

# The Effects of an Environmental Education Program on Students, Parents, and Community

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This seminal study evaluated the overall impact of an environmental education program on students, parents, and the community. The program, in place for 5 years in 5th and 6th grade classes, was designed to help learners take an in-depth look at environmental issues in their community, make data-based but reflective decisions about those issues, and participate in resolving those issues. Qualitative and quantitative methodologies were employed (including student, parent, school personnel, and community member interviews). The authors discuss programmatic connections to students' critical thinking, environmental literacy, and participation in the community; reading, writing, and speaking skills; student and teacher characteristics; and parent and community viewpoints.

From its beginnings, environmental education has sought to influence individuals and communities (UNESCO/UNEP, 1978). The purpose of this study was to evaluate the impact of an environmental education program on the students and the island community of Molokai, Hawaii. The setting of the study was particularly appropriate for a focus on community impact. Although several enclaves of households exist on the Molokai, the island (38 miles at the longest points, and 8 miles at the widest) tends to be a "community." The environmental problems and issues which arise and persist affect individuals and groups throughout the island, and tend quickly to become "island" issues. The island also has very definite boundaries so there can be no argument as to Molokai's geographic limits; that is, the community is very clearly defined, at least in a geographic sense.

## The Environmental Education Program

The program to be evaluated was built on a well researched environmental education curriculum, "Investigating and Evaluating Environmental Issues and Actions" (IEEIA), and had been in place for 5 years in a combined fifth/sixth grade classroom in one of the four public elementary schools on the island. IEEIA (Hungerford, Litherland, Peyton, Ramsey, & Volk, 1996) is a skill development program, designed to help learners take an in-depth look at environmental issues in their community, to make data-based decisions about those issues, and to participate in issue resolution. The effectiveness of this curriculum in influencing components of environmental literacy in individuals has been extensively researched (Culen & Volk,

2000; Holt, 1988; Hungerford, Volk, & Ramsey, 2000; Jamaluddin, 1990; Klingler, 1980; Ramsey, 1993; Ramsey & Hungerford, 1989; Ramsey, Hungerford, & Tomera, 1981; Simpson, 1989).

The environmental education program on Molokai uses the IEEIA curriculum throughout the school year as an umbrella for all content areas. Working in small groups, students select a local issue for investigation, plan and conduct their investigations, make recommendations based on their findings, and participate in trying to resolve those issues. Each school year, the classroom activity culminates in a 2-day end-of-the-school-year community symposium planned and conducted by the students. The community symposium is called PRISM, an acronym for Promoting Resolutions with Integrity for a Sustainable Molokai.

The words of one of the teachers describes how the program is used in the multigrade classroom:

This 5th/6th grade configuration involves students in two years of issue investigation with its attendant skill development and application, and two years of planning and participating in the community symposium. During their fifth grade year, the students are "apprentices," as they learn the fundamentals of issue analysis, information accessing, instrument design, and data collection and interpretation-working in a group with one or more experienced sixth graders. During the sixth grade year, students assume the role of mentors and peer teachers

as they lead their groups through the investigation.

## **Methodology**

A five-member research team collected the majority of the research data. Both quantitative and qualitative data were collected in a 6-day period in May, 2001. For the quantitative portion of the research, existing instruments were used to measure environmental literacy and critical thinking skills — skills which might be considered program outcomes. Roughly half of the fifth and sixth grade students at the school participated in the IEEIA program, providing us with a comparison group (the remainder of the students who participated in a traditional fifth/sixth grade school curriculum) for these quantitative measures. Additional quantitative data included the results of a survey, which had been conducted by a group of students in the school.

To capture ideas on how the environmental education program influenced the students and the community, we gathered qualitative data through interviews of students, parents, school teachers, administrators, and community members. Additional qualitative information included newspaper articles written by and about the students at the school from 1999 to 2001, the proceedings from the symposia (1997 to 2001), and information about IEEIA and PRISM provided by the teachers. We hoped to meld the quantitative and qualitative data into a thorough portrait of the influence of IEEIA/PRISM, not only on the children, but also on the island as a whole. A full description of this evaluation can be found in Cheak, Volk, and Hungerford (2002).

## **Quantitative Data Collection Procedures and Analyses**

### **Sample**

The population included all fifth and sixth grade students enrolled at the school (101 students). Each fifth and sixth grade student in this school was assigned to one of four fifth-sixth grade combination teachers. Two of the classrooms each contained 25 students with one teacher per classroom. These students ( $n = 50$ ) were taught using traditional curricula in each of the subject areas. The remainder of the students ( $n = 51$ ) were team-taught by two teachers in a large classroom, using the IEEIA program and incorporating a public symposium at the close of the school year. The sample for the quantitative data collection was comprised of the 66 students from these three

fifth/sixth grade classrooms who voluntarily completed the critical thinking and environmental literacy instruments ( $n$  of IEEIA students = 38;  $n$  of Comparison Group = 28).

## **Measuring Critical Thinking**

We used the Critical Thinking Test of Environmental Education (CTTEE) to measure critical thinking skills. The CTTEE consists of three sections, which focus on critical thinking skills associated with environmental education (making conclusions, making inferences, and identifying bias). The format of the test is multiple-choice, with a total of 27 scored items (8, 11, and 8 items in the three sections) and a range of possible scores from 0 to 27. Cheak (1999) developed and validated the CTTEE for use with high school and college students. Using a Cronbach Alpha estimate of reliability, Cheak found this test to be reliable for both high school ( $r = .87$ ) and college students ( $r = .70$ ). Robinson (2001) further validated the CTTEE for use as low as the sixth grade level with a reliability estimate of  $r = .72$  (Kuder-Richardson Coefficient) for sixth grade students. These estimates meet or exceed the acceptable range for critical thinking measures of .65 to .75 (Norris and Ennis, 1989).

The CTTEE was administered in separate 50-minute sittings on the same day to the IEEIA group and the comparison group. Instructions and example questions were read aloud to both groups of students, and the voluntary nature of participation was explained. The IEEIA group consisted of 38 students, with 18 fifth graders (47%) and 20 sixth graders (53%). The comparison group included a total of 28 students, with 18 fifth graders (64%) and 10 sixth graders (36%). We analyzed the data analyses using an Analysis of Covariance (ANCOVA) and  $t$  test comparisons of mean CTTEE scores of the two groups (IEEIA vs. Comparison).

