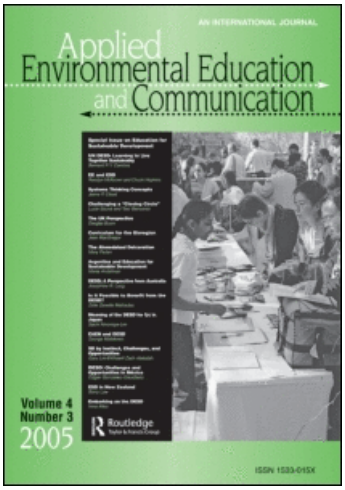

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Examining Teachers' Attitudes Toward a Required Environmental Education Program

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Examining Teachers' Attitudes Toward a Required Environmental Education Program

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Requiring teachers to partake in environmental education (EE) may generate negative reactions since elementary teachers can be overloaded with meeting standards and student performance goals. This study explores teachers' attitudes toward a required EE program, Lagoon Quest. We compare attitudes among teachers with and without prior Lagoon Quest, EE, and science experience. The results suggest that previous voluntary Lagoon Quest and other EE experience does not associate with teachers' attitudes toward the required Lagoon Quest program, but teachers with science experience are more enthusiastic about the program than those without. Less experienced science teachers indicate that they need more support and instructional aids to implement the program. Providing more training opportunities for teachers and making recommended adaptations in the written supplement may help more teachers develop competence to engage with EE programs.

ENVIRONMENTAL EDUCATION PROGRAM

Environmental education (EE) programs aim to increase environmental awareness, knowledge, skills, and action competence of participants (Jensen & Schnack, 1997; United Nations Educational Scientific and Cultural Organization [UNESCO], 1977). Regardless of their effectiveness, if these programs only reach audiences with a previous interest or comfort in environment, they will not achieve their goal of creating an environmentally literate citizenry. Requiring an environmental education program of everyone in a particular community or school is one way to reach those who have not had the interest or opportunity to voluntarily participate. While requiring students to attend an environmental education program may have the advantage of reaching all members of the audience, it could also evoke resistance and negative attitudes among teachers and students (Lee, 2000). As the environment gains public interest, school districts might think it

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appropriate to require EE. Would this action create backlash? A recent program expansion in Brevard County, Florida, offers an opportunity to explore the effect of requiring an environmental education program on teachers' attitudes toward the program.

In 2005, Brevard Public Schools added an environmental education program, Lagoon Quest, to the fourth-grade curriculum. This program was developed in the early 1990s by the Brevard Zoo as an optional opportunity for interested teachers. Participating teachers recommended this high quality program and because the school district was interested in enhancing children's interest in science, Brevard Public School administrators were willing to adopt Lagoon Quest and enable the zoo to provide the program with all fourth-grade classes. The school administrators also saw this as an opportunity to help enhance elementary teachers' competence in science. Because environmental education programs can be designed to enhance student achievement on state tests (Wilson & Monroe, 2005), the Lagoon Quest Teacher Guide included 12 in-class activities to supplement the science standards, some lessons can also be tied in reading, writing and social studies standards.

The subject of Lagoon Quest is the Indian River Lagoon, a 156-mile estuary along the Atlantic Ocean, lying mostly in Brevard County, Florida. It contributes to Brevard County's agriculture, fishing, economic, and recreational opportunities. Because of human impacts that threaten this unique ecosystem, Lagoon Quest was designed to increase students' knowledge of estuarine ecology and watershed issues around Indian River Lagoon. The program includes two major elements: twelve classroom pre- and post-trip activities and a one-day study trip where students walk into the lagoon to collect organisms and water quality data. The program staff worked with several teachers to design the classroom activities to introduce the lagoon and reinforce the science curriculum. A teacher guide and student lab book were written for the program that outlined the in-class activities and provided study trip tips. The zoo offered an in-service workshop to introduce the program to one teacher per school and demonstrate the classroom activities when the expanded program was launched in 2006.

An evaluation of Lagoon Quest during 2007 provided an opportunity to explore the attitudes of participating teachers toward the program and the environment. We began by asking, "Do teachers who had previous teaching experience with Lagoon Quest or other environmental education programs generate more positive attitudes toward Lagoon Quest than those teachers who participated only recently?" through a teacher survey. Because several schools did not submit responses, we used focus group meetings to explore nonresponding teachers' attitudes toward Lagoon Quest. We assumed that teachers did not respond to the surveys because they might not have implemented the mandatory program or it generated negative attitudes. The focus group format enabled us to explore motives and teacher attributes to a greater degree than we planned with the survey.

