational information in the usual sense of the term, but again out of the media,...".

It is interesting to compare these positive views of the role of the media with Bregha's (1992) view that the media's ineffective coverage of environmental issues is one of the five most important barriers to the flow of environmental information from government to the public.[8]

Alm (1992:55) confirms the effectiveness and efficiency of computer communications in environmental education. He suggests that computer based techniques

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[8.] The other barriers are the compartmentalization of environmental information among government departments, the manipulation of information to protect vested bureaucratic or political interests, the withholding of information, and the small number of well-funded environmental groups.

such as e-mail, discussion groups, access to data bases and interactive participation have created a global, low budget "virtual classroom, without walls, and increasingly without borders."

Besides affirming the efficacy of certain EA education techniques presented in Table 8, the literature on other types of non-formal environmental adult education contributes a number of additional techniques to the compilation. The public education campaign on pollution issues in Nigeria, reported by Oduaran (1989), included not only the use of print materials, translation strategies, and radio and television messages, but also included the use of *posters and the promotion of a monthly, national sanitation day sanctioned by the government.*

Comings et al. (1981) report on the successful publication of a *photonovel* as an environmental health education technique. A photonovel is similar in nature to a comic book but uses photographs rather than drawings. It presents a dramatic story with dialogue placed in balloons on the photographs. This format is a popular type of literature in Latin America and has been used as an educational tool both in Latin America and in Europe.

The delegates at the second meeting of the South Pacific Regional Environment Programme suggested that *song contests* be included among a range of education and public involvement projects to heighten community awareness (Lefale and Kay 1992). This particular technique may only be relevant to South Pacific nations but it highlights the need for national or global initiatives to be sensitive to regional needs and cultural identities.

Viezzer (1992:6) advocates an holistic approach to environmental education for adults. She argues for *integration of environmental issues into existing curricula.* "The problems with the environment can be coupled with the study of mathematics in things such as: the quantities of garbage produced, whether adequate recycling is taking place or not and its effect on daily life; the amount of water available in their country for human consumption in contrast to other places where this resource is abundant or non-existent etc." She also argues for *discussion of environmental issues in literacy programs* and classes. "Not only reading and writing can be learned, but also strategies for survival."

A message via the Internet from pperi@uwspmail.uwsp.edu (1994) reports on the production of an education kit for environmental education advocates. The kit includes a

comprehensive *manual* and a short *video* developed expressly for individuals and organizations interested in developing environmental education programs at the local or state level.

Finally, rrohwedder@igc.org (1993) provides a report by way of the Internet concerning the development of *interactive computer software* that prepares an environmental impact statement for individuals from their responses to a series of lifestyle questions. The software computes a household's impact points, which measure environmental damage, and action points, which measure positive contributions. A rating is given between "EcoTyrannosaurus" and "EcoHero".

Table 9, on the following page, compiles 53 education techniques either identified in the literature or adopted in the legislative processes of three Canadian jurisdictions. The literature review not only canvassed techniques used in the context of EA, but also covered techniques used in other environmental contexts such as public health, environmental protection and waste management. In addition, the literature runs the gamut from academic articles to practical literature to informal reports of community activists. Together these techniques not only represent a consensus of the theoretical and applied literature, they provide a useful and interesting inventory of the potential activities that could be undertaken in facilitating EA education.

3.5.2 CRITICAL ANALYSIS

The literature review did not reveal a great deal of information on the evaluation of education techniques available for use in EA. For the most part, evaluations of public involvement processes tend to focus on the amount of power given to the public in the decision-making process, not on the education dimension of the involvement process.

Although some writers have evaluated the effectiveness of individual education techniques (e.g., Schiboula and Byer 1991 - knowledge based computer programming; Fortner and Lyon 1985 - television programming; and, Mcleod 1987 - local media activities), none have analyzed the techniques within the framework of critical pedagogy. Such an analysis is conducted below.

Table 9: Education Techniques Identified in the EA Literature, Adopted in the Legislation of Selected Jurisdictions or Identified in Literature From Other Environmental Contexts, Categorized According to Format

- <u>audio/visual/electronic</u>
  - slide presentations
  - computerized participation
    - knowledge-based systems
    - electronic publishing
    - information retrieval systems
    - interactive computer software
  - film presentations
  - videotape

- <u>traditional publishing (printed) (verbal)</u>
  - publications
  - newspaper inserts
  - feature articles
  - reports
  - information kits
  - decisions and reasons
  - plain language legislation
  - photonovel
  - brochures
  - notices
  - position papers
  - newsletters
  - central depositories
  - translation
  - posters
  - manuals

- <u>direct/individualized</u>
  - direct mail
  - field offices
  - direct e-mail
  - phone lines
  - technical assistance

- <u>media</u>
  - public service announcements
  - news conferences
  - call-in television
  - coverage of hearings
  - news releases
  - advertising
  - talk radio
  - interviews

- <u>public presentations/events</u>
  - workshops
  - panels
  - exhibits/displays
  - simulation exercises
  - meetings
  - dialogues/coffee klatches
  - speakers bureau
  - discussion group conferencing
  - conferences
  - open houses
  - contests
    - song contests
  - town hall meetings
  - brainstorming
  - special event days

- <u>formal education</u>
  - integration into existing curricula
  - discussion in literacy programs

It must be reiterated that critical EA education is an approach to education, not an educational method. However, the position here is that certain education techniques are more suited for use within the critical approach than are others. Using Shor's (1993) descriptors of critical pedagogy and Gibson's (1994) summary of the Freirean process, the following analysis identifies a range of techniques that are well suited to critical EA education.

For ease of reference, Shor's (1993) ten descriptors are reproduced below, supplemented by three further characteristics identified by Gibson (1994):

- participatory - students participate in making their education;
- situated - the course subject matter is situated in student thought and language;
- critical - discussion encourages self-reflection and social reflection;
- democratic - discourse is constructed mutually by students and teacher;
- dialogical - the basic format is dialogue around problems posed in class;
- desocializational - students are desocialized from passivity in the classroom;
- multicultural - cultural diversity of society is recognized and accepted;
- research oriented - the teacher does research into the speech, behaviour, and cognitive development of the students while the students research problems posed by the teacher;
- activist - the classroom is active and interactive;
- affective - the dialogue is interested in a broad development of human feeling;
- relies on praxis, i.e., the action-reflection learning cycle;
- values group learning in a collective setting; and,
- uses the teacher as a coordinator.

The inventory of techniques presented in Table 9 is fairly comprehensive. It covers the spectrum from rudimentary, information dissemination techniques such as newspaper advertisements to sophisticated pedagogical techniques such as simulation exercises. It includes written devices such as manuals, brochures and booklets as well as oral methods such as public meetings, lectures and workshops. Tried and true methods such as film and video are included, as are innovative techniques such as knowledge-based systems and plain language legislation.

Almost all of the education techniques compiled in Table 9 could, theoretically, be used within the critical approach but they could also, with as much ease, be employed within the banking approach. Upon further review, however, it is revealed that the techniques can be ranked based on their congruence with the fundamental characteristics of critical methodology. It would appear that some of the techniques are well suited to critical EA education, some are poorly suited, while others appear to be neutral.

The techniques that are well suited emphasize interactive learning, are people centred and exhibit many of the descriptors of critical pedagogy. An example is the workshop technique. By definition, workshops are participatory, dialogical, desocializational, research oriented, activist, reliant on group learning and use the teacher as the coordinator. They also tend to be democratic and critical and with proper planning can be situated, multicultural and affective.

Another example is the simulation exercise technique (e.g., mock trials, debates, participatory drama). By definition, these are participatory, dialogical, desocializational, research oriented, activist, reliant on the action-reflection learning cycle, reliant on group dynamics, focussed on the means rather than the end and use the teacher as the coordinator. As well, with little effort they can also be situated, democratic, multicultural and affective.

Other techniques that exhibit many of the descriptors of critical pedagogy, and hence are well suited to critical EA education, are knowledge based systems, interactive computer software, dialogues, coffee klatches and discussion group conferencing.

The techniques that are poorly suited to critical EA education exhibit few, if any, of the descriptors of critical pedagogy. Generally, they focus on the presentation of "facts"; mere information dissemination with little or no interaction with the affected publics. Typical examples are advertising, direct mail (both e-mail and "snail mail"), posters and central depositories. Other techniques from Table 9 that fall into this category include the vast array of publishing techniques (including electronic publishing) and most of the media techniques (excluding talk radio and TV and radio interviews).

Some of the poorly suited techniques are worse than others. For example, photonovels and newsletters are probably slightly better suited to critical EA education than are posters and brochures. Newsletters are periodic and are often locally produced and,

therefore, are more likely to be current and situated in terms that are relevant to the learners. Photonovels are usually situated in "real life" circumstances and tend to focus on problem solving. In contrast, brochures and posters tend towards broad generic statements of fact.

In labelling these education techniques as poorly suited to critical EA education, it is not suggested that they be dropped from the EA education process. In the context of a well planned and coordinated critical program, the "lowliest" of the poorly suited techniques can become a valuable tool. For example, central depositories epitomize the banking approach; experts make deposits of authoritative information which is passively withdrawn by members of the public. However, as part of a critical exercise, searching a central depository becomes participatory, desocializational, research oriented, activist, and reliant on praxis; in short a valuable technique for use in critical EA education. In addition, some of the poorly suited techniques serve crucial functions in the EA process. Advertising, direct mail and others are inexpensive techniques used to provide reasonable notice of important events to members of the public. Since reasonable notice is a legal requirement under the principles of natural justice, the value of simple information dissemination techniques is evident.

The point that is being made here is that the so-called poorly suited education techniques have limited value by themselves. They become significantly more important in the context of a coordinated and planned program of critical EA education.

The education techniques labelled as neutral involve some degree of teacher-learner interaction. This interaction introduces an element of discretion so that a neutral technique can be applied as a banking tool or as a critical tool. Take, for example, panel presentations. The panel format easily fits within the banking approach to education. "Talking heads" or experts make presentations or deposits of information for the benefit of uninitiated nonexperts.

On the other hand, the panel format also easily fits into the critical approach. The key is to incorporate the fundamental characteristics of critical methodology: use resource people from the community or class, situate the dialogue in terms that are relevant to the learners, structure the panel around dialogue and problem posing, respect and value diversity in the class and so on.

Take another example, the technique of slide presentations. Obviously, one can have slide presentations within the banking approach and slide presentations within the critical approach. Slides are mere tools to achieve the given objective, domestication or conscientization. The point here is that it is the educational context that gives value to the neutral techniques. With respect to critical EA education, the so-called neutral techniques are only valuable when they are applied in the context or culture of critical pedagogy.

Some of the other techniques from Table 9 that can be classified as neutral are film and video presentations, phone lines, technical assistance, field offices, call-in television, talk radio, interviews, meetings, speakers bureaus, special event days, conferences, open houses, contests, town hall meetings and brainstorming. What each of these techniques has in common is that they involve some degree of teacher-learner interaction.

3.6   SUMMARY

The literature on public involvement indicates that education is a crucial aspect of the public involvement process. The notion explored in this research is that education is a necessity; a precondition to advanced levels of public involvement. The type of education introduced in this research is critical EA education. The foundation of critical EA education is Freire's (1970) critical pedagogy.

Critical EA education should encompass both "education about EA" and "education through EA" and should result in citizen empowerment and social action. The notion of critical EA education is supported by Finger's (1989) theory of environmental adult transformation and its relationship with environmental adult learning. Further support is offered by social learning theory and Alexander's (1994) forums of social learning.

There are three components to the rationale for critical EA education:

*   it contributes to human liberation and fundamental democratic principles;
*   there is a clear and strong need for environmental education;
*   it can profoundly improve planning and assessing of development activities by helping introduce counter-hegemonic discourses that work to reverse current trends of unsustainable resource exploitation.

Critical EA education is an approach; it is not a prescription for particular instructional methodologies. However, some instructional methods and education

techniques are better suited for use in critical education than others. The 53 education techniques identified in the literature can be ranked based on their congruence with the fundamental characteristics of critical methodology. Some of the techniques are well suited to critical EA education, some are poorly suited, while others appear to be neutral. The techniques that are well suited emphasize interactive learning, are people centred and exhibit many of the descriptors of critical pedagogy. The techniques that are poorly suited exhibit few of the descriptors of critical pedagogy, focus on information dissemination and involve little or no interaction with the affected publics. The neutral education techniques involve some degree of teacher-learner interaction. This interaction introduces an element of discretion so that a neutral technique can be applied as a banking tool or as a critical tool.

CHAPTER 4: PEMBINA VALLEY WATER SUPPLY SYSTEM

4.1   SELECTING THE CASE

Steps were taken to identify the specific education techniques used in a recent Manitoba sample case. This permitted a critical analysis, along the lines of that conducted in Chapter 3, of techniques used in actual practice.

As mentioned in Chapter one, informal interviews with officials of the provincial EA authority were conducted for the purpose of selecting an appropriate EA case. Although a number of fairly suitable EA cases were discussed during the interviews, the Pembina Valley Water Supply System emerged as the most appropriate case. First, the case was fairly recent, with the ultimate decision being rendered in June 1994. Second, the case involved a large but manageable number of participants. Third, the strata of participants are quite diverse and included individuals and organizations, cities and towns, lawyers and lay advocates, sophisticated lobby groups and grass-roots community groups, rural and urban representatives, business corporations and non-profit organizations and formal interveners and individuals who were peripherally involved. Fourth, an initial assessment of the case indicated that some degree of public education was attempted by a number of the participants. Fifth, the case involved the entire EA process, from preparation and submission of a proposal to the granting and appeal of an Environment License. Finally, the case ranked high when judged in pragmatic terms; the first language of the majority of participants in the case is English and the majority of the participants are located in the Pembina Triangle region of Manitoba, within a 2 - 3 hour drive of Winnipeg.

4.2   FACTS OF THE CASE

4.2.1   THE ASSESSMENT PROCESSES INVOLVED

The proposal for the Pembina Valley Water Supply System was subject to both the federal and provincial EA processes. When the proposal was filed in October 1991 the federal process was governed by the Environmental Assessment and Review Process Guidelines Order (EARP) (SOR/84-467). The provincial process was guided by The Environment Act, S.M. 1987-88, c. 26; Chap. E125 and regulations.

4.2.2   THE PROPONENT

The proposal for the Pembina Valley Water Supply System was submitted by the Pembina Valley Water Cooperative Inc., an organization formed in 1991. The Co-op comprises seven rural municipalities and eight towns in the Pembina Triangle area of southern Manitoba. The members are the Rural Municipalities of Dufferin, Montcalm, Morris, Roland, Rhineland, Stanley and Thompson and the Towns of Altona, Carman, Emerson, Gretna, Morden, Morris, Plum Coulee and Winkler.

The Co-op is the successor to the Pembina Valley Water Task Force. The task force was formed in 1989 in response to recurrent drought conditions, an increase in water demand in the larger communities in the Pembina Triangle and poor water supply and quality in the smaller communities and on local farms. The task force consisted of the members of the Co-op but also included representatives from the Prairie Farm Rehabilitation Administration, Manitoba Water Services Board, Manitoba Water Resources Branch and Manitoba Department of Rural Development (Pembina Valley Water Task Force 1990).

4.2.3   THE PROVINCIAL PROCESS

4.2.3(1)   THE ORIGINAL PROPOSAL

The provincial process, governed by The Environment Act, S.M. 1987-88, c. 26; Chap. E125 and regulations, and its application in the Pembina Valley Water Supply System case is summarized below.

The Environment Act provides for the environmental assessment of developments likely to have a significant effect on the environment. Developments can take one of three forms and are separated into three classes. Class 1 developments are generally pollution related. Class 2 developments are activities with significant environmental impact caused by factors other than pollution. Class 3 developments are relatively few in number and involve large scale projects such as the Pembina Valley Water Supply System.

A proponent of a development must obtain an Environmental Licence. The procedure for obtaining a licence starts with the proponent filing a proposal with Manitoba Environment. The proposal must address the matters specified in the Licensing Procedures

Regulation. Generally, the proposal must contain a description of the project, the impacts on the environment and mitigation measures. In the Pembina Valley Water Supply System case, the proponent filed its original proposal on October 18, 1991 (McNaughton 1993).[9] The Co-op proposed to develop and operate a comprehensive water supply system as a long-run solution to water-related problems in the Pembina Triangle. The project was intended to provide assured supplies of potable water for municipal, industrial and on-farm use (domestic and livestock consumption). The proposal specifically highlighted that it was not intended to provide water supplies for irrigation.

Along with the construction of new water treatment plants and pipelines, the proposal included a plan for a water conservation program and a plan for continued use of existing water sources at sustainable levels (Pembina Valley Water Cooperative 1991).

Figure 6 illustrates the Co-op's original proposed project. This involved diverting water from the Assiniboine River (up to 0.57 cubic meters per second by the year 2040) to the Boyne River and eventually to the Stephenfield Reservoir. A new water treatment plant at the reservoir would have been constructed and treated water would have been distributed by pipelines east to Carman and south to the Morden, Winkler and Plum Coulee areas.

A new water treatment plant would also have been constructed in Morris and the existing plant at Letellier would have been expanded. Water would have been diverted from the Red River to meet the demands of these two plants. Up to 0.083 cubic meters per second by the year 2040 would have been withdrawn over and above the 0.057 cubic meters per second currently being withdrawn. The new treatment plant at Morris would have served the Towns of Lowe Farm and Rosenort and the expanded Lettelier plant would have serviced the Towns of Altona, Gretna, St. Jean and Emerson. Existing treatment plants at St. Jean and Emerson would have been closed down. Regional pipelines would have been constructed to service the larger communities and smaller pipeline networks would have been built to meet rural and on-farm needs (M.M. Dillon Ltd. 1992).