## **Measuring Environmental Literacy**

We used the Middle School Environmental Literacy Instrument (MSELI) developed by Bluhm, Hungerford, McBeth, and Volk (1995) to measure a variety of components of environmental literacy. The eight subtests of the MSELI include Knowledge of Issues (12 points), Ecological Foundations (17 points), Issue Identification (6 points), Issue Analysis (16 points), Action Planning (20 points), Perceived Knowledge of Action (8 points), Perceived Skill in Action (8 points), and Self-Reported Action (50 points). The MSELI was validated as representative of an envi-

ronmental literacy framework by a 19-member panel of U.S. professional environmental educators. Reliability estimates for the eight subtests were established using a test-retest procedure. These estimates ranged from .48 to .88. Bluhm et al. (1995) field-tested the instrument with 6th, 7th, and 8th graders in five different states.

We administered the environmental literacy instrument to IEEIA and comparison students in single 50-minute sittings one day after the administration of the critical thinking instrument. Instructions and example questions were read aloud to both groups of students, and the voluntary nature of participation was explained. The IEEIA sample consisted of 38 students in all, with 17 fifth graders (45%) and 21 sixth graders (55%). The comparison sample included a total of 28 students, with 16 fifth graders (57%) and 12 sixth graders (43%). It should be noted that although the sample size was identical for both the environmental literacy and the critical thinking instruments, there were shifts in the proportions of fifth and sixth grade students between the two test administrations, that is, several students who participated in one testing situation were not present in the other. We analyzed MSEL data by making t test comparisons of the mean scores of the two groups (IEEIA vs. Comparison) on each of the subtests.

## **Student Research**

An additional source of quantitative data was provided through research conducted by four students enrolled in the IEEIA class (2 fifth graders and 2 sixth graders) during the 2000-2001 school year (Napoleon, Kepa, Bettencourt, & Delacruz, 2001). The students' research sought to determine whether the opinions, behaviors and knowledge of PRISM/IEEIA students differed from those of students who had not experienced that instructional approach. The student research surveyed students in the IEEIA class, as well as their other schoolmates who were not participating in the program. No information was available on the validity or reliability of the instrument.

## **Qualitative Data Collection and Analyses Procedures**

For the qualitative portion of this evaluation study, 34 individuals were interviewed. According to Miles and Hubberman (1994), qualitative sampling is purposive and requires boundaries that define conditions such as the types of examples that need to be studied that are directly connected to the research questions. "An explicit sampling frame is needed. It will be guided by the research questions

and conceptual framework — either prespecified or emergent . . . . random sampling will not help" (p.29). Thus, interviewees comprised a purposive sample and included 10 (current and former) IEEIA students representing a range of ability levels, 12 parents of (current and former) IEEIA students, 7 community members (community officials, representatives from community agencies, and an editor of a local newspaper), and 5 school personnel (an administrator, 2 fifth/sixth grade teachers who were using the IEEIA/PRISM program, and 2 fifth/sixth grade teachers who were using traditional curricula).

The team of researchers asked open-ended questions of individuals and the responses were tape recorded, with interviewee permission. Each interview lasted approximately 30 to 60 minutes and included broad questions designed to spark a dialogue about the interviewee's perceptions concerning the impact of the IEEIA/PRISM program. Although the interview protocol differed slightly according to the group to which the interviewee belonged (student, parent, community, or school personnel), all consisted of open-ended questions which focused on the following ideas:

- Extent of program impact on student reading and writing abilities
- Student reading practices
- Student motivation to read or write
- Literacy behaviors exhibited by students
- Student problem solving skills
- Student interest in the environment of Molokai
- Student attempts to improve the environment of Molokai (or to solve an issue on Molokai or another island)
- Reactions to IEEIA/PRISM from students, staff/faculty, parents, and island residents (community members)
- Perceived importance of the program for students, school, and island community
- Criticisms of the IEEIA/PRISM program from students, staff/faculty, parents, and island residents (community members)

Following the data collection, all interviews were transcribed. These transcripts were analyzed and similar comments among the interviewees were noted. A data table was created which contained the conceptual threads as they emerged, identified all interviewees who had commented on a specific thread, and noted their comments. Three researchers sifted through the interview data and compared their perceptions about the emerging conceptual threads. The researchers sought to triangulate these similar observations within interviewee groups and among the four interviewee groups (students, parents, school personnel, and community members).

From these interviews, 68 concepts were identified. Further analyses revealed patterns of similarity and the number of concepts was collapsed into nine major areas. During the interview process, subjects were allowed to wander in their discussions. Hence, a response to a reading question may be rich in comments about environmental citizenship. Two concepts emerged for which no related open-ended question had been posed. These concepts addressed the areas of community involvement and the use of technology by the students.

<b>TABLE 1. Major Concepts and Frequency of Related Interview Comments</b>	
Major concept	Frequency of related comment
Participatory environmental citizenship in the community	17
Improved reading and writing	37
Improved oral communication	34
Effective use of technology	5
Student characteristics	29
Teacher-related items	4
Molokai community viewpoints	42
IEEIA (program characteristics)	48
IEEIA (program importance)	42

Note. IEEIA = Investigating and Evaluating Environmental Issues and Actions.

These major concepts are presented in Table 1, along with the frequency of comments related to each major concept. For all but two of the major concepts, comments related to a discrete major concept were offered by members of all four interview groups (students, parents, school personnel, and community members), providing corroboration through triangulation. The concept — effective use of technology — was corroborated by comments from three of the interview groups (parents, school personnel, and community members), while comments on teacher-related items were offered only by members of the school personnel group.

## Findings

We will use these nine major concepts as the organizational framework for presenting the findings in our study. Quantitative data will be incorporated into these findings as they triangulate with the qualitative information.

## Participatory Environmental Citizenship in the Community

This major concept was corroborated by both qualitative and quantitative data. Quantitative findings from three instruments will be presented below (CTTEE, MSEL, Student Research). Immediately following these findings, information drawn from the interviews will be described.

### Quantitative Findings

*CTTEE.* The two samples contained unequal distributions of students by grade level (the IEEIA group consisted of 47% fifth graders and 53% sixth graders; the comparison group was composed of 64% fifth graders and 36% sixth graders. In order to ascertain whether the grade level differences between the two samples (IEEIA vs. non-IEEIA students) made a difference in the mean scores, an analysis of covariance was conducted with grade as the covariate, yielding an F value of 7.371, with a significance of .001. According to Wildt and Ahtola (1978), the purpose of an analysis of covariance in observational designs is to remove the effects of variables, which modify the relationship of the categorical independent variable (in this case, IEEIA or non-IEEIA group) to the dependent variable (CTTEE score). When the Ancova was used in this analysis, its purpose was to remove the effects of grade (fifth and sixth grade), which might modify the relationship between classroom instruction (IEEIA or non-IEEIA) and critical thinking (CTTEE score). The results of this analysis indicate that when the larger proportion of fifth grade students in the non-IEEIA group was taken into consideration, there was still a significant difference between the two groups.

