Introduction and Purpose

What do Wisconsin K-12 teachers know, feel, and do relative to teaching about the environment and associated problems or issues? In order to gain insight into this question, the Wisconsin Center for Environmental Education conducted an assessment of over 900 teachers randomly selected from the public school elementary and secondary teachers in the state.

The goal of the assessment was to provide the Wisconsin Environmental Education Board, schools, and teacher education institutions with information that might help them evaluate and strengthen environmental education programming.

Development of the Assessment

The development of the teacher assessment involved an extensive two-year research, writing, evaluation, and implementation process. An environmental education specialist from the WCEE served as staff for the project. The project was guided by the same advisory council that was established for the student environmental literacy assessment project discussed in section one of this document.

After extensive deliberation, the advisory council determined that the following guiding questions would direct the development of the assessment instrument.

1. To what extent do teachers believe EE is important and should be taught?

2. To what extent do teachers perceive EE is progressing within their schools and classrooms?

3. What are the factors (incentives or barriers) that impact the offering of EE by teachers?

4. To what extent do teachers feel they are competent in teaching about the environment?

Based on the above "guiding questions" and as a result of several reviews and pilots, a final assessment instrument was developed (Appendix C). The instrument was designed to be administered by mail and completed in less than an hour.

The assessment was divided into five sections. Each section addressed one or more of the "guiding questions" developed by the advisory council.

Population and Survey Administration

Twelve teaching areas or disciplines were selected to sample from. The teaching areas included those stated in Wisconsin's EE mandates as well as other disciplines that might include environmental topics. Three percent of Wisconsin teachers from each discipline were randomly selected. The resulting total sample size was 1,545. The survey was sent out in mid-April 1992. Nonrespondents were sent a reminder postcard and then a second copy of the survey. The final response rate was 59% (N = 915, Table T.1).

All respondents filled out Section I of the survey (N = 915). Section II was filled out only by teachers who reported they do teach about the environment (n = 631). Table T.1 provides an overview of the response rate by discipline and what percent of each population indicated that they infuse EE.

Results

Results of the teacher assessment are herein presented relative to demographic information and the guiding questions that were developed by the advisory committee. Note again that results may be reported for all respondents (N = 915) or only for those who practice EE (n = 631).

Table T.1 Response rates and EE infusion of disciplines sampled (N = 906)

Discipline	Total surveys sent	Number of responses	Response rate (%)	Infuse EE(%)
Music	79	65	82	35
Art	52	41	79	73
Agriculture	9	7	78	100
Science	93	70	75	94
Home Economics	31	21	68	76
Health	28	13	64	62
Elementary	900	517	57	76
Tech Education	42	24	57	58
Social Studies	55	31	56	74
Business	30	15	50	27
Language Arts	120	63	42	51
Math	106	39	37	36
Total	1,545	*906	59	70

* nine teachers did not indicate their teaching area

Were respondents representative of the selected statewide teacher population?

All twelve teaching areas targeted for the survey responded. Math and Language Arts were the only areas that received less than a 50% return (Table T.1).

According to the Wisconsin Department of Public Instruction (WDPI), for this state's teacher population the average years of teaching experience is 15 and the gender ratio is about 66% female to 34% male. The respondents to the EE teacher assessment had an average of about 15 years teaching (Table T.2) and were 69% female and 31% male (Table T.3). Additionally, the DPI reports that 23% of the Wisconsin teaching population graduated after 1985. Similarly, 29% of the survey respondents were found to have graduated after 1985. Based on the demographic results, the 915 respondents seem to reflect or be a representative sample of the state teacher population.

Table T.2 Number of years teaching experience (N = 914) Number of years teaching

	(n)	(%)
1 - 5	155	17
6 - 10	133	14
11 - 15	139	15
16 - 20	170	19
21 - 25	158	17
Over 25 years	159	17

Table T.3 Gender ratio of respondents to teacher survey (N = 915)

Gender	(n)	(%)
Female	629	69
Male	286	31

To what extent do teachers believe EE is important and should be taught?

Teachers, in general, seem to show substantial support for environmental education. Of the teachers presently infusing EE, over 80% agreed or strongly agreed that EE should be a priority in the schools (Figure T.1). In fact, 68% of these same teachers felt it was a "good idea" to mandate EE curriculum plans in the schools (Figure T.2) and 64% felt that pre-service teachers should have course work in EE (Figure T.3). Further evidence of the perceived importance of EE is that 91% said the EE mandate is <u>not</u> the reason they are infusing EE (i.e., other reasons motivate them to infuse) (Figure T.4).