[9.] Prior to the original proposal being filed, in April 1991 the proponent had submitted to Manitoba Environment a draft proposal for discussion purposes (McNaughton and Webb 1993).
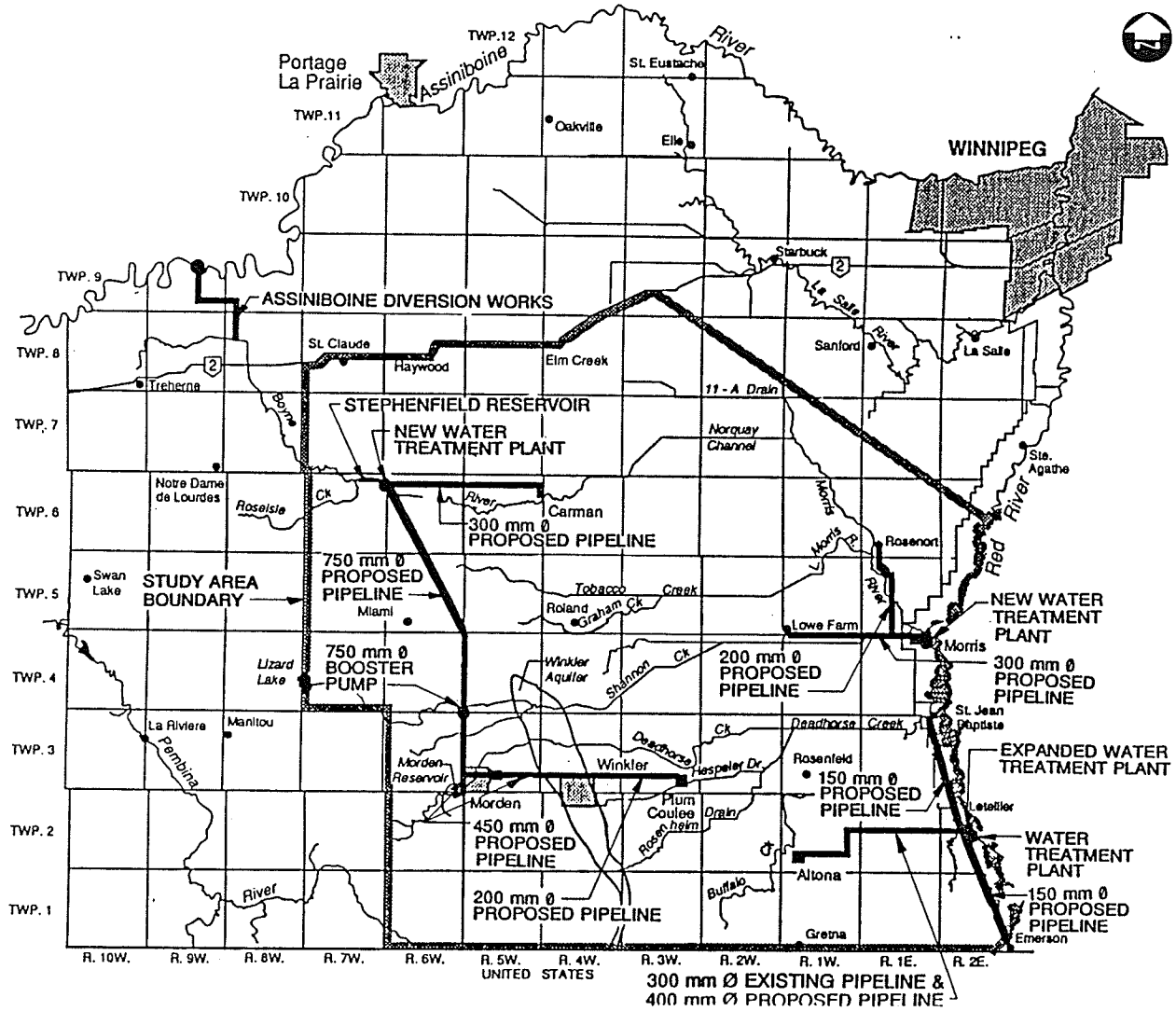
Figure 6:   The Original Pembina Valley Water Supply System Proposal
              (After M.M. Dillon Ltd. 1993)

4.2.3(2)   REACTION TO THE ORIGINAL PROPOSAL

Upon receipt of a proposal Manitoba Environment files a public notice of the proposal, files the proposal in various public registries and provides an opportunity for public comment. These things were done in the Pembina Valley Water Supply System case with advertisements being placed in newspapers in Winnipeg, Brandon, Portage la Prairie, Treherne, Morris, Morden, Altona, Manitou, Carman, La Liberte and St. Claude (McNaughton and Webb 1993).

Manitoba Environment also files the proposal with the Manitoba Interdepartmental Planning Board. Under the Interdepartmental Planning Board process a multi-agency Technical Advisory Committee is established to review the proposal and ensure that the form or class of assessment is appropriate to adequately address the effects that the development may have.

In the case at hand, an advisory committee, including representatives from the City of Winnipeg and the federal government, met and reviewed the draft proposal submitted in April 1991. Upon submission of the formal proposal in October 1991 the technical advisory review was started again and federal departments with probable interest in the proposal were formally notified (McNaughton and Webb 1993).

In this case there was significant public reaction to the proposal. Over 400 letters were received by the Minister of the Environment, Manitoba Environment, the Clean Environment Commission (CEC) and the Premier's office. The letters were from private citizens, municipalities and non-government organizations. Some were in favour of the proposal while others raised concerns and objections. Major objections were raised about potential adverse impacts on water rights exercised downstream from the proposed diversions. Objections were also raised about the accuracy of some aspects of the proposal, the scope of the environmental concerns covered in the proposal and the lack of attention paid to water conservation (McNaughton 1993).

There was also a substantial response to the proposal from agencies on the Technical Advisory Committee. Concerns were raised about a vast array of issues including population projections, water use trends, climate change, risk of damage to the pipeline network, sustainable development, wildlife and plant habitat, fish habitat,

increased irrigation, pollution from farm chemicals, water conservation, recreation issues, mitigation, road crossings, heritage resources, the hydrological models employed and storage of diesel fuel supplies at the diversion sites (McNaughton and Webb 1993).

4.2.3(3)   THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

At this stage of the process, the Minister of the Environment, upon the recommendation of Manitoba Environment, required the proponent to provide additional information and to prepare an environmental impact statement. To assist in this regard Manitoba Environment issued guidelines for the preparation of the environmental impact statement. The guidelines were developed in consultation with the Technical Advisory Committee and after consulting with the public at three scoping workshops held in Russell, Portage la Prairie and Winkler in May 1992 (McNaughton 1993).

The environmental impact statement was submitted on December 15, 1992. Manitoba Environment placed the document in the public registries and advertised its availability through local media outlets. The environmental impact statement divided potential impacts into three main categories: the impacts of engineered facilities; the impacts of water resource management operations; and, socioeconomic impacts. It identified the potential for some adverse residual impacts, made a number of recommendations regarding research and monitoring and concluded that the project was acceptable, with insignificant long-term adverse impacts (M.M. Dillon Ltd. 1992).

4.2.3(4)   THE MODIFIED PROPOSAL

On February 4, 1993, before the period for public review of the environmental impact statement had expired, the proponent modified its original proposal by submitting an addendum to the EIS (McNaughton and Webb 1993). The addendum was distributed and advertised in the same way as the EIS.

Under the modified proposal, the Assiniboine-Boyne diversion and the Stephenfield treatment plant were abandoned. In their stead it was proposed to expand the City of Portage la Prairie's existing withdrawal and treatment facilities. A water supply pipeline network was still proposed but under the modified proposal the potential service area was expanded to include the Rural Municipalities of Portage la Prairie, Grey, Cartier

and St. François Xavier (M.M. Dillon Ltd. 1993). The modified proposal rendered much of the original environmental impact statement redundant. According to the proponent, "The bulk of the new proposal is perceived, based on the preliminary assessment, to have significantly fewer environmental implications than the previous proposal involving the Assiniboine to Boyne River diversion." (M.M. Dillon Ltd. 1993:20).

4.2.3(5)   REACTION TO THE EIS AND ADDENDUM

Public expressions of concern over the Assiniboine-Boyne diversion had caused the proponent to modify its original proposal by filing the addendum (Manitoba Clean Environment Commission 1994). Even with the modified proposal significant public concern remained. Most of the comments received by Manitoba Environment in response to the EIS and addendum were critical. The technical advisory committee was less critical but also identified a number of inadequacies in the EIS documents (McNaughton and Webb 1993).

At this point Manitoba Environment requested supplemental information from the proponent to clarify technical details, provide further information and address items in the EIS guidelines that were not addressed in the EIS. The supplemental information was provided, at which time Manitoba Environment prepared a discussion paper outlining further outstanding information requirements. On April 7, 1993, before the proponent responded to the discussion paper, the Minister of Environment requested the CEC convene public hearings on the project (McNaughton and Webb 1993).

4.2.3(6)   PUBLIC HEARINGS

Following the April 7, 1993 request from the Minister, the Commission held some 40 hours of public hearings in the Pembina Valley Water Supply System case. Hearings were held in Portage la Prairie, Russell and Altona. On June 29, 1993 the Commission adjourned the hearings and requested the provision of additional information deemed to be necessary to evaluate the proposal. The Manitoba Department of Natural Resources was requested to provide details of instream flows and water withdrawal along the relevant segment of the Assiniboine River. It was also requested to provide information about water rights legislation and recent provincial water policies. The provincial Sustainable

Development Coordination Unit was requested to provide an assessment as to how the proposal reflected the principles of sustainable development. Finally, the proponent was requested to provide supplemental information and all outstanding information as detailed by Manitoba Environment (Manitoba Clean Environment Commission 1994).

Following the adjournment of the hearings, the proponent amended its proposal yet again. This amendment deleted the portion of the project related to diversion of water from the Assiniboine River. The project now focussed solely on withdrawals from the Red River and the Stephenfield Reservoir (Manitoba Clean Environment Commission 1994).

In March 1994 the Commission reconvened the hearings, this time in Winnipeg and Carman. On the instruction of the Minister of the Environment, the reconvened hearings focussed on the proponent's amended, modified proposal. Through both rounds of hearings the Commission heard presentations and received written submissions from the major participants namely, the proponent, the provincial EA authority and interested government agencies providing technical assistance, i.e., Manitoba Natural Resources and the Sustainable Development Coordination Unit. It also received 41 submissions from diverse individuals and organizations including, cities, towns, rural municipalities, environmentalists, social activists, chambers of commerce, small farmers and large farming corporations (Manitoba Clean Environment Commission 1994).

4.2.3(7)   THE LICENCE

In the end, the Commission recommended that a licence be granted for the amended, modified proposal. Four conditions were, however, placed on the project:

- that the proponent develop a comprehensive water conservation plan. The plan will include the proponent securing written contracts from those purchasing water from the system that the plan will be respected and implemented.

- that the proposed water treatment plant at the Stephenfield Reservoir and the accompanying access road shall be sited to ensure that there are minimal impacts on the Stephenfield Provincial Park.

- water supply pipelines shall be located and constructed in such a way as to minimize potential adverse environmental impacts. "Recommended Fish Protection Procedures for Stream Crossings in Manitoba", established by the Manitoba Department of Natural

Resources, are to be followed.

* potential adverse impacts to fisheries shall be mitigated through measures prescribed by the Manitoba Department of Natural Resources (Manitoba Clean Environment Commission 1994).

4.2.4   THE FEDERAL PROCESS

The EARP process, when it was still in effect, applied to any proposal:

* that was to be undertaken directly by an initiating federal department;
* that may have had an environmental effect on an area of federal responsibility;
* for which the federal government made a financial commitment;
* that would have been undertaken on lands administered by the federal government (section 6).

In a typical review under EARP, the first step was a preliminary assessment by the "lead" federal initiating department. The preliminary assessment was based on input from other federal agencies with an interest in the proposal, public reaction and the lead department's own assessment of the proposal. Upon completion, the preliminary assessment was registered with the Federal Environmental Assessment and Review Office (FEARO). The preliminary assessment generally led to one of four determinations:

* the project will have no adverse environmental effects and may therefore be exempt from further consideration and may proceed:
* the project will likely have significant adverse environmental effects and must be subject to a public review;
* the project will likely have significant adverse environmental effects and must be modified or abandoned;
* the project must undergo further study prior to a decision being made on whether a public review is necessary (section 12).

In those instances where it was determined that the project had to undergo an independent public review, an Environmental Assessment Panel was appointed by the Minister of the Environment. The public review process had its own set of rules including operating procedures, guidelines for the preparation of environmental impact statements and requirements for the dissemination of public information.

In the Pembina Valley Water Supply System case there were a number of initiating federal departments but the lead department was the Prairie Farm Rehabilitation Administration (PFRA). This agency would likely have administered federal funds, if such funds would have been contributed to the project. It fell to PFRA to ensure that the proposal was assessed in accordance with EARP procedures and to consult with other initiating federal departments such as Fisheries and Oceans and Transport Canada. It also consulted with other interested federal departments such as Indian and Northern Affairs and Environment Canada. PFRA also monitored the provincial assessment and provided the provincial EA authority with advice on the impacts of the proposal on resources under federal jurisdiction (M.M. Dillon Ltd. 1992). The final decision on the preliminary assessment was never actually registered with FEARO since PFRA was never formally approached for funding assistance.

4.3   EDUCATION TECHNIQUES USED IN THE CASE

4.3.1   RESULTS OF THE FILE REVIEW

During the informal interviews to select the study case, it was revealed that some degree of public education was attempted by participants in the Pembina Valley Water Supply System case. This was confirmed by a review of important documents from the case such as background reports, the proposal, the environmental impact statement plus amendments, key exhibits from the hearings, the CEC report and media reports.

By far the greatest education efforts were attempted by the proponent. Before the inception of the Co-op, the Pembina Valley Water Task Force regularly engaged in public education activities. In February and March 1990 the Task Force organized four *public information sessions* to explain its position to area residents. Approximately 400 people attended the meetings, held in Morris, Altona, Carman and Morden. The Task Force also organized a series of 14 *meetings* with interested parties from local governments outside of the project area. It also had a strategy of informing the *media* of recent developments in the project. "This was routinely done to inform the public of proposals under consideration, to encourage dialogue and consensus building during the study, and to obtain feedback from all interested parties." (M.M. Dillon Ltd. 1992:195). Over 50 newspaper stories about the

project appeared in papers around Manitoba from July 1989 to June 1991 when the Task Force was dissolved (Pembina Valley Water Cooperative Inc. 1991).

The Co-op continued the education efforts started by the Task Force. It held *open board meetings and rotated its meetings* through the project area. It continued the *media relations* strategy. It published a regular *newsletter* entitled, 'About Your Water', distributed to more than 16,000 residents in the project area. It organized a series of *open house information sessions* from October 15, 1991 to November 15, 1991. These sessions served a dual function. They were held to inform the public and answer questions about the project but they were also used to consult with local residents to identify issues of concern (M.M. Dillon Ltd. 1992).

The provincial EA authority, Manitoba Environment, also engaged in public education during the course of the assessment. Most of the activities relate to providing notice and access to key information but some interactive public events were conducted. What follows is a point form summary of the activities conducted by Manitoba Environment (McNaughton 1993, McNaughton and Webb 1993, Manitoba Environment 1992):

- resource people were present at the *open house information sessions* organized by the proponent in October and November 1991
- *notice of the proposal was advertised* in newspapers in Winnipeg, Brandon, Portage la Prairie, Treherne, Morris, Morden, Altona, Manitou and Carman. Advertisements in *French* were also placed newspapers in La Liberte and St. Claude.
- a summary of the proposal was filed in the *public registry*
- a *direct mailout* was conducted to interested members of the public regarding the draft EIS guidelines
- in May 1992 scoping *workshops* regarding the EIS guidelines were held in Russell, Portage la Prairie and Winkler
- *publication* of 'What You Told Us', a report of the scoping workshops
- a *direct mailout* of the final EIS guidelines to interested members of the public
- the EIS and the addendum were placed in the *public registries* and their availability was *advertised*

- an *information package* regarding the EIS, the addendum and outstanding information requirements was prepared and distributed to members of the public who had commented on the EIS or the addendum
- *update letters* were sent to members of the public who had responded to the original proposal

The case files also revealed information on education efforts undertaken by participants who were adverse in interest to the proponent. A non-governmental organization, Manitobans Against the Assiniboine Diversion (MAAD), produced a video that provided information on the potential impacts of the project. It also participated in a number of media interviews. Two other other non-governmental organizations, the Assiniboine River Campaign and the Coalition to Save the Assiniboine River, were also involved in media interviews. The City of Winnipeg, which was an intervener in the case, participated in a number of media-related activities. The Chairperson of the Committee on Works and Operations wrote an *'op ed' article* published in the Winnipeg Free Press (the article ran with a countervailing piece by the former Mayor of Carman). The Mayor and the Works and Operations Chairperson participated in media interviews with local press and on national television. Finally, the City purchased a full-page advertisement in the local press explaining its position in opposition to the proposal.

The file review also revealed a number of activities conducted by the CEC. During the first round of hearings, held in Portage la Prairie, Russell and Altona, *notice was provided in the local press*. Notice of the reconvened hearings was also advertised in the local press, and *direct notice* was forwarded to those who had participated in the first round of hearings. Transcripts from the hearings and the Commission's *final decision and report were published* and made available to the public at the Commission's offices and designated *public registries*.

4.3.2   RESULTS OF THE INTERVIEWS

As described in Chapter one, structured interviews were conducted to identify the education techniques used during the case by each of the interview subjects.