To determine what that difference was, the means of the two groups were compared using a t test. Table 2 presents the means, standard deviations, and t test comparisons for the CTTEE comparisons.

**TABLE 2. Comparison of Investigating and Evaluating Environmental Issues and Actions (IEEIA) vs. Non-IEEIA Students: Critical Thinking**

Group	N	M	SD	t	df	Sig.
Non-IEEIA	28	10.86	3.24	-3.757	64	.000*
IEEIA	38	14.18	3.77			

\* $p < .05$ .

The average CTTEE score for fifth and sixth graders enrolled in the IEEIA classroom (n = 38) was 14.18; the average score for non-IEEIA students (n = 28) was 10.86. The t test comparison between the two groups, presented in Table 2, indicated that the IEEIA students significantly outscored the non-IEEIA students on the critical thinking skills measured by this test. An examination of the IEEIA and non-IEEIA scores within the same grade level indicated that IEEIA sixth graders outscored non-IEEIA sixth graders (14.70 vs. 11.00) and IEEIA fifth graders outscored non-IEEIA fifth graders (13.56 vs. 10.78). Interestingly, this examination also indicated that the IEEIA fifth graders outscored the non-IEEIA sixth graders on the test of critical thinking.

*MSELI.* The t test comparisons of the means for the various literacy components (subtests of MSELI) indicated that the IEEIA students outscored

the non-IEEIA students on five of the eight subtests. These differences were significant for the subtests which attempted to measure Knowledge of Issues (2.84 vs. 1.24), Ecological Foundations (10.55 vs. 7.86), and Issue Analysis (9.24 vs. 4.32). Although IEEIA students outscored non-IEEIA students on subtests which attempted to measure Action Planning (7.53 vs. 5.68) and Issue Identification (4.21 vs. 3.44), the differences between the means were not significant. Table 3 presents the means, standard deviations, and t test comparisons for each of the MSELI subtests.

The t test comparisons of the means also indicated that the non-IEEIA students outscored the IEEIA students on three of the eight subtests: Perceived Knowledge of Action (4.89 vs. 4.13), Perceived Skill in Action (4.61 vs. 3.71), and Self-Reported Environmental Action (32.25 vs. 25.97). The difference was significant for the latter variable.

**TABLE 3. Comparison of IEEIA vs. Non-IEEIA Students (n = 28)s: Environmental Literacy**

Environmental literacy component (possible points)	Group	M	SD	t	Prob.
Knowledge of issues (12)	Non-IEEIA	1.24	1.33	3.418	.001*
	IEEIA	2.84	2.46		
Ecological foundations (17)	Non-IEEIA	7.86	2.18	4.254	.000*
	IEEIA	10.55	2.99		
Issue identification (6)	Non-IEEIA	3.44	2.10	1.432	.157
	IEEIA	4.21	2.32		
Issue analysis (16)	Non-IEEIA	4.32	3.26	4.592	.000*
	IEEIA	9.24	5.40		
Action planning (20)	Non-IEEIA	5.68	4.43	1.566	.122
	IEEIA	7.53	5.12		
Perceived knowledge of action (8)	Non-IEEIA	4.89	1.69	1.781	.080
	IEEIA	4.13	1.76		
Perceived skill in action (8)	Non-IEEIA	4.61	1.87	1.880	.065
	IEEIA	3.71	1.97		
Self-reported environmental action (50)	Non-IEEIA	32.25	7.13	3.251	.002*
	IEEIA	25.97	8.52		

\*  $p < .05$ .

*Student research.* This study was conducted by four students enrolled in the IEEIA class (2 fifth graders and 2 sixth graders) during the 2000-2001 school year. These students sought to determine whether the opinions, behaviors, and knowledge of PRISM (IEEIA) students differed from those of students who had not experienced that instructional approach. Major findings of the student research included the following:

- 88% of IEEIA students and 25% of non-IEEIA students consider themselves knowledgeable about the environment
- In a test of actual knowledge about the environment, 76% of IEEIA students scored 60% or better and 25% of non-IEEIA students scored 60% or better
- 75% of IEEIA students and 63% of non-IEEIA students believe that they can make a difference for the environment. In both samples, the remainder of the students were unsure
- 75% of IEEIA students and 43% of non-IEEIA students reported that they had taken an environmental action. Of those students who reported taking action; 67% of the non-IEEIA students and 50% of IEEIA students said they had participated in a beach or road clean-up; 43% of IEEIA students and 33% of non-IEEIA students reported writing a letter or article about the environment

*Combined findings from the three quantitative sources.* The students who experienced IEEIA instruction appeared to be more skilled in dimensions of critical thinking associated with environmental education than did students who had no direct experience with the program. This finding is based on the results of the CTTEE and the MSEL. IEEIA students outscored the non-IEEIA students on the test of critical thinking skills and on the portions of the environmental literacy test, which addressed cognitive skills (issue identification, issue analysis, and action planning).

In addition, the students who experienced IEEIA instruction appeared more knowledgeable of both ecology and the environment than did students who had no direct experience with the program. This finding is indicated by the results of the MSEL and student research. The IEEIA students significantly outscored the non-IEEIA students on the portions of the environmental literacy instrument, which measured knowledge of issues and ecological foundations. It appears that the IEEIA students were also much more aware of issues related to the environment; on the average they were able to name twice as many issues as their colleagues. The students' research further revealed that while most of the IEEIA students considered themselves

knowledgeable about the environment, comparatively few of the non-IEEIA students did so. A test of environmental knowledge confirmed these beliefs: IEEIA students were far more knowledgeable about the environment than were their non-IEEIA colleagues.

The quantitative results related to environmental action were inconclusive. Data sources for environmental action included the student research instrument and the MSEL. Both instruments used self-reports to measure environmental action and related variables. On the average, non-IEEIA students reported taking significantly more actions than IEEIA students on the literacy instrument (MSEL). On the other hand, many more IEEIA students than non-IEEIA students reported taking actions on the student research instrument. On the environmental literacy instrument, results indicated that non-IEEIA students reported higher perceptions of their knowledge of and skill in environmental action than did IEEIA students. In response to the student research instrument, more of the IEEIA students reported a belief that they could "make a difference for the environment" than did non-IEEIA students.

There are a number of plausible explanations for these differing results. The questions were asked differently on the two instruments used to collect data. These differences in the two instruments might have contributed to the differences in the results. Survey respondents were also limited in what actions they could report on both instruments (only ecomanagement and persuasive action prompts were provided). If students had taken either consumer actions or political actions, the only opportunity to report these actions was to check a response called "other" (on the student research instrument) and then to write in additional actions. No students volunteered actions additional to those listed on the instrument.