LITERATURE REVIEW

Teacher Experience

Teachers' teaching experience can influence student achievement (Darling-Hammond, 1999; Hanushek, 1971). Some studies indicate that teaching experience correlates with teacher effectiveness, while other studies indicate that well-prepared, inexperienced teachers can also be highly effective (Darling-Hammond, 1999). Hanushek (1971) suggested that teachers' previous teaching experience and their degree were not the most important factors in predicting students' academic achievements, but their voluntary educational experience was related to students' academic performance. This suggests that effectiveness with new programs may not be equal across

all teachers, and effective teachers are those who are well-prepared or who have relevant experience. On the contrary, Bentz, Bradley, Alderman, and Flowers (1992) indicated that experienced teachers scored higher on certain efficacy measure, such as lesson planning and developing evaluation materials for students. In a study of first-year teachers, Flores (2001) suggested that these teachers' initial education was not very influential to their teaching practices and attitudes. Their teaching practices and attitudes toward teaching were strongly influenced by their actual teaching experience, their memories while they were students, socialization with their co-workers, and their workplace conditions. Apparently, teachers' teaching experience, voluntary educational experience, and vicarious experiences may have a sizable impact on their skills, attitudes and abilities.

Requiring Educational Program

Requiring a new and unfamiliar program could generate resistance. Brehm (1966) suggested that people have a sense of specific behavioral and cognitive freedom. If they believe their freedom is threatened by a restrictive requirement, the individuals might react by sabotaging the program rather than accepting it. People with low self-esteem (Joubert, 1990) or who are defensive (Dowd & Wallbrown, 1993) are more likely to respond this way. If a required program is perceived as threatening a teacher's freedom, he or she may resent or oppose the program.

Regarding the reaction generated by implementing an environmental education program, Lee (2000) suggested that the teacher's resistance toward conducting environmental education in school might relate to the availability of resources and materials, school support, and teachers' workload. Teachers in schools with more interaction among students, colleagues, and superiors, are more effective than teachers who are in schools with less collaboration (Lee, 2000). Clearly, teachers' attitudes can be influenced by the people they work with and the social norm for interaction. The possibility of backlash suggests that teachers may express negative reactions when required to implement new programs. If such an individual were an influential teacher, he or she might generate a negative attitude about the program for colleagues.

Environmental education programs are often seen as extraneous and voluntary. If and when they become required, the degree to which the students successfully learn the concepts may depend upon teacher success at implementing the program. To increase the probability of success, zoo staff and several teachers developed classroom activities that used the Lagoon Quest study trip experience to introduce and reinforce science concepts from the curriculum. School administrators requested that the Lagoon Quest activities focus on science to help reinforce those standards in their elementary schools. Some schools rotate students to science teachers for those classes; other schools focus more time on reading and math skills and teach little science.

RESEARCH METHODS AND DATA COLLECTION

A survey was designed to understand teacher attitudes toward Lagoon Quest. The survey was reviewed by a number of teachers and experts to ensure the validity before distribution to the teachers. The survey used yes/no questions to record teachers' previous experience with Lagoon Quest and environmental education, and 5-point scale responses (none to very) to measure their attitudes toward Lagoon Quest materials, their enthusiasm toward implementing Lagoon Quest, their interests in using Lagoon Quest program in the future. Open-ended questions were used to collect their suggestions for program improvement. Two hundred and sixty surveys were distributed through Brevard Public School's mailing sys-

tem between September 2006 and May 2007.

Focus groups were conducted not only to provide insights into survey findings but also to better understand non-responding teachers' attitudes toward Lagoon Quest and their suggestions for program improvement. All of the fourth-grade teachers from seven schools did not send any completed teacher surveys were our participants. In September and October 2007, the assistant principals in these non-responding elementary schools were contacted and five agreed to arrange focus group meetings with the teachers who were responsible for the Lagoon Quest program. The researchers visited these schools and met with small group of teachers (two to three) and administrators (zero or one). Five focus group meetings were conducted, asking teachers questions such as: What was your experience with the Lagoon Quest? What made it easy or difficult to conduct the program? What suggestions do you have to improve the Lagoon Quest program? What recommendations do you have for teachers who are new to fourth grade and the Lagoon Quest program? The conversation during the focus group meetings was recorded with participants' agreement and Institutional Review Board approval.