With respect to the proponent, the interview results contribute significantly to the results from the review of the case files. Following is a point form summary of the

education activities revealed during the interviews that were not revealed by the file review:

- details of media relations activities; *press releases, press kits, press conferences, public service announcements*, television and print *interviews, advertising, talk-radio* and *call-in TV*

- activities targeted to individuals; a *toll-free phone line, direct mail* campaigns, and *technical assistance* to its supporters

- *slide presentations* and *panels* at the information sessions and open houses

- *exhibits* (e.g., mall displays)

- publication of an information *pamphlet* for use at the open house information sessions

- publication of *reports* such as an abridged version of the EIS

- production of a newspaper insert

- *integration into formal curricula*; the general manager of the proponent worked with local teachers to integrate aspects of the project into the geography curriculum. He also worked to integrate water conservation concepts into class discussions.

In the case of the Prairie Farm Rehabilitation Administration (PFRA), the interview results are significant since the document review did not reveal any efforts at public education. The interviews, on the other hand, revealed that PFRA provided *technical assistance* to the proponent. It also provided *resource people* to provide technical information at the meetings, information sessions and open houses organized by the proponent. PFRA also produced a *display* to outline key physical features of the proposal.

In the case of the interveners, the interview results make a significant contribution to the results of the file review. In addition to the media activities revealed earlier, it was also revealed that the City of Winnipeg issued a *press release*, distributed an *information kit* and organized a *press conference* that took place at the junction of the Assiniboine and Red Rivers featuring the Mayor and the Works and Operations Chairperson. It also produced an *exhibit* that was displayed at the press conference. The City also made a presentation at a *meeting* of the Winnipeg Chamber of Commerce and provided *technical assistance* to non-governmental interveners.

Central Plains Inc. undertook a range of media activities including *news releases, news conferences, advertising* (print medium) and *talk radio*. It was also active in

publishing *notices, reports, fact sheets,* articles in its regular *newsletter, position papers, information kits* and *posters.* Central Plains also participated in the open houses organized by the proponent, made use of *slides* and *video tape,* undertook a *direct mail* campaign and held *meetings* with municipal councils.

With respect to Manitoba Environment the interview results contribute to the document review but in a modest fashion. Following submission of the draft proposal in April 1991, Manitoba Environment convened a *meeting* which served as the forum for the provision of technical and process-related information to the proponent. In addition, slide presentations were used by Manitoba Environment resource people at the proponent's open house information sessions and at the EIS scoping workshops.

4.3.3 RESULTS OF THE QUESTIONNAIRE SURVEY

Upon completion of the interviews, the questionnaire survey was conducted. One of the objectives of the survey was to identify education techniques used in the Pembina Valley Water Supply System case. The data collected using this methodology supplement the data collected by the case file review and the structured interviews.

As described earlier, the sample (n = 34) was obtained from the population (N = 111). The questionnaire instrument included a combination of open and close-ended questions. The first 12 questions dealt specifically with the case and aspects of the EA process. The second part of the questionnaire, questions 13 - 19, dealt with EA education.

Question 15 was intended to elicit information about specific education techniques. Question 15a asked whether any of the participants in the case conducted education activities during the assessment process. A total of 13 respondents (38%) answered YES and 12 of these were aware of at least one of the techniques listed in Questionnaire Table 1 having been used.[10] Question 15c then asked respondents to indicate which techniques listed in Questionnaire Table 1 were actually used. Seven techniques were identified that were not identified either during the case file review nor the structured interviews: films, identified by two respondents (i.e., x = 2); conferences (x = 2); simulations (x = 3); coverage of hearings (x = 7); booklets (x = 3); manuals (x = 2); and, dialogues (x = 1).

[10.] Questionnaire Table 1 was essentially a reproduction of Table 9, which summarizes the education techniques identified in the literature and adopted in legislation enacted in Canada, Ontario and Manitoba.

4.3.4 CRITICAL ANALYSIS

Table 10 presents a listing of the education techniques used in the Pembina Valley Water Supply System case. It compiles the techniques that were revealed by the case file review, by the interviews and by the questionnaire survey. It classifies the techniques according to format, along the lines of Tables 6 - 9. It also identifies the agencies that sponsored the education activities and the roles the agencies played in the case (i.e., proponent, EA authority, adjudicator, intervener, etc.).[11]

Staying with the rankings established earlier, i.e., well suited, poorly suited and neutral, Table 10 reveals that few of the techniques used in the Pembina Valley case were well suited to critical EA education. In fact, only three such techniques were identified: simulations, dialogues and workshops. The majority of the techniques used were either poorly suited to critical EA education or were neutral. There was heavy emphasis on the poorly suited techniques of traditional publishing and provision of notice (e.g., direct mail and advertising). Among the neutral techniques used, emphasis was on open houses, town hall meetings, exhibits/displays and meetings. Media techniques involving some degree of teacher-learner interaction, such as talk-radio and call in television, were also used.

It was observed earlier that the party that attempted the most public education during the assessment was the proponent, the Pembina Valley Water Cooperative. It is interesting to note that all of the techniques used by the Co-op fall into the poorly suited or neutral categories. This is not surprising given that the Co-op would have little interest in engaging in critical education leading to conscientization. Its main interest would be in conducting forms of public relations to promote or "sell" its project to its constituents and to political power brokers.

The techniques used by the provincial agents, i.e., Manitoba Environment and the CEC, tend towards the poorly suited or neutral variety, although Manitoba Environment did use the workshop format early in the EA process when it developed the EIS guidelines. For the most part, provincial authorities focussed on traditional publishing and information dissemination for the purpose of providing notice.

[11.] Table 10 does not reveal the sponsoring agencies for the education techniques revealed by the questionnaire as this data was not collected during the survey.

Table 10: Education Techniques Used During the Environmental Assessment of the Pembina Valley Water Supply System

Proponent - Pembina Valley Water Co-op (Pembina Valley Water Task Force)

✓ *audio/visual/electronic*: slide presentations
✓ *traditional publishing*: brochures, newspaper inserts, reports, newsletters, information kits
✓ *direct/individualized*: direct mail, phone line, technical assistance
✓ *media*: advertising, news releases, news conferences, talk radio, call-in television, interviews, public service announcements
✓ *presentations/events*: panels, open houses, exhibits, meetings, town hall meetings
✓ *formal education*: integration into existing curricula

Provincial EA Authority - Manitoba Environment

✓ *audio/visual/electronic*: slide presentations
✓ *traditional publishing*: notices, reports, information kits, translation, central depositories
✓ *direct/individualized*: direct mail
✓ *media*: advertising
✓ *presentations/events*: workshops, open houses, meetings, town hall meetings

Interveners - Manitobans Against the Assiniboine Diversion, City of Winnipeg, Central Plains Inc., Assiniboine River Campaign, Coalition to Save the Assiniboine River

✓ *audio/visual/electronic*: slide presentations, videotape
✓ *traditional publishing*: brochures, notices, feature articles, position papers, reports, newsletters, information kits, posters
✓ *direct/individualized*: direct mail
✓ *media*: advertising, news releases, news conferences, talk radio, interviews
✓ *presentations/events*: workshops, open houses, meetings, town hall meetings, exhibits

Adjudicator - Manitoba Clean Environment Commission

✓ *traditional publishing*: notices, final report, final decisions, transcripts, central depositories
✓ *direct/individualized*: direct mail
✓ *media*: coverage of hearings

Lead Federal Initiating Department - Prairie Farm Rehabilitation Administration

✓ *direct/individualized*: technical assistance
✓ *presentations/events*: workshops, open houses, meetings, town hall meetings, exhibits

Techniques Identified by Participants During the Questionnaire Survey (Sponsoring Agency Not Identified)

✓ *audio/visual/electronic*: films
✓ *traditional publishing*: booklets, manuals
✓ *presentations/events*: simulations, conferences, dialogues

The techniques used by interveners also tend towards the neutral and poorly suited variety (e.g., traditional publishing, notice provision, slide presentations, videotape, meetings and town hall meetings). However, what few well suited techniques were used in this case, were used by interveners. The data indicate that intervener groups not only used the workshop format, they also used simulations and dialogues. It is true that simulations and dialogues were identified during the questionnaire survey and therefore, the sponsoring agency was not identified. However, it is safe to assume that these techniques were used by interveners since these techniques were not referenced in the official case files, nor in the interviews with the proponent and the EA authority.

4.4   SUMMARY

Informal interviews with officials of the provincial EA authority were conducted for the purpose of selecting an appropriate EA case. The Pembina Valley Water Supply System case was chosen based on the following criteria: recency, the number and nature of the participants, the range of education techniques used, whether the entire EA process was applied, the first language of the majority of participants, and the accessibility of the majority of participants in the case.

The proposal for the Pembina Valley Water Supply System was subject to both the federal and provincial EA processes. The project generated considerable controversy and the proposal underwent numerous modifications during the EA process. In the end, Manitoba's Clean Environment Commission recommended that a conditional licence be granted for an amended version of the original proposal.

By using three methodologies (review of the official case files, formal interviews and a questionnaire survey) the education techniques used in the Pembina Valley Water Supply System case were identified and compiled (Table 10). Few of the techniques used were well suited to critical EA education. The majority were either poorly suited to critical EA education or were neutral. As discussed in Chapter three, the techniques that are well suited emphasize interactive learning, are people centred and exhibit many of the descriptors of critical pedagogy. The techniques that are poorly suited exhibit few of the descriptors of critical pedagogy, focus on information dissemination and involve little teacher-learner interaction. Neutral education techniques involve some degree of interaction

and discretion so that a neutral technique can be applied as a banking tool or as a critical tool.

Although the proponent attempted the most public education during the assessment, all of the techniques used were of the poorly suited or neutral types. The techniques used by the provincial agents tended towards the poorly suited or neutral variety, although Manitoba Environment did use the workshop format when it developed the EIS guidelines. The techniques used by interveners also tended towards the neutral and poorly suited variety but what few well suited techniques were used in this case, were used by interveners.

CHAPTER 5: ASSESSING PARTICIPANT KNOWLEDGE

5.1   INTRODUCTION

A second objective of the questionnaire survey was to assess participant knowledge about environmental assessment and the Pembina Valley Water Supply System case. Such an assessment contributes to an analysis of the effectiveness of the education techniques used in the case.

As discussed in Chapter one, the questionnaire instrument included a combination of open and close-ended questions. The document was entitled 'SURVEY OF VIEWS OF PUBLIC EDUCATION ON ENVIRONMENTAL ASSESSMENT (EA) IN THE PEMBINA VALLEY WATER SUPPLY CASE'. The first 12 questions dealt specifically with the case and divided the EA process and the case into a number of stages, working back in time from the most recent stage (Report on Public Hearings) to the earliest stage (Proposal). The case was divided like this to provide structure to the questionnaire but the entire case was of interest, from beginning to end. The second part of the instrument was entitled 'QUESTIONS ABOUT EA EDUCATION' and consisted of 7 questions.

Various aspects of participant knowledge were explored:

- three questions were about whether respondents had read the documents offering the dominant discourses (the draft EIS guidelines, the EIS and the CEC decision and report);

- nine questions provided a measure of knowledge of process related matters (e.g., jurisdiction, the players in the process, the outcome of the case);

- four questions provided a measure of critical consciousness;

- two questions dealt with participation in the public hearings and were meant to identify whether the respondent participated and if so, in what manner; and

- one question dealt with whether there were any education techniques used in the case that were particularly effective.

The remainder of this chapter provides descriptive and nonparametric statistical analyses of the responses to these questions. The data are compiled, analyzed and evaluated. The level of knowledge of the respondents as a group is examined. The knowledge of individuals who were peripherally involved in the case is compared with that

of individuals who were more intimately involved. Correlations are drawn between key variables such as critical consciousness, knowledge of process, readership of the documents asserting dominant discourses and participation in the public hearings.

5.2   READERSHIP RATES OF "DOMINANT DOCUMENTS"

The questionnaire instrument makes reference to three documents that are integral to the dominant position asserted in the Pembina Valley case. These are the draft EIS guidelines, the EIS and the CEC decision and report. The EIS was prepared by the proponent while the EIS guidelines and the CEC decision and report were prepared by agents of the provincial government, which was supportive of the proponent. The results of the survey are that:

- eight respondents (24%) read each of the documents;
- 14 of the respondents (41%) didn't read any of the reports;
- 19 respondents, or 56% of the sample, read the EIS;
- 12 individuals, or 35%, read the draft EIS guidelines; and,
- 11 respondents, or 32%, read the CEC decision and report.

An objective standard against which to judge readership rates is not available but an intuitive response suggests the rates evidenced in this case are low. The rates are especially low for the draft EIS guidelines and the CEC report. Intuition in this case is guided by knowledge that the documents in question are fundamental to the assessment. Together they present the "official position", the dominant discourses asserted by state and business interests. One would think that participants must have a sound working knowledge of the official position in order to develop and assert effective counter discourses.

It is interesting to examine the relationship between readership of "dominant documents" and other key variables such as critical consciousness and level of process-related knowledge.

5.3   KNOWLEDGE OF PROCESS-RELATED INFORMATION

The questionnaire included nine questions of a factual nature designed to assess knowledge related to process and outcome. On average, the respondents answered less than 40% of these questions correctly. An examination of numerical measures of central

tendency of the % correct reveals a mean ($\overline{x}$) = 37 and a median = 39. These measures suggest a fairly symmetric data set although the histogram for the % correct (Figure 7) suggests leftward skewness. Of course, given the sample size, graphical representations of the data set must be viewed with caution. An examination of the data set also reveals significant variability. The range (R) of the data = 78, with x_{max} = 78 and x_{min} = 0. The sample standard deviation (s) = 23, with approximately 68% of the data falling in the interval ($\overline{x}$ - s, $\overline{x}$ + s) and 100% of the data falling in the interval ($\overline{x}$ - 2s, $\overline{x}$ + 2s).
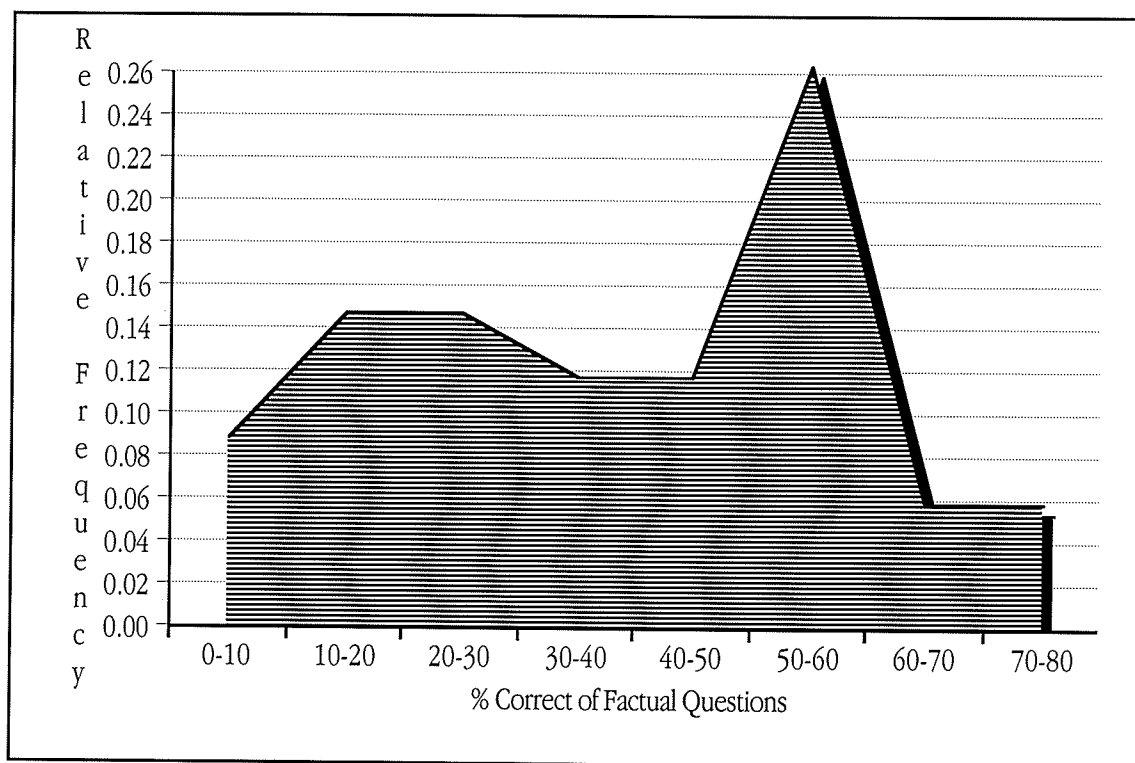
Figure 7:   Histogram for % Correct of Process-Related Questions

In the absence of a contextually specific objective standard for assessing sample mean, it becomes necessary to rely on standards from other contexts. One standard, accepted in a wide range of contexts, is that if x < 50%, x = failure. Based on this standard, the % correct evidenced in this case can be classified as being low. Given that the respondents were participating in the process voluntarily, presumably because of a personal or professional interest in the case, this is a reasonable conclusion. An intuitive

response supports this; given the importance of the project in both environmental and economic terms, one would have expected a higher average score.

It is interesting to compare the means of the sample and sample subsets consisting of data from respondents who read each of the dominant documents and data from respondents who read none of the documents (Table 11). The differences are striking and suggest a correlation between readership of dominant documents and knowledge of process-related information.