An additional explanation of the differences in findings is related to the data collection procedures. In the student research, the survey participants responded to an instrument administered by their peers. On the other hand, the MSEL was administered by "outsiders," that is, adult researchers who were at the school to evaluate an instructional program. One might speculate that during the data collection for the student research, IEEIA students wanted to impress their peers and over-reported their actions to the other IEEIA students (who administered the instrument). One could also speculate that during the IEEIA evaluation study, non-IEEIA students wanted to impress individuals they considered

important and over-reported their actions to the outside researchers.

In general, the quantitative data indicate that students who were involved in the IEEIA program were more skilled in the use of critical thinking and other cognitive strategies than were their non-IEEIA peers. IEEIA students also appear to be more knowledgeable about ecology, the environment, and environmental issues. Thus, it appears that the IEEIA program, as it is used in this instructional setting, promotes critical thinking and cognitive abilities. Because of mixed results from two of the data sources, our initial finding regarding environmental action participation was inconclusive, based on the quantitative information. As the reader will see, this finding was moderated by feedback from the qualitative information received from interviews of students, parents, teachers, and community members.

## Qualitative Findings

Ideas related to citizenship participation were freely communicated by respondents from all four interview groups. It appears that the students participate on a number of level — as individuals and members of family units, as members of the Molokai community, and as members of the statewide community. In their participation, these students appear to have a feeling of competence with taking environmental action.

**Teacher:** I think that they are starting to apply this to their everyday life — it just isn't environmental. Citizens who can resolve conflict . . . They have a sense of purpose and a sense of place. They get to take their place in the community. . . . I want a community run by people who know how to make good decisions. They have those leadership skills.

**Student:** I went before the House Committee and testified about the Bottle Bill. They were impressed and thanked us. the legislator drafted the bill but it died in the house.

**Student:** When I get older maybe it can help me if I am on a committee . . . you have problems . . . like community problems, then maybe we can use IEEIA [within the committee].

It is also very interesting that adults put a lot of faith in the fifth and sixth grade children who are in this program, so much faith as to turn particular problems over to them, listen to what they have to say at public hearings, and be aware that they can

actually teach the adults something about issue resolution.

**Parent:** You know, some of the kids have gone to Oahu to give testimony at the legislature. . . . I think it prepares our children to be good adults. It makes me feel good to see these kids because I know Hawaii is going to be in good hands in the future.

**Parent:** The benefits of the [program] for the children and the environment . . . it has a lot to do with teaching a community.

**Community Member:** When we hear PRISM we think "recyclin." Some people are recycling who do not have kids in PRISM but are now recycling because of what the PRISM kids started . . . a chain reaction of everybody getting involved.

**Community Member:** I have a couple of ongoing [community] problems — environmental violations — and I go to the authorities and hit stone walls. I talk to the kids and they are doers and not just talkers. . . . If I want something done I'll take it to these kids.

**Parent:** It's opened up the eyes of people afraid of change. When people are educated they realize that things need to change. PRISM has opened up the eyes of the community itself and large companies.

**Community Member:** The program has brought the kids into contact with all kinds of issues in the community and they have been able to hone very preliminary skills as researchers and interviewers. So, I think for them it is an opportunity that would not otherwise be provided by anybody. None of the other schools do it and I think it has been a wonderful learning experience for the kids and valuable for the community. They have been able to figure out the real story behind the community debate and I think it is preparing them to be better students and better citizens as they grow older.

The children, themselves, report trying to give members of their peer group instruction in citizenship action.

**Student:** I've been talking to my friends about positive, negative, and passive actions. They don't know what I am talking about. I try to give them the knowledge I have so they can protect and clean the environment for future generations.

The children also talk about the larger community and its needs and importance as well as educat-

ing community members to help take care of the environment.

**Student:** If I didn't join [IEEIA] I wouldn't care about the community. I am more concerned about the community and the environment because of [the IEEIA program] and understand the actions and consequences of litter and not recycling.

**Student:** Adults are pretty impressed that we are doing something to help the environment. Some kids think that it is weird for us to be concerned about the environment and that we should leave it to the adults.

The students also seem to be aware of the importance of being future-oriented when they talk of the need for change. As one student put it: "They [other youngsters] should take action and learn how to preserve and protect the environment so they can teach their kids how to keep the environment clean and healthy."

It is also interesting that the children do not talk a great deal about specific environmental actions but, instead, tend to focus on a larger picture, i.e., talking about citizenship behavior in a generic sense rather than in a situation specific sense. The only comments that dealt with specific issues were related to solid waste — littering, recycling, and the introduction of a state Bottle Bill. One might question this lack of specificity. From other sources of information (student-written articles published in the local newspaper, the proceedings from the PRISM Symposia), we surmised that it is because these young learners are exposed to numerous issues and a variety of actions, e.g., working for traditional fish pond reclamation, setting up a recycling program, taking action on a proposed runway extension, writing editorials for the local newspaper, testifying at the state capital, etc. Environmental action appears to be second nature to these children and they just "do it" when they see a need and when appropriate strategies can be worked out.

### Improved Reading and Writing

The qualitative data suggests three associated conceptual threads salient to students' general literacy behaviors, which are impacted by the IEEIA curriculum. These three areas are related to the variety of text types students read, the difficulty level of the texts and the improvement of students' writing skills.

## Text Variety

As a result of students' engagement in the IEEIA program, parents, school personnel, community members, and students reported an increase in the types of texts accessed by students and an increase in the number of sources of texts used for information. Types of materials included books, encyclopedias, pamphlets, articles, magazines, permits, minutes of public hearings, and transcripts of expert testimony from the state legislature.

**Community Member:** They're using their reading and language skills and everything. They read permit applications by various organizations — they actually read through those things. I'm very impressed with that. They may not be doing their standard Three R's of "reading, riting, and 'rithmetic" in the classroom, but they're getting their education in a more applicable manner I think that matters to them.

Sources of text material used by students during their inquiry included the library, the Internet, newspapers, community public records, and agency experts. One additional source used by students was text from previous inquiry projects, authored by present and former students of the IEEIA program. The issues that students chose to explore were local environmental issues, which are unique to Hawaii. There is often a paucity of published information on these, so students utilize what is available. This often requires them to wander into authentic texts to conduct research. Another important source of information appeared to be the local newspaper, *The Molokai Dispatch*, which publishes articles about the students and the program for the local community readership. The newspaper also lavishes column space on students in the program to publish student-authored articles on local environmental topics. This creates enormous interest by the students and adults in the community to read the local newspaper.

Several significant observations emerged from the interviews with regard to the variety of text type. Students read a wide variety of text. The text types they chose to read varied depending on the purpose. Students became risk-takers and waded into difficult material in their search for information on a particular topic.