Figure T.1 EE should be considered a priority in our K-12 educational system. (n=623)

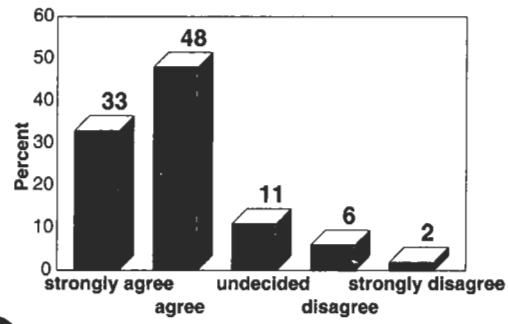


Figure T.2 It is a good idea to mandate that school districts develop and implement an EE curriculum plan. (n=624)

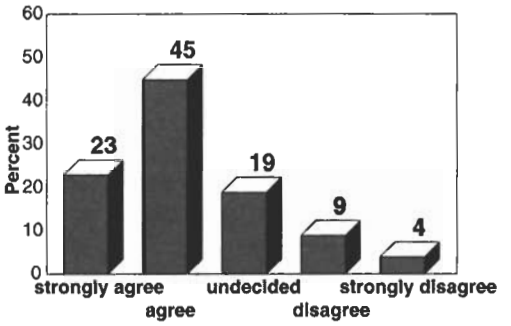


Figure T.3 Pre-service teachers should be required to take an EE methods class. (n=624)

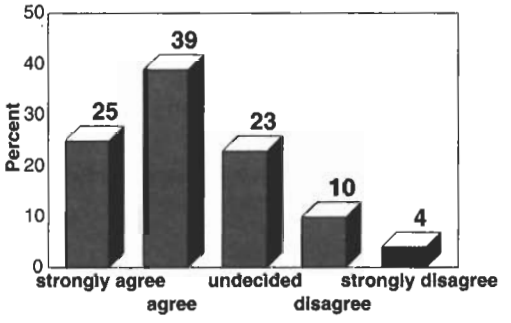
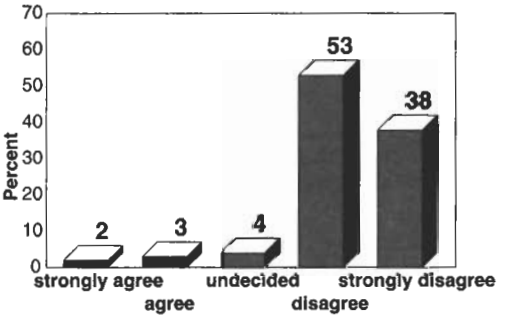


Figure T.4 The main reason I teach students about the environment is because it is mandated. (n=625)



To what extent do teachers perceive EE is established or progressing within their districts and classrooms?

The responses related to progress of EE in districts were very disheartening. According to a state mandate, school districts in Wisconsin were to have developed an EE curriculum plan by 1990. However, of the 905 respondents to the survey in 1992 only 30% reported that their district had such a plan. Over 52% were not sure, and 18% felt their school did not have a plan (Figure T.5).

The response was more positive when the teachers were asked if they infuse environmental education into their classroom curriculum. Over 69% responded that they do (Figure T.6). However, 42% of those teaching EE felt they spent less than 30 minutes per week teaching about the environment and 75% spend one hour or less per week (Figure T.7).

Figure T.5 Does your school district have a written EE curriculum plan? (N=905)

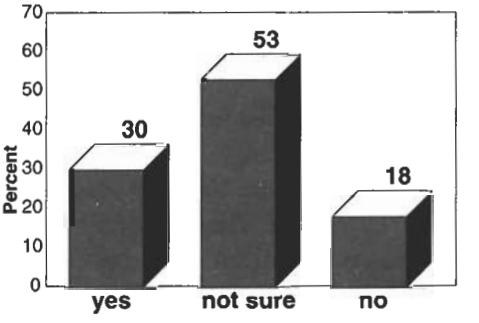


Figure T.6 Do you currently infuse education about the environment into your class curriculum? (N=915)