Table 11: Mean of the Sample and Two Sample Subsets S1 and S2, Where S1 = {Measurements From Respondents Who Read Each of the Dominant Documents} and S2 = {Measurements From Respondents Who Read None of the Dominant Documents}

Measure	Sample	Sample Subset Where Respondents Read Each of the Reports (S1)	Sample Subset Where Respondents Read None of the Reports (S2)
n	34	8	14
$\bar{x}$	37	61	17

Using the Spearman rank correlation coefficient (r_s) reveals a correlation between readership of dominant documents and knowledge of process-related information. Table 12 shows the ranks on these two variables. As indicated in the table, a considerable number of ties are present in both the x and y variables. In such a case, Siegel (1956) suggests using the following formula for r_s, which incorporates a correction factor to account for the presence of a relatively large proportion of ties.

$$r_s = \frac{\Sigma x^2 + \Sigma y^2 - \Sigma d_i^2}{2\sqrt{\Sigma x^2 \Sigma y^2}}$$

where

$$\Sigma x^2 = \frac{N^3 - N}{12} - \Sigma T_x$$

$$\Sigma y^2 = \frac{N^3 - N}{12} - \Sigma T_y$$

$$T = \frac{t^3 - t}{12}$$

t = the number of observations tied at a given rank

Given the data revealed in Table 12, the following values can be determined:

$$\Sigma d_i^2 = 1,372$$

$$\Sigma x^2 = \frac{N^3 - N}{12} - \Sigma T_x$$

$$= \frac{(34)^3 - 34}{12} - (\frac{2^3 - 2}{12} + \frac{2^3 - 2}{12} + \frac{9^3 - 9}{12} + \frac{4^3 - 4}{12} + \frac{4^3 - 4}{12} + \frac{5^3 - 5}{12} + \frac{5^3 - 5}{12} + \frac{3^3 - 3}{12})$$

$$= 3,272.5 - 93$$

$$= 3,179.5$$

$$\Sigma y^2 = \frac{N^3 - N}{12} - \Sigma T_y$$

$$= \frac{(34)^3 - 34}{12} - (\frac{8^3 - 8}{12} + \frac{5^3 - 5}{12} + \frac{7^3 - 7}{12} + \frac{(14)^3 - 14}{12})$$

$$= 3,272.5 - 307.5$$

$$= 2,965$$

$$r_s = \frac{\Sigma x^2 + \Sigma y^2 - \Sigma d_i^2}{2\sqrt{\Sigma x^2 \Sigma y^2}}$$

$$= \frac{3,179.5 + 2,965 - 1,372}{2\sqrt{(3,179.5)(2,965)}}$$

$$= \frac{4772.5}{6140.75}$$

$$= .777$$

Table 12: Ranks on Readership of "Dominant Documents" and Knowledge of Process-Related Information

Respondent	Rank		di	di2
	Readership of Dominant Documents	Knowledge of Process Information		
1	4.5	9	4.5	20.25
2	17	15.5	-1.5	2.25
3	4.5	9	4.5	20.25
4	17	9	-8	64
5	27.5	19.5	-8	64
6	27.5	29	1.5	2.25
7	27.5	24	-3.5	12.25
8	27.5	24	-3.5	12.25
9	4.5	9	4.5	20.25
10	11	15.5	4.5	20.25
11	27.5	24	-3.5	12.25
12	17	19.5	2.5	6.25
13	17	3.5	-13.5	182.25
14	17	24	7	49
15	11	9	-2	4
16	4.5	1.5	-3	9
17	4.5	1.5	-3	9
18	27.5	29	1.5	2.25
19	4.5	3.5	-1	1
20	27.5	24	-3.5	12.25
21	11	9	-2	4
22	27.5	33	5.5	30.25
23	27.5	33	5.5	30.25
24	27.5	29	1.5	2.25
25	4.5	9	4.5	20.25
26	27.5	19.5	-8	64
27	27.5	33	5.5	30.25
28	17	19.5	2.5	6.25
29	11	9	-2	4
30	4.5	15.5	11	121
31	27.5	15.5	-12	144
32	11	29	18	324
33	17	9	-8	64
34	27.5	29	1.5	2.25
				1,372

A Spearman rank correlation coefficient (r_s) of .777 indicates a strong association between the two variables, readership of "dominant documents" and knowledge of process-related information.

An examination of responses to questions on the roles and functions of various parties in the EA process and on the outcome of the case reveals a number of interesting observations. Three sets of questions were directed to assessing knowledge of the proponent, the provincial EA authority and the CEC. Regarding the proponent:

- 19 respondents, or 56% of the sample, had read the EIS;
- 15 respondents (44%) knew that the EIS had been submitted by the Pembina Valley Water Cooperative; and
- 28 respondents (82%) correctly identified the proponent of the project.

Compare this with matters relating to the CEC:

- 11 respondents, or 32% of the sample, had read the Report on Public Hearings;
- 10 respondents (29%) knew that the Commission had prepared the report;
- 14 respondents (41%) knew the Report on Public Hearings made recommendations to theProvincial Minister of the Environment;
- 12 respondents (35%) knew that a licence had been granted in this case; and,
- nine respondents (26%) knew there was an appeal filed against the decision to grant a licence.

With respect to the provincial EA authority (i.e., Manitoba Environment):

- 12 respondents, or 35% of the sample, had read the draft EIS guidelines;
- seven respondents, or 21%, knew that Manitoba Environment had prepared the guidelines; (Compare that seven respondents, or 21% of the sample, thought that the guidelines had been prepared by the proponent.); and,
- eight respondents (24% of the sample) were aware that they had been given an opportunity to comment on the draft guidelines.

Based on the standard that if $x < 50\%$, $x =$ failure, the level of knowledge demonstrated by the respondents of matters relating to Manitoba Environment and the CEC is rather low. This is supported by an intuitive response to the confusion evidenced by the data. As many people thought that the EIS guidelines had been prepared by the proponent

as thought they had been produced by Manitoba Environment. Less than a quarter of respondents knew of their opportunity to comment on the EIS guidelines. Less than a third had read the final CEC report. Approximately a third were aware of the granting of a licence.

The level of knowledge demonstrated by the respondents is higher with respect to matters relating to the proponent. More than half of the respondents had read the EIS and nearly half knew who had prepared the document. The proportion of respondents who could identify the proponent is very high, at 0.82.

It is interesting to note that in contrast to the generally low level of knowledge of matters relating to the CEC, 41% of respondents knew the CEC report provided recommendations to the Provincial Minister of the Environment. Few respondents read the CEC report, few knew who prepared the report, few knew the outcome of the case, but nearly half knew who was responsible for the ultimate decision.

One of the factual questions included in the questionnaire dealt with jurisdiction over EA. This was a close-ended question that offered four response options: FEDERAL, PROVINCIAL, MUNICIPAL and DON'T KNOW. It included a direction to select as many responses as appropriate. The two most frequently chosen response options were FEDERAL and PROVINCIAL, and PROVINCIAL, both at 35%. Five respondents chose DON'T KNOW or left the question blank. Figure 8 summarizes the data regarding perceptions of jurisdiction over EA.

Again, without a contextually specific objective standard it is difficult to assess the results of the jurisdiction question. However, based on the 50% standard, one can conclude that respondent knowledge of jurisdiction over EA is low. An intuitive approach does not offer much insight. A common sense analysis may lead an observer to suggest that questions of jurisdiction are legal niceties that are irrelevant to the average citizen including the average EA participant. On the other hand, years of experience in the field of public legal education lead the writer to conclude that knowledge of jurisdictional issues is crucial for citizen activists concerned with matters of public policy. Knowledge of jurisdiction not only assists in lobbying efforts, it is essential for long term law-reform strategies.
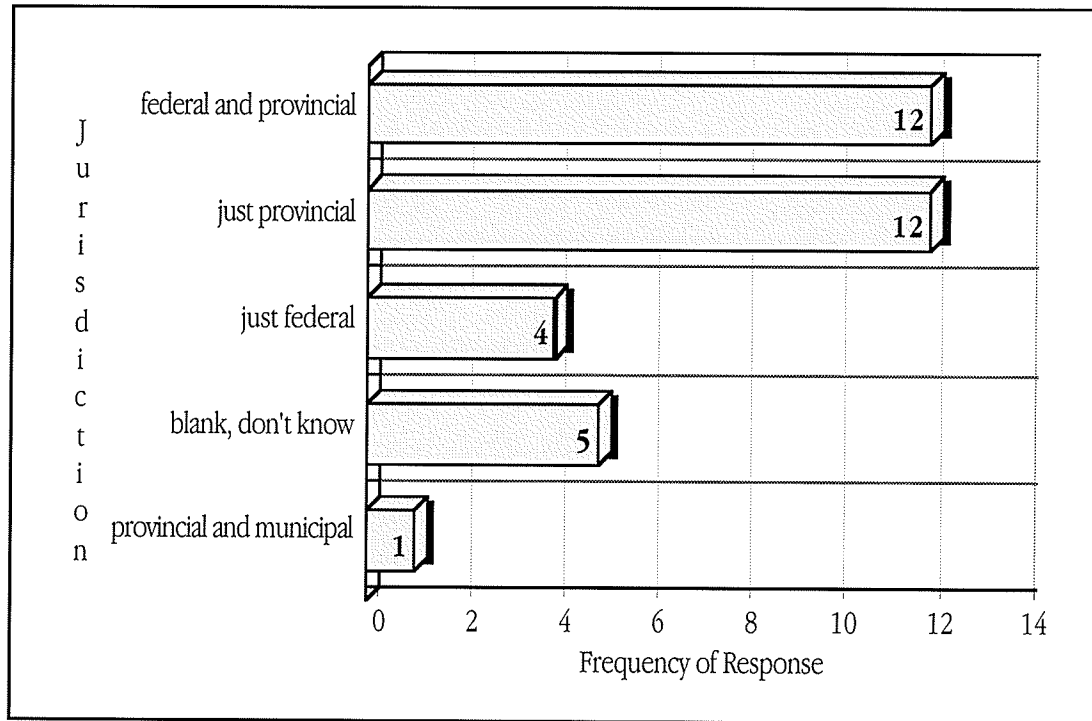
Figure 8:   Respondent Perceptions of Jurisdiction Over EA

5.4   CRITICAL CONSCIOUSNESS

5.4.1   INDICATORS

The questionnaire survey gathered data which provide a rough measure of critical consciousness of EA and the Pembina Valley case. Four indicators of critical consciousness were used to score each respondent on a five tier ordinal scale (zero to four). The respondents were then ranked and the Spearman rank correlation coefficient was used to determine correlations between critical consciousness and other variables such as readership of "dominant documents" and knowledge of process-related information.

The first indicator of critical consciousness was:

* *Did the respondent challenge the official position on the purpose of the project asserted by the proponent and the provincial government? Alternatively, did the respondent demonstrate an understanding of interdependency in resource systems and resource communities?*

This indicator appears in the responses to question nine, which asked respondents to indicate which statement best describes their understanding of the purpose of the project. According to the EIS, the stated purpose of the Pembina Valley Water Supply System was to provide a supply of potable drinking water for communities in the Pembina Triangle (M.M. Dillon Ltd. 1992). This became a contentious issue with different perspectives leading to different conclusions about the project's real purpose. In response to question nine, 34% of respondents agreed with the stated purpose of the project, while 55% selected responses that challenged the official position. In addition, a number of respondents provided comments which reveal an understanding of interdependency in resource systems and resource communities (Table 13). This shows an ability to critically assess the official position submitted by the proponent and offer a knowledgeable and reasonable alternative position.

Table 13: Respondent Comments Regarding the Purpose of the Project

☞ Also to provide the area with a guaranteed raw water source for the next 50 years.
☞ But increased water for drinking would have freed up water in their own area for irrigation and industrial use.
☞ The PVWC claimed the project was strictly for human consumption, but if there is in fact a water shortage problem in the region, then irrigation is partly to blame. It is fair to say that the actual purpose of the project was never revealed.
☞ To replace their current drinking water supply with a new source thus freeing up this supply for irrigation.

The second indicator of critical consciousness was:

- *Did the respondent express an informed, critical opinion on the efficiency, efficacy or fairness of the EA process?*

This indicator appears in responses provided to a number of open-ended questions. A relatively high degree of critical judgment is evidenced in comments about the EA process

and government's role in that process. Issues raised in the comments include conflict of interest, the political nature of the process and the CEC's lack of authority (Table 14).

Table 14:   Critical Respondent Comments Regarding the Efficiency, Efficacy or Fairness of the EA Process

> ☞ Definite feeling that the process was not objective. Because of political considerations the environmental impacts in the Portage area were minimized. The proponent was not objective and was self-serving. There appears to have been a hidden agenda on the part of the provincial government. PFRA also seemed to be a proponent. The CEC is just another provincial government department.
>
> ☞ The EA should have been done by an independent source. Not by the government or influenced by the parties involved.
>
> ☞ In the PVWC case - the CEC was not an impartial body and independent (government appointed people).
>
> ☞ Too much was political rather than common sense concern.
>
> ☞ It's just alot of paper work and expense to look good. In the end the government does what ever it wants anyway.
>
> ☞ I got the impression they were going ahead with their plans without any advice from anyone else, good or bad.
>
> ☞ Ideally, the CEC should be an impartial body - but in reality the chairperson (and the others) I believe were political appointees and as a result made the recommendations desired by the body appointing them (the Minister of Environment or the government?)
>
> ☞ It should have been explained clearly that the Manitoba government supported the project, and was not objective.
>
> ☞ I know that the CEC does not always hold fair hearings.
>
> ☞ We have learned that the whole process is a "farce" - if the government wants the proposal to go ahead, there is no thought of sustainability.
>
> ☞ When the government is the proponent (along with PVWC) and uses a large amount of taxpayers' money assisting with the project - the whole process is a "farce".
>
> ☞ It is all a case of politics. Tell you whatever the government wants to hear. In the case of the Pembina Valley Water Supply System, the EA process was a complete farce.

The third indicator of critical consciousness was:

- *Did the respondent emphasize the value of working with other concerned citizens during the EA process?*

Recognizing the value of concerned citizens working together, was selected as an indicator of critical consciousness because of the importance of cooperative community action in constructing effective counter hegemonic discourses. The third indicator appears in the responses to question 10, which asked about the respondent's general orientation to the notion of environmental assessment. Six response options were provided: two filters (UNDECIDED and DON'T KNOW) and the following four substantive responses.

- EA ANTICIPATES POTENTIAL ENVIRONMENTAL IMPACTS; this was meant to represent a broad and anticipatory approach to the issue;
- EA ENFORCES LEGISLATED ENVIRONMENTAL STANDARDS; this was meant to represent a more restrictive orientation to EA, one that focuses on a regulatory function normally associated with environmental protection;
- EA BRINGS CONCERNED CITIZENS TOGETHER TO DISCUSS MATTERS OF DEVELOPMENT; this option was meant to represent a view of EA that highly values the public participation dimension of EA; and,
- OTHER.

The most frequent response chosen (21 respondents, or 60% of the sample) was the one representing the broad anticipatory approach. The next most frequent response (5, or 14%) was the option focussing on public participation.

The fourth indicator of critical consciousness was:

- *Did the respondent agree that education conducted during the Pembina Valley EA could have been improved?*

This indicator appears in the responses to question 17, which asked for the respondents' opinions on whether education about EA could have been improved in the Pembina Valley case. The results were that 26% of respondents answered YES, 41% answered DON'T KNOW, 24 % left the question blank and 9% answered NO.

5.4.2   CORRELATIONS

Using the four indicators of critical consciousness, each respondent was scored on a five tier scale (zero to four). The respondents were then ranked and the Spearman rank measure of association was used to determine correlations between critical consciousness and two other variables namely, readership of "dominant documents" and knowledge of process-related information. Tables 15 and 16 show the ranks on these three variables. Since a large proportion of ties are present, Siegel's (1956) corrected formula for r_s is used.

Given the data revealed in Table 15, the following values can be determined for the association between critical consciousness and knowledge of process-related information.

$$\Sigma d_i^2 \;=\; 3{,}645$$

$$\Sigma x^2 \;=\; \frac{N^3 - N}{12} - \Sigma T_x$$

$$= \frac{(34)^3 - 34}{12} - \left(\frac{2^3 - 2}{12} + \frac{2^3 - 2}{12} + \frac{9^3 - 9}{12} + \frac{4^3 - 4}{12} + \frac{4^3 - 4}{12} + \frac{5^3 - 5}{12} + \frac{5^3 - 5}{12} + \frac{3^3 - 3}{12}\right)$$

$$= 3{,}272.5 - 93$$

$$= 3{,}179.5$$

$$\Sigma y^2 \;=\; \frac{N^3 - N}{12} - \Sigma T_y$$

$$= \frac{(34)^3 - 34}{12} - \left(\frac{(11)^3 - 11}{12} + \frac{(10)^3 - 10}{12} + \frac{(12)^3 - 12}{12}\right)$$

$$= 3{,}272.5 - 338.5$$

$$= 2{,}934$$

$$r_s \;=\; \frac{\Sigma x^2 + \Sigma y^2 - \Sigma d_i^2}{2\sqrt{\Sigma x^2 \Sigma y^2}}$$

$$= \frac{3{,}179.5 + 2{,}934 - 3{,}645}{2\sqrt{(3{,}179.5)\,(2{,}934)}}$$

$$= \frac{2{,}468.5}{6108.6}$$

$$= .404$$

A Spearman rank correlation coefficient (r_s) of .404 indicates a fairly strong association between critical consciousness and knowledge of process-related information.

Table 15: Ranks on Critical Consciousness and Knowledge of Process-Related Information

Respondent	Rank		di	di2
	Knowledge of Process Information	Critical Consciousness		
1	9	6	3	9
2	15.5	6	9.5	90.25
3	9	16.5	-7.5	56.25
4	9	27.5	-18.5	342.25
5	19.5	27.5	-8	64
6	29	27.5	1.5	2.25
7	24	27.5	-3.5	12.25
8	24	6	18	324
9	9	16.5	-7.5	56.25
10	15.5	16.5	-1	1
11	24	16.5	7.5	56.25
12	19.5	27.5	-8	64
13	3.5	6	-2.5	6.25
14	24	6	18	324
15	9	16.5	-7.5	56.25
16	1.5	6	-4.5	20.25
17	1.5	6	-4.5	20.25
18	29	27.5	1.5	2.25
19	3.5	16.5	-13	169
20	24	16.5	7.5	56.25
21	9	6	3	9
22	33	27.5	5.5	30.25
23	33	34	-1	1
24	29	16.5	12.5	156.25
25	9	27.5	-18.5	342.25
26	19.5	27.5	-8	64
27	33	27.5	5.5	30.25
28	19.5	16.5	3	9
29	9	6	3	9
30	15.5	6	9.5	90.25
31	15.5	27.5	-12	144
32	29	6	23	529
33	9	27.5	-18.5	342.25
34	29	16.5	12.5	156.25
				3,645

Given the data revealed in Table 16, r_s for critical consciousness and readership of "dominant documents" is determined below.