**Parent:** I notice that there is a big difference in the type of reading material in particular. My child is an avid reader, but has always done the typical read the narrative and answer the questions type of projects. [IEEIA] differs in that [she] reads much more technical informational type of material.

She has not done this before. It also is different in that she reads for a purpose for real world problems. This is engaging.

The lines between what was read to fulfill a school assignment and what was read to follow a personal interest became blurred. Some parents appeared to give contradictory answers when they were asked if their child had homework.

**Parent:** I think a lot of it is in school, so I don't see as much of it at home.

This statement was made after a lengthy discussion about the research the student did at home. Apparently the parents regarded homework as traditional textbook driven tasks and did not regard the research as homework. It is unclear if the parents understood that this too was assigned as homework. Students took ownership of their inquiries and this ownership appeared to change how the parents labeled their academic labor. The perception of research as homework changed. Research took on a life of its own and became a personal interest to pursue, in which students engaged in real world problem solving. This perceived change in the view of reading as homework was evidenced in interviews from parents, community members, and the students themselves.

## Text Difficulty

Students read texts written at various levels of difficulty and consistently pointed out that the material they read was more difficult than what they normally would read. One of the teachers commented on the reason for the need of students to read material written at a high level of difficulty.

**Teacher:** You could have kids reading at all levels. The materials [related to local issues] . . . are all written for adults. There is no children's text for how much water there is on Molokai, or what kind of chemicals remain in the soil from years of use on pineapples.

The difficulty of the material appeared to be mediated through students' strategic reading behaviors and their personal interest in the issue they investigated. Student interviewees were questioned about how they dealt with the issue of difficulty of the material, i.e., "What do you do when you get stuck?" One student replied, "The group goes in to help me." The interviewer asked, "What do you do if the group gets stuck?" The student replied, "We skip that part and go to another to keep on going on . . . keep working and then we go back and think about it and as you get it, then done." The

interviewer asked the student how that made him feel. The student replied, "I feel so proud of myself and I feel I can do it again." Students' high level of interest and purpose fueled positive dispositions toward reading in the face of challenge. Indeed, they expected challenge and mediated the difficulty through strategic problem solving.

There was considerable evidence that students utilized a wide array of strategies when they read. First, they used strategies to monitor their own comprehension. When they sensed that things were not going well cognitively, they would troubleshoot by rereading, seeking help from a capable peer, and taking notes. Apparently, the students realized that they were reading to understand information of a conceptual nature and to apply that knowledge, as opposed to reading for more traditional textbook driven reasons, i.e., verbal recall or memory of details from the text.

Students seemed to share this perception of the challenge inherent in conceptually loaded text.

**Student:** The hard part is just learning the concepts and putting it together. You read the passage over and over again until you make sense of it.

**Student:** Well, the concepts in there aren't really a part of the Hawaiian school program, and so the concepts are just a little harder, but when you understand all of those concepts and you get through them and your brain gets used to them, I think that's what helps you because then you are able to process more inside your brain.

This unusual identification of the conceptual nature of the texts they read indicates a level of sophistication with regard to students' knowledge of the reading process. This was remarkable given that the word, concept, was never introduced by the interviewer in the interview questions. Students seem to understand that these conceptually laden texts contain technical vocabulary, and they are aware of the challenges presented by the unfamiliar terminology and complex concepts. Further, they find value in learning this vocabulary to communicate their ideas.

**Student:** There are different words and I can use them in the correct way. My writing skills have improved. I like to express the feelings and issues I investigate.

**Student:** When we do issue analysis, and those kind of things, we really got to go back, read through, write things down. I don't think other classes in the sixth grade

do that. I am not too sure, but I don't think so. That's helping me for learning. And the fact that all the words, all the words inside there, are unnatural to what we usually write down, and it helps us write down more words — big words, such as conclusions and inferences — things like that.

## Writing Behaviors

Students' writing skills appeared to improve as a result of their engagement in inquiry. This seemed to be directly related to the purpose set for writing. A variety of purposes for writing shared the common element of authenticity. Students wrote for assigned school projects, as a strategy to understand difficult reading material; to develop instruments for the collection of primary research data; for personal pleasure (journals); to inform the public (newspaper articles); to submit testimony at local and state hearings; to make reports at public meetings; to shape presentations at local, state, national, and international meetings and conferences; and for contractual purposes. Not only did students write for a variety of purposes, but they also wrote for a variety of audiences, who were consumers of their written products.

**Parent:** [My daughter now] has a real purpose for writing. The old program [in another school] was the same old stuff — design a candy bar and a wrapper. Then write an advertisement to sell it. [The other school] had "creative" kinds of projects like that. It still is a project. There is no real purpose there. It has no tie to the real world. It is creative — that is about all you can say. . . . We felt like she was not getting a good education with those types of activities. We are very happy that [she] is in this program. All of the children work on projects and they work together sometimes. It is so exciting to see them relate to the real world.

As with reading behaviors, the lines became blurred between what was written to fulfill a school assignment and what was written to follow a personal interest. What was clear was that students wrote for real audiences and for real purposes. Just as reading behaviors exhibited by the students reflected student persistence in the face of challenging tasks, so did the writing behaviors. Students expected challenge. Challenge was not perceived as failure, and indeed spawned strategic behaviors both on an independent and collaborative level. This was not on a superficial level, but as a way of informing others.

**Parent:** My daughter is more into . . . deep thinking when she writes. She's descriptive in expressing herself and not just surface.

**Parent:** It was very important to her and she was excited about what she was doing. She's very shy, but while in the PRISM program, her style of writing was opened up. She's an excellent writer.

**Student:** . . . there are different words I can use . . . and I use them in a correct way. My writing skills have improved. I like to express the feelings and issues I investigate.

The students recognize that they have a voice and their voice is heard. Their voice is communicated through their written projects. The following example illustrates how students' voices were heard by adults who were sincerely interested in the message of these students. The adults were members of a professional educational council and contracted the students to write a news column for their organization in the local newspaper.

**Community member:** We [the Native Hawaiian Education Council] have contracted with them . . . the teachers and students . . . so at the present they do two things for us. They [present] council reports in our local newspapers. They do the interviews and of course, they use what they learn in class and they write up the stories and they send it to the local newspapers for them to print in their weekly paper.

The interest held by the broader community in the students' written projects encouraged a high degree of engagement in literacy activities. The same dynamics seemed operative whether literacy behaviors were engaged in for personal pleasure or to solve a problem (academically or as active community members). Students embraced challenge and supported each other through modeling and scaffolding of composition strategies.

**Parent:** So now they [students and teachers of IEEIA] have people coming to their presentations that don't even have students in the program.