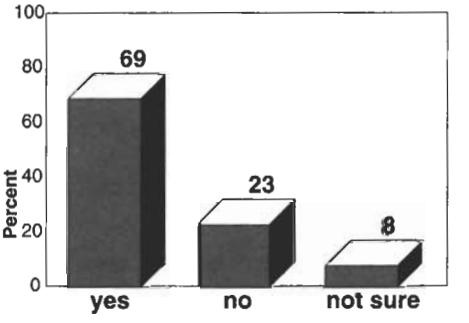
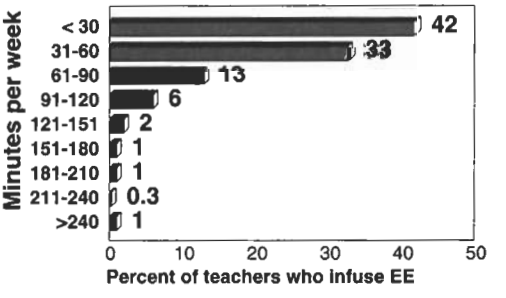


Figure T.7 For all subjects you teach, approximately how much time per week do you spend teaching about the environment? (N=618)



To what extent do teachers feel they are competent in teaching about the environment.

Teachers' overall perceived EE competencies were assessed by averaging their mean responses to all the items addressing the components of environmental literacy (cognitive, affective, behavioral) and perceived effectiveness. The responses for the individual items were assigned a value of from 1 (strongly disagree) to 5 (strongly agree). The average of the mean of all these responses (mean of means) is assigned a similar value scale. The overall mean response value for perceived competencies was 3.63. When teachers were asked specifically whether they believed they were effective in contributing to students' environmental literacy, the mean response was 3.84 (Table T.4). Both of these response values (i.e. falling between undecided and agree but closer to agree) indicate that teachers agree to some extent that they are effective and competent in teaching students about the environment.

Table T.4 Overall Perceived Competencies of Teachers Who Infuse EE (see Appendix C for complete items and means)

Effective at infusing EE (Item 5, M = 3.78)

Effective at addressing cognitive learning outcomes (Items 18-21, MM = 3.73)

Effective at addressing affective learning outcomes (Items 27-29, MM = 3.62)

Effective at addressing behavioral learning outcomes (Items 35, 36, 37, MM = 3.18)

Instruction contributes to environmental literacy (Item 40, M = 3.84)

Notes: Overall MM = 3.63 on a 5 point scale where 5=strongly agree and 1=strongly disagree. (n for the items listed ranged from 582 to 628)

Cognitive learning components

When presented with a list of 18 cognitive education methods that could be used to teach about the environment, 84% of the teachers said that more than half of the methods were valuable (Figure T.8). Only 49%, however, stated that they had used more than half of the methods effectively (Figure T.9). The three methods teachers most often reported using effectively were observations, audiovisuals, and lectures (Table T.5). Despite the apparent lack of diversity of methods, teachers agreed they were able to help students increase their cognitive understanding (MM = 3.73, Table T.4).

Figure T.8 Number of Cognitive Education Methods Teachers Feel Are Valuable for Teaching About the Environment (n=620)

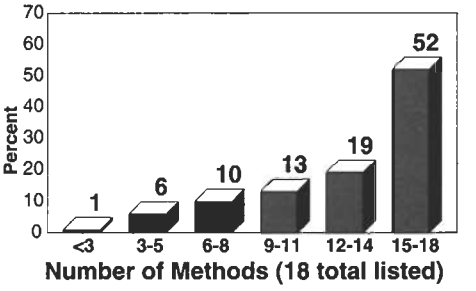


Figure T.9 Number of Cognitive Education Methods Teachers Report Using Effectively (n=610)

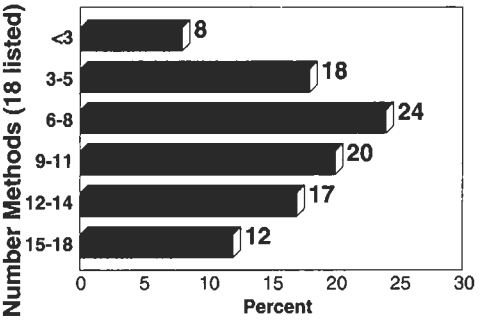


Table T.5 Cognitive Education Methods Teachers Reported Using Effectively (n=588)

Method	Frequency	%
Observations	479	81
Audiovisuals	407	69
Lectures	397	68
Problem Solving	390	66
Cooperative Learning	364	62
Writing, Art, Music	355	60
Outdoor Education	350	60
Experiments	343	58
Projects	299	51
Guided Discovery	294	50
Role Play	244	41
Self-direction	236	40
Env. Issue Investigation	206	35
Community Resources	202	34
Data Analysis	198	34
Simulations	134	23
Case Studies	115	20
Computers	106	18