A Spearman rank correlation coefficient (r_s) of .527 indicates a fairly strong association between the two variables critical consciousness and readership of "dominant documents".

$$\Sigma d_i^2 = 2{,}788$$

$$\Sigma x^2 = \frac{N^3 - N}{12} - \Sigma T_x$$

$$= \frac{(34)^3 - 34}{12} - \left(\frac{8^3 - 8}{12} + \frac{5^3 - 5}{12} + \frac{7^3 - 7}{12} + \frac{(14)^3 - 14}{12}\right)$$

$$= 3{,}272.5 - 307.5$$

$$= 2{,}965$$

$$\Sigma y^2 = \frac{N^3 - N}{12} - \Sigma T_y$$

$$= \frac{(34)^3 - 34}{12} - \left(\frac{(11)^3 - 11}{12} + \frac{(10)^3 - 10}{12} + \frac{(12)^3 - 12}{12}\right)$$

$$= 3{,}272.5 - 338.5$$

$$= 2{,}934$$

$$r_s = \frac{\Sigma x^2 + \Sigma y^2 - \Sigma d_i^2}{2\sqrt{\Sigma x^2 \Sigma y^2}}$$

$$= \frac{2{,}965 + 2{,}934 - 2{,}788}{2\sqrt{(2{,}965)(2{,}934)}}$$

$$= \frac{3{,}111}{5{,}899}$$

$$= .527$$

Table 16:   Ranks on Critical Consciousness and Readership of "Dominant Documents"

Respondent	Rank		di	di2
	Readership of Dominant Documents	Critical Consciousness		
1	4.5	6	-1.5	2.25
2	17	6	11	121
3	4.5	16.5	-12	144
4	17	27.5	-10.5	110.25
5	27.5	27.5	0	0
6	27.5	27.5	0	0
7	27.5	27.5	0	0
8	27.5	6	21.5	462.25
9	4.5	16.5	-12	144
10	11	16.5	-5.5	30.25
11	27.5	16.5	11	121
12	17	27.5	-10.5	110.25
13	17	6	11	121
14	17	6	11	121
15	11	16.5	-5.5	30.25
16	4.5	6	-1.5	2.25
17	4.5	6	-1.5	2.25
18	27.5	27.5	0	0
19	4.5	16.5	-12	144
20	27.5	16.5	11	121
21	11	6	5	25
22	27.5	27.5	0	0
23	27.5	34	-6.5	42.25
24	27.5	16.5	11	121
25	4.5	27.5	-23	529
26	27.5	27.5	0	0
27	27.5	27.5	0	0
28	17	16.5	0.5	0.25
29	11	6	5	25
30	4.5	6	-1.5	2.25
31	27.5	27.5	0	0
32	11	6	5	25
33	17	27.5	-10.5	110.25
34	27.5	16.5	11	121
				2,788

5.5   LEVELS OF PARTICIPATION

To further the assessment of participant knowledge about EA and the Pembina Valley Water Supply System case, the questionnaire survey included questions regarding participation in the public hearing process. Question 3a asked whether respondents participated in the public hearings held in the Pembina Valley case. It was learned that 16 respondents, or 47% of the sample, participated in the hearings.

Question 3b asked the respondents who participated to specify the mode of their participation. Six response options were offered: FORMAL INTERVENTION, ORAL PRESENTATION, SUBMISSION OF A LETTER, SUBMISSION OF A WRITTEN BRIEF, ATTENDANCE and OTHER. The most frequent mode of participation was ATTENDANCE, followed by SUBMISSION OF A WRITTEN BRIEF and SUBMISSION OF A LETTER.

Table 17 presents the comments received in response to question 3b. The comments do not add significantly to the results from the close-ended portion of the question.

Table 17:   Comments Regarding Mode of Participation in the Public Hearings

☞   Put my name to a form against this proposal
☞   Did not present, hearings called off.
☞   I wrote a letter protesting the initial decision not to hold public meetings in Winnipeg. I also wrote to several politicians and perhaps the CEC (can't remember) opposing the diversion.
☞   Did not present as hearings were called off.
☞   We made a formal (oral) presentation of a brief with supporting documentation at Portage la Prairie in June of 93 and at Carman in March of 94.

For the purpose of analysis, the modes of participation were ranked on a three tier ordinal scale based on the level of participation and complexity of each mode.

SUBMISSION OF A LETTER and ATTENDANCE were placed in the lowest rank. SIGNING A PETITION, which was identified in a response to the open-ended part of question 3b, was also placed in the lowest rank. ORAL PRESENTATION and SUBMISSION OF A WRITTEN BRIEF were placed in the middle rank. FORMAL INTERVENTION was in the highest rank. Using scores on the ordinal scale, the respondents were then ranked and the Spearman rank correlation coefficient was used to determine correlations between level of participation and other variables such as critical consciousness and knowledge of process-related information.

However, before examining the Spearman rank correlation coefficients, it is interesting to compare knowledge of process-related information of the sample and sample subsets consisting of measurements from respondents who participated in the public hearings and measurements from respondents who did not participate in the public hearings (Table 18). Doing so reveals a substantially higher mean of % correct for the subset where respondents participated than for the subset where respondents did not participate and for the sample as a whole.

Table 18: Mean of % Correct of Process-Related Information of the Sample and Two Sample Subsets S1 and S2, Where S1 = {Measurements From Respondents Who Participated in the Public Hearings} and S2 = {Measurements From Respondents Who Did Not Participate in the Public Hearings}

Measure	Sample	Sample Subset Where Respondents Participated (S1)	Sample Subset Where Respondents Did Not Participate S2
n	34	16	17
$\bar{x}$	37	51	27

The data revealed in Table 18 suggests that a higher level of knowledge is associated with having participated in the public hearing process. This is confirmed by

analysis using the contingency coefficient (C). Siegel's (1956) formula and framework for analysis is followed.

$$C = \sqrt{\chi^2 / N + \chi^2}$$

where
$$\chi^2 = \Sigma \Sigma \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

O_{ij} = the observed number of cases categorized in the ith row of jth column

E_{ij} = number of cases expected to be categorized in the ith row of jth column

$\Sigma \Sigma$ directs one to sum over all cells

Table 19 is a 2 x 8 contingency table built on two variables namely, knowledge of process-related information and whether the respondent participated in the public hearings. Knowledge is measured by the number of process-related questions answered correctly. There were nine such questions but the most anyone answered correctly was seven.

Table 19:   2 x 8 Contingency Table Built on Two Variables: Knowledge of Process-Related Information and Whether the Respondent Participated in the Public Hearings

Participation	Knowledge								Total
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	
Yes	0	1	2	1	1	7	2	2	16
No	3	4	3	3	3	2	0	0	18
Total	3	5	5	4	4	9	2	2	34

Given the data revealed in Table 19, χ^2 is determined as follows:

$$\chi^2 = \Sigma \Sigma \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

$$= \frac{(0 - 1.4)^2}{1.4} + \frac{(1 - 2.4)^2}{2.4} + \frac{(2 - 2.4)^2}{2.4} + \frac{(1 - 1.9)^2}{1.9} + \frac{(1 - 1.9)^2}{1.9} + \frac{(7 - 4.2)^2}{4.2}$$

$$+ \frac{(2-0.9)^2}{0.9} + \frac{(2-0.9)^2}{0.9} + \frac{(3-1.6)^2}{1.6} + \frac{(4-2.6)^2}{2.6} + \frac{(3-2.6)^2}{2.6} + \frac{(3-2.1)^2}{2.1}$$

$$+ \frac{(3-2.1)^2}{2.1} + \frac{(2-4.8)^2}{4.8} + \frac{(0-1.1)^2}{1.1} + \frac{(0-1.1)^2}{1.1}$$

$$= 14.23$$

Knowing the value of χ^2, the correlation, *C*, between knowledge of process-related information and whether the respondent participated in the public hearings is determined as follows:

$$C = \sqrt{\chi^2 / N + \chi^2}$$

$$= \sqrt{\frac{14.23}{34 + 14.23}}$$

$$= .543$$

Given the fairly strong association between knowledge of process-related information and whether the respondent participated in the public hearings, it is interesting to examine whether a correlation exists between participation and another of the key variables identified in the study namely, critical consciousness. Table 20 is a 2 x 5 contingency table that examines the association between participation and critical consciousness. Critical consciousness is measured by the rankings established by the four indicators described earlier.

Table 20: 2 x 5 Contingency Table Built on Two Variables: Critical Consciousness and Whether the Respondent Participated in the Public Hearings

Participation	Critical Consciousness					Total
	0	1	2	3	4	
Yes	0	3	5	8	0	16
No	1	9	5	3	0	18
Total	1	12	10	11	0	34

Based on the data presented in Table 20, χ^2 and C are computed in this manner:

$$\chi^2 = \Sigma\Sigma \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

$$= \frac{(0 - 0.5)^2}{0.5} + \frac{(3 - 5.6)^2}{5.6} + \frac{(5 - 4.7)^2}{4.7} + \frac{(8 - 5.2)^2}{5.2} + \frac{(1 - 0.5)^2}{0.5} + \frac{(9 - 6.4)^2}{6.4}$$

$$+ \frac{(3 - 5.8)^2}{5.8} + \frac{(5 - 5.3)^2}{5.3}$$

$$= 6.24$$

$$C = \sqrt{\chi^2 / N + \chi^2}$$

$$= \sqrt{\frac{6.24}{34 + 6.24}}$$

$$= .394$$

With the discovery of positive correlations between participation, knowledge and critical consciousness using the contingency coefficient, it is intriguing to examine these associations in more detail. The Spearman rank correlation coefficient was used to determine two correlations: one between level of participation and critical consciousness and the other between level of participation and knowledge of process-related information. Tables 21 and 22 show the ranks on these three variables. As before, Siegel's (1956) corrected formula for r_s is used since a large proportion of ties are present.

Based on the data presented in Table 21, r_s for level of participation and critical consciousness is computed as follows:

$$\Sigma d_i^2 = 455$$

$$\Sigma x^2 = \frac{N^3 - N}{12} - \Sigma T_x$$

$$= \frac{(16)^3 - 16}{12} - (\frac{3^3 - 3}{12} + \frac{(10)^3 - 10}{12} + \frac{3^3 - 3}{12})$$

$$= 340 - 86.5$$

$$= 253.5$$

$$\Sigma y^2 = \frac{N^3 - N}{12} - \Sigma T_y$$

$$= \frac{(16)^3 - 16}{12} - \left(\frac{8^3 - 8}{12} + \frac{5^3 - 5}{12} + \frac{3^3 - 3}{12}\right)$$

$$= 340 - 54$$

$$= 286$$

$$r_s = \frac{\Sigma x^2 + \Sigma y^2 - \Sigma d_i^2}{2\sqrt{\Sigma x^2 \Sigma y^2}}$$

$$= \frac{253.5 + 286 - 455}{2\sqrt{(253.5)\,(286)}}$$

$$= \frac{84.5}{538.5}$$

$$= .157$$

A Spearman rank correlation coefficient (r_s) of .157 indicates that a weak association exists between critical consciousness and level of participation.

Table 21: Ranks on Critical Consciousness and Level of Participation

Respondent	Rank		di	di2
	Level of Participation	Critical Consciousness		
1	15	4.5	10.5	110.25
3	8.5	11	-2.5	6.25
4	2	15	-13	169
9	8.5	11	-2.5	6.25
12	15	15	0	0
13	8.5	4.5	4	16
14	8.5	4.5	4	16
15	8.5	11	-2.5	6.25
16	2	4.5	-2.5	6.25
17	2	4.5	-2.5	6.25
19	8.5	11	-2.5	6.25
20	15	11	4	16
21	8.5	4.5	4	16
29	8.5	4.5	4	16
31	8.5	15	-6.5	42.25
32	8.5	4.5	4	16
				455

Based on the data reported in Table 22, r_s for level of participation and knowledge of process-related information is determined in the following manner. As can be seen, a fairly strong correlation exists between these two variables.

Table 22: Ranks on Knowledge of Process-Related Information and Level of Participation

Respondent	Rank		di	di2
	Level of Participation	Knowledge of Process Information		
1	15	8	7	49
3	8.5	8	0.5	0.25
4	2	8	-6	36
9	8.5	8	0.5	0.25
12	15	13	2	4
13	8.5	3.5	5	25
14	8.5	14.5	-6	36
15	8.5	8	0.5	0.25
16	2	1.5	0.5	0.25
17	2	1.5	0.5	0.25
19	8.5	3.5	5	25
20	15	14.5	0.5	0.25
21	8.5	8	0.5	0.25
29	8.5	8	0.5	0.25
31	8.5	12	-3.5	12.25
32	8.5	16	-7.5	56.25
				245.5

$$\Sigma d_i^2 = 245.5$$

$$\Sigma x^2 = 253.5$$

$$\Sigma y^2 = \frac{N^3 - N}{12} - \Sigma T_y$$

$$= \frac{(16)^3 - 16}{12} - \left(\frac{2^3 - 2}{12} + \frac{2^3 - 2}{12} + \frac{7^3 - 7}{12} + \frac{2^3 - 2}{12}\right)$$

$$= 340 - 29.5$$

$$= 310.5$$

$$r_s = \frac{\Sigma x^2 + \Sigma y^2 - \Sigma d_i^2}{2\sqrt{\Sigma x^2 \Sigma y^2}}$$

$$= \frac{253.5 + 310.5 - 245.5}{2\sqrt{(253.5)\ (310.5)}}$$

$$= \frac{318.5}{561.1}$$

$$= .568$$

5.6   VIEWS ON EA EDUCATION

5.6.1   EFFECTIVE EDUCATION TECHNIQUES

Another objective of the questionnaire survey was to examine views on EA education. Question 16 asked whether there was an event or activity that particularly affected the respondent's understanding of the Pembina Valley EA. Seven respondents (21% of the sample) answered YES. Five of the seven identified the particular event or activity (Table 23).

Table 23:   Events or Activities that Affected Respondent Understanding of the Pembina Valley EA.

☞   Hearings in Russell
☞   The public hearing process
☞   Participating in a press conference in opposition to the project with Manitobans Against the Assiniboine Diversion
☞   Pembina Valley Reports. Central Plains Water Task Force study and reports
☞   Presentation in Portage la Prairie by Pembina Valley Water Cooperative

The first two of the comments presented in Table 23 refer to the public hearing process. Although the public hearing process is not an education technique within the analytic framework used earlier in this chapter, the hearing process *is* a key element in the notion of education through EA. The fact that respondents identified participation in public

hearings as an event that particularly affected their understanding reinforces the whole participatory approach underlying critical EA education. Specifically, it reinforces the assertion that participation in the EA process becomes an educational process in itself and contributes to the development of critical consciousness.

The third comment refers to an education technique that may be described as poorly suited to critical EA education namely a press conference. However, the comment refers to *participating* in the press conference. This leads to the conclusion that this respondent may have been an organizer, a researcher or a presenter at the press conference rather than just an observer. Again, this focus on participation reinforces the approach underlying the concept of critical EA education.

The fourth comment refers to published studies and reports. This suggests that information dissemination, particularly publication of technical studies or reports, has a valid role to play in EA education. This is consistent with the point made earlier that information dissemination is important but becomes even more so when it is supplemented with a coordinated critical education program.

Lastly, the fifth comment refers to a presentation made at a town hall meeting in Portage a Prairie. This suggests the value of neutral techniques that involve some degree of interaction between learner and teacher.

5.6.2   DEMAND FOR EDUCATION

Another dimension of respondent views explored in the questionnaire concerns public demand or need for EA education. Question 18a asked whether EA education is necessary for the public's involvement in environmental assessment to be effective. A strong majority of respondents (24 or 71%) answered YES while only 3 respondents or 9% answered NO (Figure 9). This empirical evidence supports the literature reviewed earlier which asserts that public demand for environmental education exists and is a component of the rationale for critical EA education.
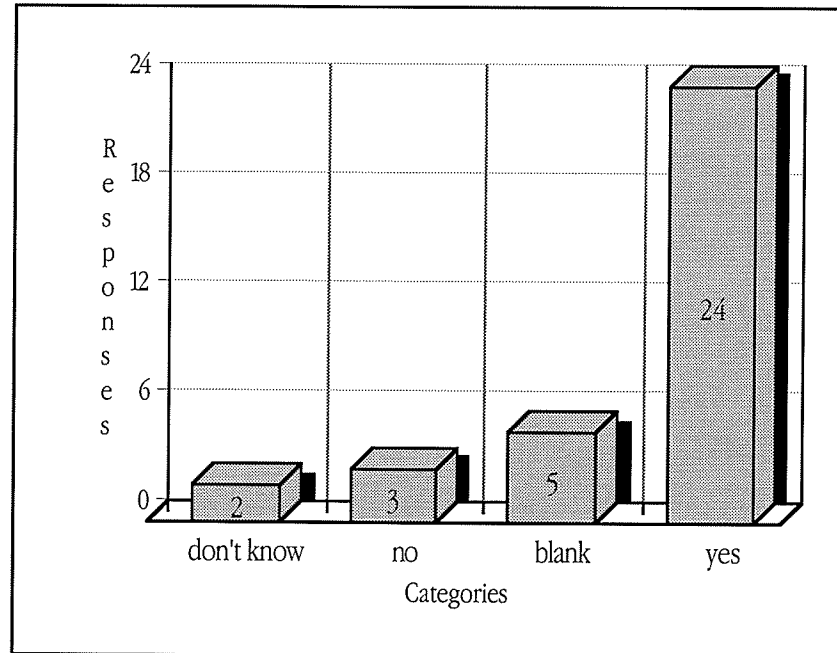
Figure 9:   Respondent Views On Whether EA Education is Necessary for Public
Involvement to be Effective

Comments received with regards to this issue also clearly express a perceived need
for education about EA. Table 24 presents a collection of these comments.