**Parent:** I know for a fact that [my daughter] writes much better because she has an audience. She knows she has to write for the newspaper; she knows she has to write testimony, so she has to work with the teachers really hard.

**Student:** We started writing our articles for the newspaper, because we have our own column . . . our own section.

## Improved Oral Communication

The oral communication skills of students also appeared to be honed on the whetstone of authentic tasks with real purpose. Students were motivated by a personal interest in a topic and the genuine interest of the community at large as their audience. An in-depth knowledge on the topic they chose had a positive impact on students' self-efficacy as speakers and communicators. Some community members who attended the students' public symposia (PRISM) on their research projects commented on what they saw.

**Community Member:** Hawaiian children — they are pretty shy. I never noticed kids more comfortable about what they were talking about [than during PRISM]. They knew the subject well and they were allowed — given permission to take command of the whole thing — control, which is, I think, the biggest part [pause] — I mean they really took command of the subject. They were thorough. They taught. We learned. They knew the subject well. Knew it well; we could tell. It was not read from the paper.

**Community Member:** I am a researcher and I see something that's very important when they have presented themselves [students] at adult forums — most impressive.

**Community Member:** The Board of Education was here last year and the whole board was very lackadaisical and almost slept through this boring meeting and the PRISM kids came on and they perked up and peppered the kids with hard questions and the kids did not flinch and they brought down the house. It gives you goose bumps. It was just wonderful.

Purpose allowed students to perform in a variety of settings for a variety of audiences. Students spoke to make presentations at conferences off the island and at symposia to local community members, parents, and teachers. They also gave testimony at state legislature as knowledgeable citizens on an environmental topic. The students' enhanced oral communication skills increased their knowledge and skills in other areas.

**Parent:** She has been able to go and testify at the legislature and she is very self-assured. Her issue was the bottle bill and they worked with a . . . I'm not sure if it was a representative or a senator . . . the bill was presented and so they went to testify in favor of it and I think they went twice to go testify. So now she understands that there are bills . . . and

the process of how to make a law. To me that is a big deal.

In addition to the increase in students' knowledge and skills of content, students' self-esteem appeared to flourish.

**Parent:** . . . you don't see many kids [like these students] standing up in front of a gigantic audience and giving a long speech without being embarrassed, smiling, blushing — acting like a kid. [They] act like an adult and . . . just take it.

**Student:** It [IEEIA] has helped me out with public speaking and helped me achieve my goals. I can be what I want to be.

**Parent:** . . . like this boy from the PRISM class. He was another boy who was real shy. I mean he wasn't really the type to talk in a crowd. Now he . . . you can't keep him quiet. He is just talking big time and it made him better. I have seen that by not being his parent, but being a parent on the side and watching him grow. It was good to see that because I see that in my daughter.

Not only was the difference in self-esteem noticed, but the level of knowledge students had on their topics appeared to be noticed by the adults who listened to their speeches and presentations.

**Community Member:** Maybe parents did not have the words to describe the concern and yet they [students] had the words to describe what the concern was.

**Community Member:** It's not just the project in school to get a grade. Because they take it out into the community. I've seen these kids attend public hearings and give testimony about issues — like water issues or use of land — based on their surveys. They're talking to the government officials. And that's a hard thing to do, you know. These are little elementary school kids giving testimony, which is more factual than what adults are saying. . . . It's very impressive.

**Parent:** The community members that have come to the symposium were really surprised. Like, "WOW" — that kind of surprise. They didn't expect it to be on that level, you know, that caliber, because they come to a symposium presented by fifth and sixth graders and they leave like, "WOW, that was heavy duty stuff for fifth and sixth graders."

The students' in-depth knowledge of the topic afforded them confidence. Students' oral communi-

cation was also impacted by and strongly linked to their reading and writing behaviors. Students worked diligently on reading and writing tasks because the audience was a concern. Some writing tasks became published texts and others became public speeches or presentations. The purpose and audience made these tasks authentic and this resulted in motivated, strategic, engaged behavior.

### Effective Use of Technology

Although no questions in the interview process mentioned the use of technology in any context (academic, presentation, publishing), a number of comments on the students' use and skill with regard to technology were volunteered. It appears that when technology is needed, the students simply access it, and use it effectively with minimal, but timely support from their instructors or peers. Students used technology in their research to access information, to process and integrate information from a variety of sources, and to communicate and collaborate with experts and with their fellow researchers. Thus, students used technology for various purposes in research, authorship, publication, and dissemination of information. Apparently, the students have become so skilled with the technology that one community group (the Native Hawaiian Education Council) has recognized their skill and asked for the students' assistance in the completion of the agency's own productions.

Students use a variety of technologies to meet their goals, such as the computer (e-mail, Internet searches, various software programs including video editing programs and presentation programs), cameras (still and video), telephones, and presentation technology. The types of projects produced by the students include texts for publication, texts for speeches, overhead transparencies, presentations, videos, school assignments, correspondence, and testimony. Again, as with their general literacy behaviors, the uses of technology and the student products are driven by purpose. The technology is not regarded as another thing to learn. It is regarded as a needed tool towards the achievement of goals.

The teachers indicated that the fifth and sixth grade students are not specifically trained in the use of technology in this program and certainly may have learned basic technological skills elsewhere. The attention to computer usage in this classroom appears to be on a "need" basis, and the training is furnished to small groups of students by the teachers or by capable peers. Students are given the help they need with computer searches when they need and/or ask for it. Students were given small group

instruction on the use of video, digital camera, slide presentations, Imovie, and Web site development.

**Teacher:** The students use computers as they would any other educational tool — on an "as need, when they need" basis — hopefully with ease and seamlessly. They know when they need to use them and how to use them for word processing, data display, and internet searches without any prompting from us. We do a couple of hours of small group instruction in basics each year and then teach on a needed basis for those kids without much computer comfort. We also have small group instruction on video, digital camera, slide presentations, Imovie, and web site development. Some of the instruction is done during committee work or other special projects. In some cases our sixth graders teach the fifth graders.

### Student Characteristics

The interviews indicated positive effects on the maturity, self-esteem, poise and autonomy of students as a result of their participation in the IEEIA program.

**Student:** I am in charge of the curbside recycling program at home. It's not a chore anymore; it's fun.

**Student:** It [IEEIA] helped my speaking skills and my confidence.

**Student:** It [IEEIA] helps me with public skills and helps me to be brave and teaches me to go for what I want . . . I can solve problems a lot easier. I help out a lot more.

**Student:** They [parents and other adults] respect the program and respect me more as adults.

**Community Member:** . . . a lot of self confidence. I have seen kids that I [never expected to see] standing up in front of people and speak[ing], [making] community presentations in front of many people. To me, I think it has benefited them all around.