(Note: Because multiple responses were chosen, the frequencies total more than the n and the percents total more than 100%)

Affective learning components

When asked to evaluate affective education methods, 21% of the teachers reported that all of the seven methods listed were valuable, but an equal number indicated they were not sure if any of these methods were valuable (Figure T.10). Only 3% of the teachers reported that they used all these methods effectively while 14% said they either do not use any of these methods or were unsure if they used any of these methods effectively (Figure T.11). The two methods teachers most often said they used effectively were sensory awareness and action learning (Table T.6). In summary, teachers moderately agreed that they were effective at using affective EE methods (MM 3.67, Table T.4)

Figure T.10 Number of Affective/Values Education Methods Teachers Feel Are Valuable for Teaching About the Environment (n=578)

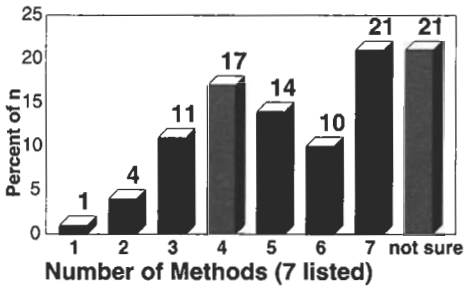


Figure T.11 Number of Affective/Values Education Methods Teachers Report Using Effectively (n=543)

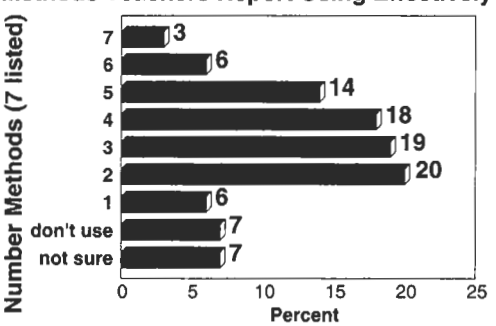


Table T.6 Affective/Values Education Methods Teachers Reported Using Effectively (n=503)

Method	Frequency	%
Sensory/Awareness	424	78
Action Learning	350	64
Values Clarification	261	48
Moral Development	242	45
Values Analysis	219	40
Behavior Modification	166	31
Inculcation	65	12

(Note: Because multiple responses were chosen, the frequencies total more than the n and the percents total more than 100%)

Respondents who indicated they do not use the affective education methods were asked to indicate a reason (from a choice of statements) for not using these methods. Approximately 34% reported that they may have used these methods but were not sure of what they were called. Another 21% indicated they do not know enough about the methods. There were most likely additional reasons not supplied because 20% of the teachers chose the response "none of the above." (Appendix C, Section IV, item 26)

Behavioral learning components

Of the survey respondents, 62% said they do and 38% reported that they do not or don't know if they involve students in any of the listed environmental action strategies (Figure T.12). The most frequently chosen reason for not involving students in these actions was inappropriateness for grade level (25%). Lack of time was also a common response (22%) (Table T.7). Only 1% of those reporting that they do involve students in any of the listed action strategies reported using all five of the strategies listed. About 73% felt effective in using only one or two of the methods (Figure T.13). The two methods respondents most frequently indicated they used effectively were ecomanagement and persuasion (Table T.8).

Figure T.12 Have you involved students in environmental action strategies? (n= 589)

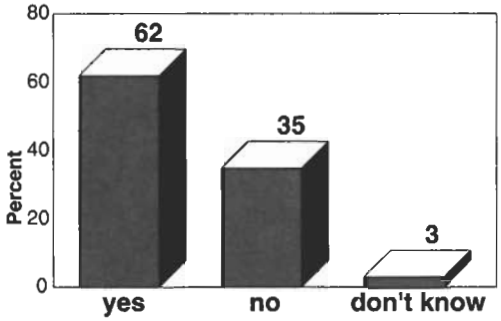


Table T.7 Main Reason for Not Involving Students in Environmental Action Strategies (n=319)

Reason	No. of teachers	%
It is inappropriate for grade level	79	25
There is no time	70	22
Do not have the knowledge	63	20
Actions not related to subject	49	15
Administration does not support	3	1
None of the above	55	17

Figure T.13 Number of Environmental Action Strategies Teachers Report Using Effectively (n=360)