Table 24:   Comments Regarding the Need for EA Education

☞   So that everyone knows what's going on. So everyone can understand the advantages and disadvantages of the projects.
☞   Person needs to be educated on the matter before can make sound decisions.
☞   This process, and public speaking, is not a common practice for people involved in water hearings.
☞   Create awareness of process and implications for future.
☞   Lack of knowledge about the process discourages participation.

5.7 SUMMARY

One of the objectives of the questionnaire survey was to assess participant knowledge about environmental assessment and the Pembina Valley Water Supply System case. Various aspects of participant knowledge were explored including readership of the documents offering the dominant discourses, knowledge of process-related information and critical consciousness.

The questionnaire instrument made reference to three documents that were integral to the dominant position asserted in the Pembina Valley case: the draft EIS guidelines; the EIS; and, the CEC decision and report. An intuitive response to the readership rates of these documents suggests that the rates evidenced in this case are low, particularly for the draft EIS guidelines and the CEC report.

The questionnaire also included nine questions of a factual nature designed to assess knowledge of process-related information. The mean of the % correct for the sample was 37. Using the Spearman rank correlation coefficient (r_s), a strong correlation between readership of dominant documents and knowledge of process-related information was revealed ($r_s = .777$).

The questionnaire survey also gathered data which provide a rough measure of critical consciousness of EA and the Pembina Valley case. Four indicators of critical consciousness were used to score each respondent on a five tier ordinal scale (zero to four). Again using the Spearman rank correlation coefficient, fairly strong correlations were revealed for critical consciousness and readership of dominant documents ($r_s = .527$) and critical consciousness and knowledge of process-related information ($r_s = .404$).

Another aspect of participant knowledge that was examined pertains to participation in the public hearing process. It was learned that 16 respondents, or 47% of the sample, participated in the hearings. Using the contingency coefficient, correlations were discovered between knowledge of process-related information and participation in the public hearing process ($C = .543$) and between critical consciousness and participation in the public hearing process ($C = .394$).

The associations were further examined using the Spearman rank correlation coefficient. For the purpose of analysis, the modes of participation were scored on a three

tier ordinal scale. The respondents were then ranked and it was determined that a fairly strong correlation exists between knowledge of process-related information and level of participation (r_s = .568). while a weak correlation exists between critical consciousness and level of participation (r_s = .157).

Yet another aspect of participant knowledge that was examined pertains to respondent views on EA education. It was learned that seven respondents (21% of the sample) indicated that there was an event or activity that particularly affected their understanding of the Pembina Valley EA. Five of the seven identified the particular event or activity, with two of these being participation in the public hearing process. It was also learned that a strong majority of respondents (24 or 71%) indicated that EA education is necessary for the public's involvement in environmental assessment to be effective. This supports one of the elements of the rationale for critical EA education namely that there is a demand on the part of the public for EA education.

CHAPTER 6: IMPLEMENTING CRITICAL EA EDUCATION

6.1   CONCLUSIONS

The general purpose of this practicum was to explore the role of education in EA and to determine the effectiveness of education techniques currently employed in EA public involvement processes. The specific objectives were to: i) identify the range of techniques used to conduct education about EA; ii) identify the specific techniques used in a recent Manitoba sample case; iii) evaluate the knowledge about EA held by selected participants in the Manitoba sample case; and, iv) make recommendations for improving EA education.

By using four research methods namely, literature review, informal interviews, structured interviews and questionnaire surveys, the general purpose and specific objectives of this research were accomplished. The literature review revealed a need for research on the education dimension of EA public involvement processes. Further, it led to the development of the concept of critical EA education. This concept was applied to a range of education techniques identified in both the theoretical and the practical literature. It was also applied to techniques, identified through interviews and questionnaire surveys, employed in the Pembina Valley case. This chapter links critical EA education with aspects of participant knowledge and provides a broad set of conclusions and recommendations about EA education.[12]

6.1.1   THE CONCEPT OF CRITICAL EA EDUCATION

6.1.1(1)   DYNAMICS

The review of the literature on public involvement in EA indicated that public education plays a significant, but poorly defined role, in current thinking on public involvement. It also revealed a diverse range of education techniques available for use in the context of EA. A total of 53 techniques were identified in the practical and academic literature and adopted in the legislation of three Canadian jurisdictions. The techniques

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[12.] Given the nature of the data set and the anonymous nature of the questionnaire survey, it was impossible to measure the effect of a single education technique. Therefore, distinctions are not made between the various techniques, nor between the various organizations that undertook education during the case. Rather, an aggregate approach is taken with respect to analysis and assessment.

adopted in the three jurisdictions examined tend to focus on information dissemination and serve to fulfil notice requirements. Emphasis is also on project-specific information through the establishment of a system of public registries and records and through the release of information to the media.

Consideration of the theories of critical pedagogy, environmental adult transformation and social learning lead to the concept of critical EA education. Encompassing both "education about EA" and "education through EA", critical EA education has the potential to clearly define the role of education in the complex of public involvement. Education about EA is conducted within the participatory framework provided by critical pedagogy. It provides process-related knowledge and facilitates participation in the environmental assessment process. Once in the process, participants engage in education through EA and are transformed by critical interaction with others. Education about EA and education through EA are codependent. The former provides the foundation for the latter, while the latter gives substance and meaning to the former. The ultimate goals of critical EA education are to empower citizens and animate the community towards social activism.

6.1.1(2)   RATIONALE

Critical EA education contributes to human liberation and furthers the fundamental precepts of democracy. It also offers significant potential to improve the planning and assessment of development activities by fostering critical consciousness among EA participants. Critical consciousness enables participants to evaluate pro-development discourses and present credible and forceful counter discourses including examples and theories of cooperation among resource communities, alternative economic models, and holistic belief systems.

Critical EA education also helps meet public demand for EA environmental education. Descriptive statistical analysis of the data collected from participants in the Pembina Valley Water Supply System case confirms the assertion found in the literature that there is significant public demand for EA education (71% of respondents thought that EA education is necessary for the public's involvement in environmental assessment to be effective).

6.1.1(3)   EMPIRICAL EVIDENCE

Nonparametric statistical analysis of variables at work in the Pembina Valley case provide empirical evidence for the concepts of critical EA education. For example, the data reveal a fairly strong correlation between knowledge of process-related information and critical consciousness ($r_s = .404$). They also reveal fairly strong correlations between whether the respondent participated in the public hearings and knowledge of process-related information ($C = .543$) and between whether the respondent participated in the public hearings and critical consciousness ($C = .394$).

Moreover, a fairly strong correlation was found between readership of dominant documents and critical consciousness ($r_s = .527$). This observation is consistent with the theoretical assertions made with respect to discourse analysis. It was argued earlier that critical EA education will foster critical consciousness, which will enable members of the public to evaluate dominant discourses and present credible and forceful counter discourses. Inherent in this argument is that members of the public must have access to the dominant discourses before they will be able to develop and assert counter discourses.

Finally, it was revealed that a strong correlation between readership of dominant documents and knowledge of process-related information ($r_s = .777$).

6.1.2   WELL SUITED EDUCATION TECHNIQUES

6.1.2(1)   FRAMEWORK FOR ANALYSIS

The education techniques available for use in the context of EA can be ranked based on their congruence with the fundamental characteristics of critical methodology. Some of the techniques are well suited to critical EA education, some are poorly suited, while others appear to be neutral.

The techniques that are well suited emphasize interactive learning, are people centred and exhibit many of the descriptors of critical pedagogy. An example is the workshop technique. By definition, workshops are participatory, dialogical, desocializational, research oriented, activist, reliant on group learning and use the teacher as the coordinator. They also tend to be democratic and critical and with proper planning can be situated, multicultural and affective. Other examples of techniques that are well suited to

critical EA education are simulation exercises (e.g., mock trials, debates, participatory drama) knowledge based systems, interactive computer software, dialogues, coffee klatches and discussion group conferencing.

The techniques that are poorly suited to critical EA education exhibit few, if any, of the descriptors of critical pedagogy. Generally, they focus on the presentation of "facts"; mere information dissemination with little or no interaction with the affected publics. Typical examples are advertising, direct mail, posters, central depositories traditional publishing techniques, electronic publishing, and most media-related techniques. Although the poorly suited techniques play an important part in the public involvement process by providing notice of key events, they have limited value by themselves in the context of critical EA education. In this context they become significantly more important when used in coordination with a cross section of well suited techniques.

The neutral education techniques involve some degree of teacher-learner interaction, which introduces an element of discretion so that a neutral technique can be applied as a banking tool or as a critical tool. Examples include panel, slide, video and film presentations, phone lines, technical assistance, field offices, call-in television, talk radio, interviews, meetings, speakers bureaus, special event days, conferences, open houses, contests, town hall meetings and brainstorming. The educational context gives value to neutral techniques. With respect to critical EA education, the neutral techniques are only valuable when they are applied in the context or culture of critical pedagogy.

6.1.2(2) TECHNIQUES USED IN THE CASE

By using three methods (review of the official case files, formal interviews and a questionnaire survey) the education techniques used in the Pembina Valley Water Supply System case were identified and compiled. A review of this compilation indicates that some degree of public education was attempted by participants in the Pembina Valley Water Supply System case. It also indicates that the greatest education efforts were attempted by the proponent but efforts were also made by Manitoba Environment, several interveners, supporters of the proponent (PFRA), and the Clean Environment Commission.

Critical analysis based on the fundamental characteristics of critical methodology indicates that few of the techniques used in the Pembina Valley case were well suited to

critical EA education. The analysis also indicates that all of the techniques used by the proponent were poorly suited to critical EA education or were of the neutral variety. The techniques used by the provincial agents, i.e., Manitoba Environment and the CEC, also tended towards the poorly suited or neutral variety. The techniques used by interveners also tended towards the neutral and poorly suited variety, but what few well suited techniques were used in this case were used by interveners.

6.1.2(3)   RESULTS IN THE CASE

Descriptive statistical analysis of the data indicates that readership rates of the dominant documents (the EIS, the EIS guidelines, and the CEC report) were low. Descriptive statistical analysis also indicates that from an aggregate point of view, the level of knowledge of the participants, evidenced by the % correct of nine process-related questions, was low ($\overline{X} = 37\%$). It also indicates that the levels of knowledge of matters relating to Manitoba Environment and the CEC were low.

One exception to the low levels of knowledge was with respect to the political dimension of the CEC's role (i.e., 41% knew the CEC provided recommendations to the Minister of the Environment). A possible explanation for this exception is found in the extensive media coverage given the political dimension of the case, including the role of the Provincial Minister of the Environment. Of the 14 press clippings collected as part of the case file review, 10 focussed on the political dimension and seven dealt specifically with discretion exercised by the minister.

Another exception to the generally low level of knowledge demonstrated by the participants was that the level of knowledge of the role and function of the proponent was moderate to high (e.g., 56% of the sample had read the EIS and 82% correctly identified the proponent). This confirms that poorly suited education techniques used within a banking approach can be effective for the purposes of information dissemination.

Descriptive statistical analysis of the data collected from participants in the Pembina Valley case indicates that respondents were not highly critical of discourses presented in the case. Less than half of the respondents expressed critical comments concerning the effectiveness, efficiency or fairness of the process and a little more than half (55%) challenged the official position on the purpose of the project.

Finally, participation in the public hearing process was relatively low. Only 16 respondents, or 47% of the sample, participated in the public hearings.

6.1.3   THE SUBSTANCE OF CRITICAL EA EDUCATION

6.1.3(1)   EDUCATION ABOUT EA

Based on critical pedagogy, environmental adult transformation, social learning and similar theoretical developments, one can determine some elements of critical EA education. Within the participatory framework provided by critical pedagogy, a range of methods of instruction should be used to provide education about EA. The content should include process-related information, including how status quo decision making processes and project decisions can be challenged. It should also include the substance of dominant and counter discourses offered during any given EA case, including the engineering aspects of a project, ecological and economic analyses of proposed project alternatives and how ecosystems work. Skills training such as how to make presentations, lobbying strategies and advocacy skills are very important. Finally, it should include the mechanics of law reform and the basics of judicial review.

Although some of the elements of education about EA are evident, further research is required to fully define both substantive and procedural elements.

6.1.3(2)   EDUCATION THROUGH EA

It was argued earlier that once in the environmental assessment system, participants engage in education through EA. Through this process they learn how to work with other members of the public to define and pursue their own goals. Through the development of critical consciousness, participants evaluate dominant discourses and are empowered to present credible and forceful counter discourses. Overall, via education through EA participants are transformed by critical interaction with others.

Although the general notion of education through EA is presented, further research is required to fully explore the dynamics of the concept. Finger's (1989) theory of environmental adult transformation and social learning theory may be instructive in guiding this research.

This conclusion regarding further research is supported by an observation from the nonparametric statistical analysis of the data on participant knowledge. There it was revealed that, although a fairly strong correlation exists between level of participation and knowledge of process related information (r_s = .568), only a weak correlation is evident between level of participation and critical consciousness (r_s =.157). This is not consistent with the theoretical basis of critical EA education and therefore requires further research.

6.2   RECOMMENDATIONS

6.2.1   A PROGRAM OF CRITICAL EA EDUCATION

The role of education in the complex of public involvement is poorly defined in the literature. The concept of critical EA education, however, has the potential to more clearly define that role. It has a strong rationale, a solid theoretical foundation and empirical support from the Pembina Valley Water Supply System case. *It is, therefore, recommended that a comprehensive program of critical EA education be developed for Manitoba.*

6.2.2   EDUCATION TECHNIQUES

6.2.2(1)   WELL SUITED TECHNIQUES

As described earlier, the education techniques available for use in the context of EA can be ranked based on their congruence with the fundamental characteristics of critical methodology. Analysis based on the fundamental characteristics of critical methodology indicates that few of the techniques used in the Pembina Valley case were well suited to critical EA education. Given the results from the case with respect to the four key variables examined (readership of dominant documents, knowledge of process-related information, critical consciousness and participation in the hearings), *it is recommended that the program focus in a general way on techniques that are well suited to critical EA education, i.e., techniques that emphasize interactive learning, are people centred and exhibit many of the descriptors of critical pedagogy.*

To add further particulars to the general approach described above, *it is further recommended that the program focus on workshops, simulation exercises*

(e.g., mock trials, debates, participatory drama) knowledge based systems, interactive computer software, dialogues and discussion group conferencing.

At a logistical level, implementation of interactive education techniques must pay heed to Westman (1985), who discusses the representativeness of response to different techniques and identifies a number potential problems. People employed outside of the home during the day are not likely to attend seminars or workshops or hearings held during the daytime. Events which require travel but do not compensate the participants for travel expenses will likely be biased towards those participants whose costs are paid for by the interests they represent. Traditionally, certain groups are almost always under represented by most public involvement techniques: e.g., recent immigrants, children and people who live in remote communities.

The importance of logistical matters such as the ones raised by Westman (1985) is supported by comments received during the questionnaire survey. In providing final comments on education about EA (question 19), one respondent stated,

"Because of ... presentations of natural resources and the PVWC at the Portage hearings, those supposedly being consulted (the public) had to wait until 9 pm at night to present. This was not acceptable."

Another respondent complained that, "The meeting I was informed of was in Winnipeg - 100 miles for me and not even in the Pembina Valley area." Another called for, "A more local meeting. The only one I was informed of was in Winnipeg."

6.2.2(2)   PROVIDING NOTICE AND INFORMATION

Given that poorly suited or neutral techniques play a role in the public involvement process by providing notice of key events, and that such techniques can be effective for the purposes of information dissemination, *it is recommended that the program not ignore poorly suited and neutral techniques but, rather, incorporate them to take advantage of their strengths.*

6.2.2(3)   ACCESS TO DOMINANT DOCUMENTS

Given the theoretical foundations for critical EA education, and given the

correlations found between the key variables examined in the Pembina Valley case, *it is recommended that techniques be applied to facilitate access to the dominant documents filed in any given EA case.*

6.2.2(4)   PLAIN LANGUAGE PRINCIPLES

Dominant documents, such as the EIS, are often published in report form and are couched in a mixture of scientific and bureaucratic language. The level of the language and the amount of jargon is likely not appropriate to ensure meaningful communication with a majority of EA participants. Resort to fundamental plain language principles and design rules is necessary to ensure that typical EA documents are published in a format that is readable for the average user. In addition, simple principles of graphic design can be adopted to alter the typical report form to make it significantly more user-friendly. With personal computers and desktop publishing software available to most government departments and environmental consultants, this would take little effort. *It is, therefore, recommended that plain language principles be applied to dominant documents to address issues of style, format and language.*

6.2.2(5)   FIELDTESTING

Simple fieldtesting can be a cost effective means to ensure adequate communication with the intended audience. In Freirean terms, fieldtesting situates the subject matter of the report in learner thought and language and encourages learner participation in the process. *It is, therefore, recommended that some method of fieldtesting be applied to dominant documents to measure appropriate language levels and publishing formats for the intended audiences.*

6.2.2(6)   ALTERNATIVE PUBLISHING FORMATS

Electronic publishing has proven to be a very effective method of conducting environmental education (Alm 1992). It has also proven to be an effective means of communication for interveners who are opposing project proposals. The experiences of the Inter-Church Uranium Committee Educational Cooperative in Saskatchewan is an excellent case in point (Penna (1993a).