**Parent:** Before she came into the program, she was very shy — never wanted to go in front of the public and speak and she was a very shy person. . . . And when we went to the first symposium they had, I was just blown away with what they did . . . with the information that they had, what they did in the community . . . to see our daughter grow in that aspect where she opened herself up more — it was just a shock to us. And as far as the research that they do, to present to the

board, or to the people — it is beyond. . . the kinds of things that they do is . . . harder than what we ever started [when I was in school].

Students viewed themselves as competent players and the involvement of the adults in their learning was not viewed merely as a celebration of their individual achievement, but affirmed the students' academic accomplishments as a valued resource in the community.

This was not limited to students of high ability. One of the most interesting findings is related to the impact of this program on students, in particular, on lower ability students. We heard a special needs student say, "I feel so proud of myself and I feel I can do it again." We heard the teachers tell us of special needs students who were able to exit the special needs program "because of their work in IEEIA." A special education aide at the high school tells us that she can easily identify graduates of PRISM [IEEIA] "because of the way they approach challenging tasks."

These observations parallel those made by Judith Holt (1988) and John Ramsey (personal communication, 1987). The observations from this evaluation simply add to the evidence that student involvement in IEEIA develops self-confidence and feelings of improved self-esteem that might not be observed as a consequence of a more traditional school program. One quote sums up views repeated by parents and community members:

**Community Member:** I'll tell you some of them [students in the program] come from some pretty dysfunctional families, and this is a program that gives a chance and encouragement to kids that otherwise would be discouraged and would not do as well. I think it is a wonderful program. It makes kids just feel good about themselves, you know, "I can succeed — I've got skills." And hopefully, they can pick up with that at the next level [seventh grade]. At least, they feel more confidence.

The IEEIA program appears to generate a feeling of self-control that might otherwise not be present. A student explains: "You get to have a say in this program and make your own decisions."

### Teacher-Related Items

The program was described by one teacher as having a "liberating" effect. No longer following a prescribed agenda set by a scope and sequence of fragmented content areas, teachers were able to

"guide from the side" and facilitate student learning. This support had positive effects on the students' learning and motivation to produce. It also had positive effects on teacher efficacy. Both of the IEEIA teachers confess quite readily that the program is not infused into the rest of the curricula but that the other subjects have been infused into the program. The teachers explain how this integration impacts their teaching.

**Teacher:** When we started using this, I was searching for something like this. If we didn't have IEEIA I would probably still be searching for something. I was a good teacher but I think that I am a better teacher because of it. It has kind of completed the 'whole package.' . . . This unifies everything. It made it much easier for instruction because we use this for our framework.

**Teacher:** If a kid can't read, . . . we will work on our reading skills . . . we have to be able to read in order to [understand and investigate issues]. We need vocabulary in order to do this. We need science content in order to do the science. We need technology in order to use the technology. It is the same framework. It is no longer an isolated framework for each [content area].

**Teacher:** When I looked at this curriculum [I realized that] I would have to give up control. I was going to have to facilitate . . . and trust that my students would get this knowledge without my exact input and control — trust that they could "do" this research. [IEEIA] forces me to facilitate rather than to dictate . . . watching 25 young minds start to make their own discoveries . . . you must sit back and watch the magic work.

All of the school personnel interviewed acknowledged the time, effort, and dedication put into the IEEIA program by its teachers. The principal referred to the strong commitment of the teachers and to their sense of mission. One of the teachers spoke of her own fears when she began teaching the program and of what convinced her to repeat the program beyond its first year.

**Teacher:** . . . the first year. . . It was like every time the kids were ready to go forward I was afraid to let them go. I wanted to control that situation. I was afraid to give them independent research time — to do their conclusions and inferences . . . I was really struggling with the process myself. The thing I came out with was [that] the students had gained an incredible amount of confidence in themselves — really excited about what they were learning. I wanted to do it again. They wanted to do this again. I knew

that this was something that they saw value in.

When asked, "What kind of teacher is right for a curriculum such as IEEIA?" this same teacher provided a challenging response:

**Teacher:** That is a really big question — I have spent a lot of time thinking about it. I wish that every teacher had the persona to offer this curriculum to their students. I can only imagine what an incredible adult population we would have if this were the case. I don't think that every teacher does — it takes an incredible amount of courage to change. It also takes a principal who is willing for you to try something that might not give you immediate gain. The first year will be rugged — learning is no different between children and teachers as it is between children and children. We need to provide an internship in a classroom — not in place of student teaching but in team teaching. We need to look at innovative practices when we train teachers. . . . It won't work for every kind of teacher. You have to have good management skills, but they can be learned.

### **Molokai Community Viewpoints, Program Characteristics, and Program Importance**

In addition to student and teacher impact, the data analysis revealed a strong influence on the community at large. This impact went beyond a positive effect on parental involvement. It affected members of the community at multiple levels of involvement, whether those community members happened to be parents of students who were participants in the program or not. Furthermore, there was evidence that the outcome on the community at large was related to perceptions about the program and its importance to the island community.

Members of the community were impressed with the achievement of the students and were aware that on many issues, the students were more knowledgeable than many adults on the island. The level of students' knowledge had effects on the adults in the community.

**Community Member:** . . . the children, students, the young people — they are setting the example for the entire island. When adults say to people, 'Pick up litter, don't litter the land,' it goes in one ear and out the other. But when you see these kids actually researching and doing, I think that it makes an impact on the entire island.

**Parent:** When we came here [to Molokai and heard about this program, I knew we would have no problem with this school. [My daughter] is challenged and gets to work on so many real issues that she can relate to and get involved with. We are so happy because [our daughter] is so motivated and challenged. She really gets involved and has our whole household recycling. Even when my husband doesn't want to be bothered, [his daughter] has the information that she shares that gets everyone in the house doing it. She is very convincing because she has so much information and knows how to use it to help others understand.

The community becomes involved through the students' presentations at symposia, articles published in the local newspaper (authored by students), and by witnessing of changes in behavior on the part of students and their families. Their perception of the IEEIA program is that of a problem-solving tool. It provides a conduit for communication among the community about local issues that impact the everyday lives of members of the island community. The community's perception of the unbiased nature of the program provides a lens to view these issues, allows safety for involvement. Everyone can express his or her viewpoints and consider others' viewpoints surrounding issues of local significance. This participation is evidently infectious. When adults became more knowledgeable of the issues through students' presentations, they become more than spectators. They become participants themselves. This in turn has enormous impact on the motivation of the students to thoroughly investigate the issues they choose. Publication of the students' findings places demands on their communicative skills and fuels their drive to refine and polish their products and presentations.