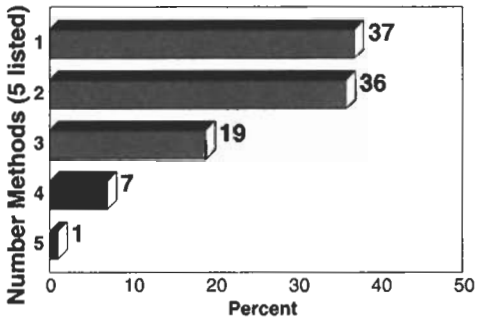


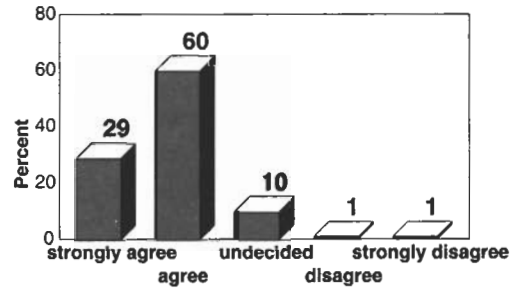
Table T.8 Environmental Action Strategies Teachers Reported Using Effectively (n=354)

Strategy	Frequency	%
Ecomanagement	271	77
Persuasion	238	67
Economic action	106	30
Political action	57	16
Legal action	12	3

(Note: Because multiple responses were chosen, the frequencies total more than the n and the percents total more than 100%)

Overall, respondents agreed that teachers should provide students with opportunities to gain actual experience in resolving environmental issues (Figure T.14). Teachers were undecided as to whether they are accomplishing this objective; their mean response in this competency area was 3.18 (Table T.4).

Figure T.14 Teachers should provide students with opportunities to gain actual experience in resolving environmental issues (n = 626)



What are the factors (incentives or barriers) that impact the offering of EE by teachers?

As stated previously, the final response rate for the survey was 915 teachers. Of these, approximately 31% (N = 284) indicated that they do not teach about the environment (Figure T.6).

Teachers who reported not infusing EE concepts were asked to indicate why they do not infuse EE (Table T.9). The most commonly reported reason was that they perceive EE as being unrelated to their subject area (25%). The second most frequently chosen response was lack of background in EE (24%). When asked what would influence them to teach about the environment, a third (33%) of the teachers selected the response of in-service training (Table T.10). The second most common response was better access to resources (26%).

Table T.9 Main Reason for Not Infusing EE (n=269)

Reason	No. of teachers	%
Concepts unrelated to subject	68	25
Do not have background	64	24
Do not have class time	37	14
Not enough prep time	20	7
Other things more important	19	7
Lack of resources or funding	12	4
School setting not conducive	7	3
Not appropriate for grade level	5	2
Other	37	14

Table T.10 Factors That Would Influence Teachers to Infuse EE into classes (n=243)

Factor	No. of teachers	%
More in-service classes on EE	79	33
Better access to resources	62	26
More prep time	44	18
More administration support	10	4
More funding	1	0.4
Other	47	19

For those teachers who reported they are infusing EE, there seems to be some correlation to in-servicing and district EE plans. That is, teachers who have taken EE in-service courses reported significantly higher responses to perceived competencies in, attitudes toward, and class time spent teaching about the environment (Appendix H). Similarly, those teachers who indicated that their school district has an EE plan (n = 271) reported greater perceived competencies and greater class time spent with regard to teaching about the environment (Appendix I).

Finally, a statistical analysis called regression analysis was performed to determine if any particular aspects of a teacher's background seemed to impact the amount of class time spent on EE. The areas accounting for most of the variability in amount of class time spent were participation in EE in-service education (37% of variability), number of in-service courses taken in EE (24% of variability), and frequency of reference to school district EE curriculum plan (33% of variability). These findings suggest that more EE in-service opportunities and use of EE curriculum plans may lead to more time spent on environmental education in the classroom.

Summary

The Wisconsin Teacher Assessment of Environmental Education was conducted to determine what the state's teacher population knows, feels, and does relative to teaching about the environment and associated issues. Findings indicated that teachers believed education about the environment is important enough to be mandated. They reported that districts could substantially improve EE by developing, improving, or operationalizing EE curriculum plans. They felt EE should be a part of pre-service teacher training. Indications were that the amount of EE offered by a teacher increased relative to the availability of an EE plan in their district and relative to the amount of personal EE training. Implications and strategies related to these findings are presented in Section IV of this document.