Alternative publishing formats also include the production of video summaries as means of reaching audiences with low literacy levels. An excellent example of this is found in the discipline of public legal education with the production of a video summary of the Report of the Aboriginal Justice Inquiry of Manitoba prepared during the Public Inquiry into the Administration of Justice and Aboriginal People. *It is, therefore, recommended that education efforts to facilitate access to dominant and counter documents include publishing in alternative formats.*

6.2.3   THE SUBSTANCE OF CRITICAL EA EDUCATION

6.2.3(1)   EDUCATION ABOUT EA

Given the theoretical foundations for critical EA education, and given the correlations found in the Pembina Valley between case, *it is recommended that education about EA include:*

- *process-related information, including how status quo decision making processes and project decisions can be challenged;*
- *the substance of dominant and counter discourses offered during any given EA case, including the engineering aspects of a project, ecological and economic analyses of proposed project alternatives and how ecosystems work;*
- *skills training including how to make presentations and lobbying/advocacy skills;*
- *the mechanics of law reform and the basics of judicial review; and,*
- *how members of the public can work together to define and pursue their own goals.*

The call for skills training is further supported by comments received during the questionnaire surveys. One respondent remarked that, "This process, and public speaking, is not a common practice for people involved in water hearings." Another stated that the process was, "Complicated but I believe the hearing was well attended and alot of people got involved. But everyone needs to go through one to be able to be effective at the second one."

A Freirean approach appears to be particularly well suited to the objective of skill development. Techniques such as simulations, workshops, videotapes and training manuals can be very effective when emphasis is placed on participation, dialogue, self-reflection and learner specific contexts.

A caution must be issued with regards to the expectations one might have for a skills training program. Skills training is necessary and it is reasonable to expect it to have beneficial effects on participant knowledge, access to the hearing process and community empowerment. However, it is not a replacement for sound professional advice. In addition to skill development, interveners quite often require financial assistance to retain the services of professionals such as lawyers, engineers and resource managers.

This sentiment was echoed in comments received during the surveys. "Funding to challenge the issuance of a licence is a problem. Also hearings have to be held in all areas affected. I distrusted and disbelieved the water volume figures in the EIA but I have no way of checking without hiring my own engineer or other expert qualified to check the figures etc." "For things such as large scale water diversion, the process is necessary but it is difficult for an individual or group to challenge the proponents EIA without funding for experts, i.e., engineers etc." "The CEC refused to provide intervener funding for opponents, meaning the resources and research were in the hands of the proponents."

6.2.4   FURTHER RESEARCH

6.2.4(1)   EDUCATION ABOUT EA

Although some of the elements of education about EA are evident, *further research is required to fully define those substantive and procedural elements that will facilitate public involvement in the EA process.*

6.2.4(2)   EDUCATION THROUGH EA

Research is required to explore the dynamics of education through EA and the relationship, if any, between this concept and the notion of environmental adult transformation. The relationship between education through EA and social learning also deserves further research.

6.2.4(3)   ACCESS TO COUNTER-HEGEMONIC DOCUMENTS

This research does not provide empirical evidence to suggest an association between readership of counter-hegemonic documents and critical consciousness but such an association is well founded in the literature on critical pedagogy and social learning. Indeed, it is not an overstatement to suggest that access to counter-hegemonic documents may be more important than access to dominant documents. *Further research is required to explore the relationship between access to counter-hegemonic documents and critical consciousness.*

6.2.4(4)   TESTING CRITICAL CONSCIOUSNESS

Nonparametric statistical analysis of the data on participant knowledge revealed a weak correlation between level of participation and critical consciousness when the theory suggests there should be a strong association between these two variables. Also, there are questions whether the indicators of critical consciousness used in this research actually measure critical consciousness or merely indicate opposition to the proposed project. In addition, it must be recognized that tests were not run to measure whether the indicators were independent of each other. *These points suggest that further research is required on the subject of critical consciousness including identifying accurate measures and testing the association between level of participation and critical consciousness.*

6.2.5   THE SPONSORING AGENCY

The preceding discussions and recommendations beg the question of sponsorship. That is, who would be interested in implementing a comprehensive program of critical EA education in Manitoba? In a typical EA case the proponent would have little interest in engaging in critical education leading to conscientization. Its main interest in education would be in conducting forms of public relations to promote or "sell" its project to its constituents and to political power brokers. Often this can also be said of the EA authority and the adjudicative agency. These are, after all, agents of governments that are often advocating traditional pro-development discourses in support of the proponent.

The only individuals or organizations with an interest in pursuing critical EA education would be those who are motivated to change the status quo. That is, those who are advocating positions that run counter to the traditional discourses of state and big business. The most likely candidates are to be found among non-governmental organizations in the nonprofit sector. Aside from being politically motivated, non-governmental organizations bring other strengths to the table including the commitment of their members, expertise of staff and volunteers, flexibility in adapting to changing circumstances and broad community contacts. *For these reasons it is recommended that responsibility for implementing a comprehensive critical EA education program in Manitoba be given to a non-governmental organization established for this purpose.*

However, given that there are numerous existing non-governmental organizations active in Manitoba in the fields of environmental education and environmental assessment, *it is further recommended that the new organization develop partnerships with existing agencies at both the institutional and the programming levels.*

A significant problem facing many organizations in the nonprofit sector is that funding is often insecure and inadequate. As well, reliance on government funding creates the appearance of conflict of interest and may jeopardise the independence of the recipient organization. To address these issues it is necessary to identify a non-governmental source of long term, adequate funding. Intervener funding models may offer guidance in this regard. *Further research is required to explore how Manitoba's intervener funding regime may be amended to accommodate the provision of support to the agency responsible for implementing critical EA education.*

6.3   CONCLUDING REMARKS

Environmental assessment was an important development in the evolution of natural resources management. It shifted the focus from regulation and control to anticipation and prevention. However, EA has yet to live up to its potential as a truly revolutionary planning mechanism. There are significant problems with most, if not all, EA processes in Canada. One area of concern is with respect to public involvement. Full and meaningful

public involvement has a number of requirements, one of which is effective public education. Critical EA education provides a framework to understand education in the complex of public involvement and can move EA closer to its potential as a valuable tool for sustainable development.

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APPENDIX A

INTERVIEW QUESTIONS AND COVERING LETTER

<u>Alan Diduck</u>

March 17, 1995

Bruce Webb, P.Eng.
Water Development and Control Assessment Officer
Environmental Approvals
Manitoba Environment
Building 2, 139 Tuxedo Avenue
Winnipeg, Manitoba
R3N 0H6

Dear Mr. Webb:

As you are aware, I am conducting research into public education techniques used during environmental assessment. Since Manitoba Environment used a variety of techniques (such as open houses and local media announcements) during the assessment of the Pembina Valley Water Supply System, your experiences are extremely important to the research.

I am writing to confirm our meeting on Wednesday, March 22, 1995 at 9:30 am at your office. As we discussed, the purpose of the meeting is to conduct an interview to identify the specific education techniques used by Manitoba Environment during the assessment of the Pembina Valley Water Supply System and to solicit your opinion on improving education about environmental assessment.

The entire interview should take no longer than 60 minutes to complete. For your information, I have enclosed a copy of the interview questions.

I appreciate the many demands that are made of your time and I am, therefore, very grateful for the opportunity to meet with you on the 22nd.

Once again, thank you for your assistance and if you have any questions about the interview please do not hesitate to contact me.

Very sincerely yours,

Alan P. Diduck, LLB
Graduate Student
Natural Resources Institute, University of Manitoba

OBJECTIVES OF THE INTERVIEW

To identify the specific education techniques used by Manitoba Environment during the environmental assessment of the Pembina Valley Regional Water Supply Proposal.

To solicit opinion on improving education about EA.

STRUCTURE OF THE INTERVIEW

The interview questions divide the EA process into 5 parts: the final report stage, the public hearings stage, submission of the environmental impact statement (EIS), preparation of the EIS guidelines and the proposal stage. This was done to provide structure but the interview is not limited to these specific stages. The entire EA process is of interest, from beginning to end.

Except for the questions that specifically state otherwise, please provide responses from the point of view of Manitoba Environment. That is, do not limit your answers to the education techniques with which you were personally involved.

DEFINITION

Education is the use of information dissemination and general instruction to create an awareness of an EA process and related issues. Examples of education techniques include newspaper advertisements, panel presentations, publication of brochures and slide presentations.

1)   What are your views on public involvement in the environmental assessment (EA) process?

      Please do not limit your response to Manitoba Environment's policy on this issue, if such a policy exists. I am also interested in your personal opinion.

2a)   Is education about EA necessary for the public's involvement to be effective?
      ❏ YES   ❏ UNDECIDED   ❏ DON'T KNOW   ❏ NO

b)   Why do you feel this way?

      Again, please do not limit your response to Manitoba Environment's official policy on this issue.

3)   EA participants sometimes conduct public education activities (such as the ones found in Table 1), while othertimes they do not.

      Did Manitoba Environment conduct education activities as part of the environmental assessment of the Pembina Valley Regional Water Supply Proposal?
      ❏ YES   ❏ DON'T KNOW   ❏ NO

4)   The Clean Environment Commission issued its final report for the Pembina Valley Regional Water Supply Proposal in May 1994.

a)   Did Manitoba Environment conduct any education activities at this stage of the process?
      ❏ YES   ❏ DON'T KNOW   ❏ NO

b)   If yes, did it use any of the education techniques listed in Table 1?
      ❏ YES   ❏ DON'T KNOW   ❏ NO

c)   If yes, which techniques did it use? Please indicate by marking in the boxes in Table 1.

1

5a)   Did Manitoba Environment use any further education techniques at the final report stage of the process?

       ❏ YES   ❏ DON'T KNOW   ❏ NO

b)   If yes, which techniques did it use?

---

6   The Clean Environment Commission held public hearings on the Pembina Valley Regional Water Supply Proposal in June 1993 and March 1994.

a)   Did Manitoba Environment conduct any education activities at this stage of the process?

       ❏ YES   ❏ DON'T KNOW   ❏ NO

b)   If yes, did it use any of the education techniques listed in Table 2?

       ❏ YES   ❏ DON'T KNOW   ❏ NO

c)   If yes, which techniques did it use? Please indicate by marking in the boxes in Table 2.

7a)   Did Manitoba Environment use any further education techniques at the public hearing stage of the process?

       ❏ YES   ❏ DON'T KNOW   ❏ NO

b)   If yes, which techniques did it use?

---

8)   The environmental impact statement (EIS) for the Pembina Valley Regional Water Supply Proposal was submitted in December 1992 and February 1993.

a)   Did Manitoba Environment conduct any education activities at this stage of the process?

       ❏ YES   ❏ DON'T KNOW   ❏ NO

b)   If yes, did it use any of the education techniques listed in Table 3?

       ❏ YES   ❏ DON'T KNOW   ❏ NO

c)   If yes, which techniques did it use? Please indicate by marking in the boxes in Table 3.

9a) Did Manitoba Environment use any further education techniques at the EIS stage of the process?

❑ YES   ❑ DON'T KNOW   ❑ NO

b) If yes, which techniques did it use?

10) Manitoba Environment prepared draft EIS guidelines for the Pembina Valley Regional Water Supply Proposal in May 1992.

a) Did Manitoba Environment conduct any education activities at this stage of the process?

❑ YES   ❑ DON'T KNOW   ❑ NO

b) If yes, did it use any of the education techniques listed in Table 4?

❑ YES   ❑ DON'T KNOW   ❑ NO

c) If yes, which techniques did it use? Please indicate by marking in the boxes in Table 4.

11a) Did Manitoba Environment use any further education techniques at the EIS guidelines stage of the process?

❑ YES   ❑ DON'T KNOW   ❑ NO

b) If yes, which techniques did it use?

12) The Pembina Valley Regional Water Supply Proposal was submitted to Manitoba Environment in October 1991.

a) Did Manitoba Environment conduct any education activities at this stage of the process?

❑ YES   ❑ DON'T KNOW   ❑ NO

b) If yes, did it use any of the education techniques listed in Table 5?

❑ YES   ❑ DON'T KNOW   NO

c) If yes, which techniques did it use? Please indicate by marking in the boxes in Table 5.

13a)   Did Manitoba Environment use any further education techniques at the proposal stage of the process?
       ❑ YES   ❑ DON'T KNOW   ❑ NO

b)   If yes, which techniques did it use?

14a)   Did Manitoba Environment conduct any other education activities (not already referred to in questions 1-13) during the environmental assessment of the Pembina Valley Regional Water Supply Proposal?
       ❑ YES   ❑ DON'T KNOW   ❑ NO

b)   If yes, did it use any of the education techniques listed in Table 6?
       ❑ YES   ❑ DON'T KNOW   ❑ NO

c)   If yes, which techniques did it use? Please indicate by marking in the boxes in Table 6.

15a)   Did Manitoba Environment use any further education techniques during education activities not already referred to in questions 1-13?
       ❑ YES   ❑ DON'T KNOW   ❑ NO

b)   If yes, which techniques did it use?

16)   Do you have any comments on how education about EA could have been improved during assessment of the Pembina Valley Regional Water Supply Proposal?

Please do not limit your response to education conducted by Manitoba Environment. I am also interested in your views on education conducted by other participants.

17)   Finally, do you have any general comments on education about EA?

Please do not limit your response to the Pembina Valley Regional Water Supply Proposal. I am also interested in your views on the subject generally.

4

TABLE 1

AUDIO / VISUAL / ELECTRONIC

❑ slides   ❑ films   ❑ videotapes
❑ computerized participation
      - ❑ knowledge-based systems
      - ❑ electronic publishing
      - ❑ information retrieval systems
      - ❑ interactive computer software
      - ❑ discussion group conferencing

DIRECT / INDIVIDUALIZED

❑ direct mail   ❑ direct e-mail   ❑ phone lines
❑ technical assistance   ❑ field offices

FORMAL EDUCATION

❑ integration into curricula   ❑ discussion in literacy programs

MEDIA

❑ coverage of hearings   ❑ news releases   ❑ news conferences
❑ talk radio   ❑ participatory TV   ❑ advertising
❑ public service announcements

PRESENTATIONS / EVENTS

❑ workshops   ❑ conferences   ❑ panels
❑ open houses   ❑ exhibits/displays   ❑ meetings
❑ town hall meetings   ❑ brainstorming   ❑ simulations
❑ dialogues/coffee klatches ❑ speakers bureau   ❑ special event days
❑ contests
      - ❑ song contests

PUBLISHING

❑ booklets   ❑ brochures   ❑ newspaper inserts
❑ notices   ❑ feature articles   ❑ position papers
❑ reports   ❑ newsletters   ❑ information kits
❑ central depositories   ❑ translation   ❑ posters
❑ photonovel   ❑ manual   ❑ decisions and reasons
❑ plain language legislation

TABLE 2

AUDIO / VISUAL / ELECTRONIC

☐ slides   ☐ films   ☐ videotapes
☐ computerized participation
     - ☐ knowledge-based systems
     - ☐ electronic publishing
     - ☐ information retrieval systems
     - ☐ interactive computer software
     - ☐ discussion group conferencing

DIRECT / INDIVIDUALIZED

☐ direct mail   ☐ direct e-mail   ☐ phone lines
☐ technical assistance   ☐ field offices

FORMAL EDUCATION

☐ integration into curricula   ☐ discussion in literacy programs

MEDIA

☐ coverage of hearings   ☐ news releases   ☐ news conferences
☐ talk radio   ☐ participatory TV   ☐ advertising
☐ public service announcements

PRESENTATIONS / EVENTS

☐ workshops   ☐ conferences   ☐ panels
☐ open houses   ☐ exhibits/displays   ☐ meetings
☐ town hall meetings   ☐ brainstorming   ☐ simulations
☐ dialogues/coffee klatches   ☐ speakers bureau   ☐ special event days
☐ contests
     - ☐ song contests

PUBLISHING

☐ booklets   ☐ brochures   ☐ newspaper inserts
☐ notices   ☐ feature articles   ☐ position papers
☐ reports   ☐ newsletters   ☐ information kits
☐ central depositories   ☐ translation   ☐ posters
☐ photonovel   ☐ manual   ☐ decisions and reasons
☐ plain language legislation

TABLE 3

AUDIO / VISUAL / ELECTRONIC

❑ slides   ❑ films   ❑ videotapes
❑ computerized participation
    - ❑ knowledge-based systems
    - ❑ electronic publishing
    - ❑ information retrieval systems
    - ❑ interactive computer software
    - ❑ discussion group conferencing

DIRECT / INDIVIDUALIZED

❑ direct mail   ❑ direct e-mail   ❑ phone lines
❑ technical assistance   ❑ field offices

FORMAL EDUCATION

❑ integration into curricula   ❑ discussion in literacy programs

MEDIA

❑ coverage of hearings   ❑ news releases   ❑ news conferences
❑ talk radio   ❑ participatory TV   ❑ advertising
❑ public service announcements

PRESENTATIONS / EVENTS

❑ workshops   ❑ conferences   ❑ panels
❑ open houses   ❑ exhibits/displays   ❑ meetings
❑ town hall meetings   ❑ brainstorming   ❑ simulations
❑ dialogues/coffee klatches   ❑ speakers bureau   ❑ special event days
❑ contests
    - ❑ song contests

PUBLISHING

❑ booklets   ❑ brochures   ❑ newspaper inserts
❑ notices   ❑ feature articles   ❑ position papers
❑ reports   ❑ newsletters   ❑ information kits
❑ central depositories   ❑ translation   ❑ posters
❑ photonovel   ❑ manual   ❑ decisions and reasons
❑ plain language legislation

TABLE 4

AUDIO / VISUAL / ELECTRONIC

❏ slides   ❏ films   ❏ videotapes
❏ computerized participation
     - ❏ knowledge-based systems
     - ❏ electronic publishing
     - ❏ information retrieval systems
     - ❏ interactive computer software
     - ❏ discussion group conferencing

DIRECT / INDIVIDUALIZED

❏ direct mail   ❏ direct e-mail   ❏ phone lines
❏ technical assistance   ❏ field offices

FORMAL EDUCATION

❏ integration into curricula   ❏ discussion in literacy programs

MEDIA

❏ coverage of hearings   ❏ news releases   ❏ news conferences
❏ talk radio   ❏ participatory TV   ❏ advertising
❏ public service announcements