### **Discussion**

Traditional learning contexts are typically textbook driven and discrete content areas are taught in isolation with little integration of the curriculum. Teachers typically dominate the instruction and make the bulk of the instructional decisions. Many students find such contexts boring and irrelevant. Students from diverse backgrounds are even more at risk to be disconnected and even confused by the mismatch with their cultural bonds. Contexts such as these impoverish any chance for motivation or critical thought. There is much research-based evidence that questions the effectiveness of such instructional contexts. There is less research-based evidence on instructional contexts that are focused on purely integrated contexts, which are inquiry driven and student centered. It is within contexts

such as these that it is possible for individuals to find social value as part of a group. This sense of belonging increases self-esteem (Erickson, 2002). This study expands our knowledge of this type of context and its impact on student achievement.

In order to ground the interpretations of students' literacy behaviors, it is important to note that in this study, literacy appears to have multidimensional characteristics. These characteristics include general literacy, environmental literacy, and technological literacy.

General literacy refers to students' ability to participate in the communicative aspects of literacy that empower an educated citizenry, who are able to comprehend complex problems and solve them based on sound judgments. Today, expectations are higher than in the past and current definitions of literacy include critical thinking skills, in which one must be able to read widely and integrate information from a variety of viewpoints. One must be able to use this knowledge to reach good decisions and take reasonable action.

Environmental literacy was also enhanced in the classroom under study. Environmental literacy demands critical thinking and effective decision-making skills. Individuals must be able to weigh sides of an issue and to make informed responsible decisions. Students see themselves as active and participating members of the community, and they take responsible roles in the resolution of issues in their community, on their island, and in their state. Although the quantitative data suggested an inconclusive nature about this finding, the qualitative sources spoke loudly and clearly. The students formed partnerships with a variety of community agencies and initiatives and undertook such "adult" actions as meeting with elected officials to discuss legislation to be introduced and then providing testimony to the state legislature regarding the proposed legislation. The actions which they undertake appear to be of a more sophisticated mature than that of their grade level counterparts and, thus, their environmental behavior may have been underreported in the quantitative data portion because of limiting characteristics of the environmental literacy instrumentation.

It is recognized that not all components of general literacy abilities or environmental literacy abilities are addressed in this study. Certain limitations surfaced due to the nature of the qualitative research and the design of the study. Although some attempt was made to explore these types of literacy independently in the interpretation, there was evidence that considerable overlap existed in

the data. It may be prudent to note that students' development of these multiple expressions of literacy appeared to occur synergistically over an extended course of study. Short episodic courses of study are unlikely to produce such effects.

This study has indeed opened our eyes to the impact on student achievement as a result of student participation in the IEEIA inquiry-based instructional program. It has also opened our eyes to effects that extend beyond the classroom door. The importance of the sociocultural implications on student learning is striking.

Furthermore, that the students became familiar with and adept in using a wide variety of technologies was evident. There were numerous references to the computer, e-mail, Internet, still and video cameras, and video editing and presentation technologies. As with their general literacy behaviors, the student uses of technology and the student products appeared to be driven by purpose. In this classroom, technology was a tool, used towards the achievement of goals. Students selected and used technology for the purposes of accessing information from a variety of sources and for analyzing, evaluating and synthesizing information. They also used technology to communicate and present their findings to the community — in their efforts to comprehend complex problems within the community and to solve them based on sound judgments. This integration of literacy and technology in the curriculum is consistent with the International Reading Association's assertion that students have the right to ". . . instruction that develops the critical literacies essential to effective information use and a literacy curriculum that integrates the new literacies of information and communication technology into instructional programs" (International Reading Association, 2001).

**Community Member:** I see great benefits from [the program] . . . especially for the students, the schools, and our island community. No doubt about it. . . I think a lot of the students, many of them being natives, as our schools are really high in native populations, [pause] I think what PRISM has done is it has added to that cultural perspective, or that cultural sense that exists here on this island and has defined it even more specifically . . . which they then pass on to the general public through the various media.

The native Hawaiian culture has unique characteristics, which were positively impacted by the IEEIA program. It is believed that the nature of this program influenced student achievement positively, while it preserved the cultural identity of the

students and adult participants. Au and Kawakami (1985) found that when cultural compatibility exists between learners and their instructional context, student achievement is increased. This study expands our knowledge of how cultural compatibility increases community involvement in the educational lives of children.

One strong characteristic of the Hawaiian culture is the value attached to group rather than individual performance. According to Au and Kawakami (1985), this value "seems to be consistent with the importance in Hawaiian culture of contributing to the well-being of one's family or circle of friends, rather than working only for one's personal well-being" (p.409). In this study, we observed students heavily involved in peer collaboration. They worked together on significant community issues and they worked on these issues (and their solutions) in a cohesive and integrated way. All students, regardless of academic ability, appeared to be participants in the "community of learners." Even students with special needs participated and were aware of their importance to the group effort. In turn, the group dynamics played a key role in scaffolding students' persistence in the face of challenge.

A second characteristic of the native Hawaiian culture is the "talk story" nature of discourse. Au and Kawakami (1985) describe the main feature of talk story as joint performance. "Children who are leaders, who are liked and have many friends, are usually those who know how to involve other children in conversation during talk story, not those who speak at length on their own" (p.409). The IEEIA program provided a problem-solving structure, not as a dictated form of discourse, but rather as an inclusive organic discourse into which all were invited and expected to contribute. IEEIA is perceived as providing a balanced, unbiased lens through which participants can evaluate, analyze, and formulate solutions to real problems. This allows for cultural compatibility. For these students, it is in the context of cooperative discourse that experiences are shared and meaning is constructed.

It is evident in the findings of this study, that the IEEIA program permitted a talk story environment that was so strong it permeated the entire island community. Its presence traveled beyond the classroom and engaged the local newspaper, parents, community members, agencies, and citizen councils.

## Future Research

The findings of the evaluative study uncover a number of areas for further study. We suggest further study into the following dimensions:

- Parent involvement and its relationship to students' community investigations
- Cognitive apprenticeships (teacher, community, student)
- Programmatic applications of technology
- Teachers as instructional team and teacher preparation for communities of learning involving students, parents, communities, and the school
- Multigrade classrooms and students as mentors/mentees
- Long-term effects of IEEIA on student learning and life/career decisions
- Impacts of the IEEIA program in other schools and community contexts

Authors' Note: Individuals wishing to obtain the complete evaluation report may do so by contacting the Center for Instruction, Staff Development and Evaluation, 1925 New Era Road, Carbondale, Illinois, 62901 (e-mail: [cisde@midwest.net](mailto:cisde@midwest.net)).

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