PRESENTATIONS / EVENTS

❏ workshops   ❏ conferences   ❏ panels
❏ open houses   ❏ exhibits/displays   ❏ meetings
❏ town hall meetings   ❏ brainstorming   ❏ simulations
❏ dialogues/coffee klatches   ❏ speakers bureau   ❏ special event days
❏ contests
     - ❏ song contests

PUBLISHING

❏ booklets   ❏ brochures   ❏ newspaper inserts
❏ notices   ❏ feature articles   ❏ position papers
❏ reports   ❏ newsletters   ❏ information kits
❏ central depositories   ❏ translation   ❏ posters
❏ photonovel   ❏ manual   ❏ decisions and reasons
❏ plain language legislation

TABLE 5

AUDIO / VISUAL / ELECTRONIC

❏ slides ❏ films ❏ videotapes
❏ computerized participation
     - ❏ knowledge-based systems
     - ❏ electronic publishing
     - ❏ information retrieval systems
     - ❏ interactive computer software
     - ❏ discussion group conferencing

DIRECT / INDIVIDUALIZED

❏ direct mail ❏ direct e-mail ❏ phone lines
❏ technical assistance ❏ field offices

FORMAL EDUCATION

❏ integration into curricula ❏ discussion in literacy programs

MEDIA

❏ coverage of hearings ❏ news releases ❏ news conferences
❏ talk radio ❏ participatory TV ❏ advertising
❏ public service announcements

PRESENTATIONS / EVENTS

❏ workshops ❏ conferences ❏ panels
❏ open houses ❏ exhibits/displays ❏ meetings
❏ town hall meetings ❏ brainstorming ❏ simulations
❏ dialogues/coffee klatches ❏ speakers bureau ❏ special event days
❏ contests
     - ❏ song contests

PUBLISHING

❏ booklets ❏ brochures ❏ newspaper inserts
❏ notices ❏ feature articles ❏ position papers
❏ reports ❏ newsletters ❏ information kits
❏ central depositories ❏ translation ❏ posters
❏ photonovel ❏ manual ❏ decisions and reasons
❏ plain language legislation

TABLE 6

AUDIO / VISUAL / ELECTRONIC

❏ slides   ❏ films   ❏ videotapes
❏ computerized participation
        - ❏ knowledge-based systems
        - ❏ electronic publishing
        - ❏ information retrieval systems
        - ❏ interactive computer software
        - ❏ discussion group conferencing

DIRECT / INDIVIDUALIZED

❏ direct mail   ❏ direct e-mail   ❏ phone lines
❏ technical assistance   ❏ field offices

FORMAL EDUCATION

❏ integration into curricula   ❏ discussion in literacy programs

MEDIA

❏ coverage of hearings   ❏ news releases   ❏ news conferences
❏ talk radio   ❏ participatory TV   ❏ advertising
❏ public service announcements

PRESENTATIONS / EVENTS

❏ workshops   ❏ conferences   ❏ panels
❏ open houses   ❏ exhibits/displays   ❏ meetings
❏ town hall meetings   ❏ brainstorming   ❏ simulations
❏ dialogues/coffee klatches   ❏ speakers bureau   ❏ special event days
❏ contests
        - ❏ song contests

PUBLISHING

❏ booklets   ❏ brochures   ❏ newspaper inserts
❏ notices   ❏ feature articles   ❏ position papers
❏ reports   ❏ newsletters   ❏ information kits
❏ central depositories   ❏ translation   ❏ posters
❏ photonovel   ❏ manual   ❏ decisions and reasons
❏ plain language legislation

APPENDIX B
CHECKLIST TO AID THE FORMULATION OF QUESTIONS

FOR EACH QUESTION THE RESEARCHER SHOULD:

✓ clearly define the topic

✓ be clear about the information that is required and the reason for wanting the information
- avoid the use of words that are so abstract or general that they lack specific empirical referents
- avoid words that are unlikely to be understood by all respondents either because they are rarely used in everyday life, or are jargon

✓ ensure the question is relevant to respondents by:
- using a filter
- not asking for information respondents are likely to have forgotten
- avoiding hypothetical issues

✓ ensure the question is not biased by:
- ensuring balance in the introduction to the question
- ensuring that sets of response options are complete
- ensuring that sets of response options are balanced
- avoiding using words that are likely to invoke stereotypical reactions

✓ avoid complexities such as:
- asking 2 or more questions at once
- words that have several meanings
- checking whether the question has been worded as simply as possible
- using too many "meaningful" words in the one question
- qualifying clauses and phrases; if qualifying clauses and phrases have to be used they should be placed at the beginning rather than at the end of the question
- long questions
- negatives and double negatives

✓ ensure the respondents know what kind of answer is required by:
- providing context for the question
- telling them why the question is being asked
- informing respondents what will be done with the information they give
- specifying the perspective that respondents should adopt

(After Foddy 1993)

APPENDIX C

QUESTIONNAIRE INSTRUMENT, COVERING LETTER

AND REMINDER LETTER

May 1, 1995

«first name» «last name»
«business»
«address»
«town»
«pcode»

Dear «title» «last name»:

I am a graduate student at the Natural Resources Institute at the University of Manitoba. I am conducting research into public education techniques used during environmental assessment. This research is being carried out as part of the Masters of Natural Resources Management program.

I am writing to you because of your involvement in the Pembina Valley Regional Water Supply System case. This was a recent and important local case. Your experiences are critical to the research.

I wish to request a few minutes of your time to complete a questionnaire survey. The objectives of the survey are to:
- identify education methods used in the Pembina Valley Regional Water Supply System case
- examine public knowledge about the case, and
- ask your opinion on improving education about environmental assessment

I am requesting that you give me your candid opinion with regard to aspects of environmental assessment and the Pembina Valley Regional Water Supply System case. Please be assured that your responses will be kept in strict confidence and will remain anonymous. Enclosed is a survey questionnaire that will take you approximately 15 minutes to complete. A stamped, self-addressed envelope is enclosed for your convenience in returning it to me upon completion.

I appreciate the many demands that are made on your time but I hope you will be able to accommodate my request. Your participation will not only contribute to the success of the research, it will contribute to improving environmental assessment in Manitoba by addressing issues of efficiency, effectiveness and fairness.

If you have any questions about the research, please do not hesitate to contact either myself, at (204) 943-2382, or Dr. John Sinclair, at (204) 474-8374. Thank you for your assistance.

Very sincerely yours,

Alan P. Diduck, LLB
Graduate Student

May 18, 1995

«first name» «last name»
«business»
«address»
«town»
«pcode»

Dear «title» «last name»:

About three weeks ago I requested you to complete a questionnaire survey about the Pembina Valley Water Supply System case. If you have completed and returned the questionnaire, thank you very much. Your assistance is much appreciated.

If you have yet to complete the questionnaire, I urge you to give positive consideration to my request. I would like to get as many responses as possible to ensure success of the research.

I realize this is a very busy time of year and you undoubtedly have a number of important matters to which you must attend. However, the questionnaire is fairly brief and should take no longer than 15 minutes to complete. As well, please be reminded that your response will be kept in strict confidence and will remain anonymous.

In my earlier correspondence I enclosed a questionnaire and a stamped, self-addressed envelope. If these documents were miscarried in the mail or otherwise mislaid, please call me and I will send further copies. You may call me
          or you may call Dr. John Sinclair (

Thank you for your attention to this matter and I hope you will find the time to complete the questionnaire and drop it in the nearest postal box.

Very sincerely yours,

Alan P. Diduck, LLB
Graduate Student

SURVEY OF VIEWS OF PUBLIC EDUCATION ON ENVIRONMENTAL ASSESSMENT (EA) IN THE PEMBINA VALLEY WATER SUPPLY CASE

The first 12 questions deal specifically with the Pembina Valley Water Supply System case. The questions divide the EA process and the case into a number of stages, working back in time from the most recent stage (Report on Public Hearings) to the earliest stage (Proposal). The case was divided like this to provide structure to the questionnaire but the entire case is of interest, from beginning to end.

1a)   Have you read the 'Report on Public Hearings' concerning the Pembina Valley Regional Water Supply System case, prepared in May 1994?

       O   yes   O   no

b)   As far as you are aware, who prepared the report?

- O   Central Plains Inc.
- O   City of Brandon
- O   City of Portage la Prairie
- O   City of Winnipeg
- O   Clean Environment Commission
- O   Federal Environmental Review Office (FEARO)
- O   Federal Minister of the Environment
- O   Manitoba Environment
- O   Pembina Valley Water Cooperative
- O   Provincial Minister of the Environment
- O   Prairie Farm Rehabilitation Administration
- O   undecided
- O   don't know
- O   other

2a)   The Report on Public Hearings recommended whether a licence should be granted in the Pembina Valley Regional Water Supply System case. As far as you are aware, to whom was the recommendation made?

- O   Central Plains Inc.
- O   City of Brandon
- O   City of Portage la Prairie
- O   City of Winnipeg
- O   Clean Environment Commission
- O   Federal Environmental Review Office (FEARO)
- O   Federal Minister of the Environment
- O   Manitoba Environment
- O   Pembina Valley Water Cooperative
- O   Provincial Minister of the Environment
- O   Prairie Farm Rehabilitation Administration
- O   undecided
- O   don't know

b)   Are you aware of the granting of a licence in this case?

        O yes   O don't know   O no

c)   Are you aware of any appeals filed against the decision to grant (not grant) a licence in this case?

        O yes   O don't know   O no

3a)   Public hearings were held in the Pembina Valley Regional Water Supply System case in June 1993 and March 1994. Did you participate in the hearings?

        O yes   O no

b)   If yes, how did you participate? *Please select as many responses as appropriate.*

        O formal intervention
        O oral presentation
        O submission of a letter
        O submission of a written brief
        O attendance
        O other *(please describe below)*

_____

_____

_____

_____

4a)   Have you read the 'environmental impact statement (EIS)' for the Pembina Valley Regional Water Supply System case, submitted in December 1992 and February 1993?

        O yes   O no

b)   As far as you are aware, who submitted the EIS?

        O Central Plains Inc.
        O City of Brandon
        O City of Portage la Prairie
        O City of Winnipeg
        O Clean Environment Commission
        O Federal Environmental Review Office (FEARO)
        O Federal Minister of the Environment
        O Manitoba Environment
        O Pembina Valley Water Cooperative
        O Provincial Minister of the Environment
        O Prairie Farm Rehabilitation Administration
        O undecided
        O don't know

5)	Which of the following statements best describes your understanding of an environmental impact statement (EIS)? *Please select just one response.*
- ○	an environmental impact statement is the same as an environmental assessment
- ○	an environmental impact statement describes the potential impacts of a proposed project on the environment
- ○	undecided
- ○	don't know
- ○	other *(please describe below)*

_____

_____

_____

_____

6)	The 'EIS guidelines' establish the scope (parameters) of the EIS. Have you read the draft EIS guidelines, prepared in May 1992?
- ○	yes		○	no

b)	As far as you are aware, who prepared the draft EIS guidelines?
- ○	Central Plains Inc.
- ○	City of Brandon
- ○	City of Portage la Prairie
- ○	City of Winnipeg
- ○	Clean Environment Commission
- ○	Federal Environmental Review Office (FEARO)
- ○	Federal Minister of the Environment
- ○	Manitoba Environment
- ○	Pembina Valley Water Cooperative
- ○	Provincial Minister of the Environment
- ○	Prairie Farm Rehabilitation Administration
- ○	undecided
- ○	don't know

c)	Were you given an opportunity to comment on the draft EIS guidelines?
- ○	yes		○	don't know		○	no

7)	In your opinion, what were the main environmental impacts associated with the Pembina Valley Regional Water Supply System case as it was originally proposed? *Please select as many responses as appropriate.*
- ○	decrease in the water quality of the Assiniboine River
- ○	decrease in the water quality of the Boyne River
- ○	decrease in the water quality of the Pembina River
- ○	decrease in the water quality of the Red River		*(continued over)*

3

- O excessive withdrawal from the Assiniboine River
- O excessive withdrawal from the Boyne River
- O excessive withdrawal from the Pembina River
- O excessive withdrawal from the Red River
- O negative impacts on fish and fish habitat in affected rivers
- O negative impacts on heritage resources
- O negative impacts from construction and operation of transfer canals and pipelines
- O pollution from operation and construction of a water treatment plant at the Shellmouth Reservoir
- O pollution from operation and construction of a water treatment plant at the Stephenfield Reservoir
- O significant increase in the level of the Shellmouth Reservoir
- O significant decrease in the level of the Shellmouth Reservoir
- O significant increase in the level of the Stephenfield Reservoir
- O significant decrease in the level of the Stephenfield Reservoir
- O stabilization of the Winkler Aquifer
- O destabilization of the Winkler Aquifer
- O undecided
- O don't know
- O other *(please describe below)*

_____

_____

_____

_____

8)   As far as you are aware, who was the proponent (the project sponsor) in the Pembina Valley Regional Water Supply System case?
- O Central Plains Inc.
- O City of Brandon
- O City of Portage la Prairie
- O City of Winnipeg
- O Clean Environment Commission
- O Federal Environmental Review Office (FEARO)
- O Federal Minister of the Environment
- O Manitoba Environment
- O Pembina Valley Water Cooperative
- O Provincial Minister of the Environment
- O Prairie Farm Rehabilitation Administration
- O undecided
- O don't know

4

9) Which of the following statements best describes your understanding of the purpose of the Pembina Valley Regional Water Supply System proposal? *Please select just one response.*

- O to provide a solution to drinking water supply problems in the "Pembina Triangle" region
- O to provide a solution to irrigation problems in the "Pembina Triangle" region
- O to promote economic development in the "Pembina Triangle" region
- O to divert water to and promote economic relationships with North Dakota
- O undecided
- O don't know
- O other *(please describe below)*

_____

_____

_____

_____

10) Which of the following statements best describes your understanding of environmental assessment (EA)? *Please select just one response.*

- O EA anticipates potential environmental impacts
- O EA enforces legislated environmental standards
- O EA brings concerned citizens together to discuss matters of development
- O undecided
- O don't know
- O other *(please describe below)*

_____

_____

_____

_____

11) As far as you are aware, which level of government has authority (jurisdiction) over EA? *Please select as many responses as appropriate.*

- O federal
- O provincial
- O municipal
- O don't know

12) Do you have any final comments about EA process or the Pembina Valley Water Supply System case?

_____

_____

_____

_____

5

QUESTIONS ABOUT EA EDUCATION

Education is the use of information dissemination and general instruction to create an awareness of an EA process and related issues. Examples of education techniques include newspaper advertisements, panel presentations, publication of brochures and slide presentations.

13)   In your opinion, when you first got involved in the Pembina Valley Water Supply System case, did you understand the EA process that was going to be followed?

        ○ yes   ○ don't know   ○ no

        Please comment.

_____

_____

_____

_____

14)   In your opinion, do you know more about environmental assessment now than you did before your involvement in the Pembina Valley Water Supply System case?

        ○ yes   ○ don't know   ○ no

        Please comment.

_____

_____

_____

_____

15a)   EA participants sometimes conduct public education activities (such as the ones found in Table 1, page 8), while other times they do not. As far as you are aware, did any of the participants in the Pembina Valley Water Supply System case (such as Manitoba Environment, Central Plains Inc. and the Pembina Valley Water Cooperative) conduct education activities during the environmental assessment ?

        ○ yes   ○ don't know   ○ no

b)   If yes, are you aware of them using any of the education techniques listed in Table 1?

        ○ yes   ○ don't know   ○ no

c)   If yes, which techniques did they use that you are aware of? Please indicate by marking in the boxes in Table 1, page 8.

16a)   In your opinion, was there an event or activity that particularly affected your understanding of the Pembina Valley Water Supply System environmental assessment?

           O   yes   O   don't know   O   no

b)   If yes, what was this event or activity?

_____

_____

_____

_____

17a)   In your opinion, could education about EA have been improved in the Pembina Valley Water Supply System case?

           O   yes   O   don't know   O   no

b)   If yes, how could education about EA have been improved?

_____

_____

_____

_____

18a)   In your opinion, is education about EA necessary for the public's involvement to be effective?

           O   yes   O   don't know   O   no

b)   Why do you feel this way?

_____

_____

_____

_____

19)   Do you have any final comments on education about EA?

_____

_____

_____

_____

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TABLE 1

AUDIO / VISUAL / ELECTRONIC

❏ slides   ❏ films   ❏ videotapes
❏ computerized participation
    - ❏ knowledge-based systems
    - ❏ electronic publishing
    - ❏ information retrieval systems
    - ❏ interactive computer software
    - ❏ discussion group conferencing

DIRECT / INDIVIDUALIZED

❏ direct mail   ❏ direct e-mail   ❏ phone lines
❏ technical assistance   ❏ field offices

FORMAL EDUCATION

❏ integration into curricula   ❏ discussion in literacy programs

MEDIA

❏ coverage of hearings   ❏ news releases   ❏ news conferences
❏ talk radio   ❏ participatory TV   ❏ advertising
❏ public service announcements

PRESENTATIONS / EVENTS

❏ workshops   ❏ conferences   ❏ panels
❏ open houses   ❏ exhibits/displays   ❏ meetings
❏ town hall meetings   ❏ brainstorming   ❏ simulations
❏ dialogues/coffee klatches   ❏ speakers bureau   ❏ special event days
❏ contests
    - ❏ song contests

PUBLISHING

❏ booklets   ❏ brochures   ❏ newspaper inserts
❏ notices   ❏ feature articles   ❏ position papers
❏ reports   ❏ newsletters   ❏ information kits
❏ central depositories   ❏ translation   ❏ posters
❏ photonovel   ❏ manual   ❏ decisions and reasons
❏ plain language legislation

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TABLE 1

AUDIO / VISUAL / ELECTRONIC

☐ slides   ☐ films   ☐ videotapes
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       - ☐ knowledge-based systems
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