DATA ANALYSIS

The survey data were analyzed with quantitative statistical tools with a significance level of $p < 0.05$. To investigate how environmental education experience and prior experience with Lagoon Quest influence teachers' attitudes toward Lagoon Quest, an independent *t*-test was conducted. The focus group conversations were transcribed and analyzed with domain analysis. A domain includes categories and sub-categories that share a similar meaning or meanings (Spradley, 1979). The information that individuals use to describe their experiences and perspectives can be categorized in domains, and these domains can be developed from a small group with specialized interests and needs (Hatch, 2002). The narratives were coded using Strauss and Corbin's (1998) three coding steps: open coding, axial coding, and selective coding. Open coding was used to investigate words and sentences that associated with teachers' impressions of Lagoon Quest and their suggestions to improve Lagoon Quest. The axial coding was used to group these key words into different categories; selective coding indicated the main domains of focus group conversations.

DESCRIPTIONS OF PARTICIPANTS

In 2006 and 2007, there were 260 fourth grade teachers in Brevard Public Schools. One hundred and thirty teachers returned the survey; a 50% response rate. Due to missing data, only 91 complete surveys were used for data analysis. This high number of incomplete surveys was due, in part, to a computer glitch that skipped a section of the survey. Because of anonymity and confidentiality, it was not possible to identify non-respondents, although we could identify the schools that responders came from. To explore potential non-respondent bias, focus groups were conducted in schools that contributed no teacher responses. The participants of five focus groups were thirteen fourth-grade teachers and two assistant principals; only one participant was male. Among the fifteen people, eleven were from three Title I schools. Title I schools have a high percentage of students from economically disadvantaged families (Gordon, 2004). Three teachers were new to the program and had not yet participated, three participated only once when the program was required and seven voluntary participated prior to 2004. Some of these teachers had experience with other environmental education programs, and four teachers had been teaching science for several years.

Table 1
Difference of teachers' attitudes between those who had prior Lagoon Quest experience and those who did not*

	Teachers without LQ experience (n)	*SD*	Teachers with LQ experience (n)	*SD*	*F*	Sig.
Materials	4.12 (61)	0.74	4.26 (30)	0.74	0.52	0.47
Enthusiasm	4.13 (61)	0.97	4.30 (30)	0.88	0.002	0.97
Future interest	4.05 (61)	0.87	4.17 (30)	0.87	0.56	0.46

*1 = Very low, 2 = Low, 3 = Ok, 4 = High, 5 = Very high.

SURVEY RESULTS

The results suggest that teachers' previous experience with Lagoon Quest does not create a significant difference in three attitudes: teachers' attitudes toward Lagoon Quest materials, teachers' enthusiasm toward Lagoon Quest, and their interests in using Lagoon Quest in the future (Table 1). Similarly, there is no significant difference between survey respondents who used other environmental education programs and those who have not (Table 2).

Although the findings suggest that the teachers who voluntarily participated in Lagoon Quest or who voluntarily engaged in other environmental education programs are not more likely to consider Lagoon Quest favorably than the newly required teachers, both experienced and inexperienced teachers had fairly positive attitudes toward Lagoon Quest, making it difficult to discern a significant difference.

FOCUS GROUP RESULTS

To explore the survey findings and address the non-respondent bias, we conducted focus group meetings in schools that were not represented in the survey responses. During the focus group meetings, the researchers asked teachers whether they have been teaching elementary science. The researchers observed that teachers expressed different attitudes toward Lagoon Quest based on their self-defined experience in teaching science. Therefore, the domains and direct quotes from these two groups of teachers are presented separately (Table 3).

Teachers Who Had Prior Experience Teaching Science

The participants who taught science were very willing to share their Lagoon Quest experience and offer suggestions for program improvement during the focus groups. These teachers expressed positive feelings and concerns about Lagoon Quest, perceptions of the academic value of Lagoon Quest, strategies for collaboration with colleagues, and descriptions of challenges with Lagoon Quest.

Teachers' Positive Feelings About Lagoon Quest

The teachers who had more science experience expressed a positive impression of Lagoon Quest primarily because of their students'

Table 2
Difference of teachers' attitudes between those who had prior environmental experience and those who did not*

	Teachers without EE experience (n)	*SD*	Teachers with EE experience (n)	*SD*	*F*	Sig.
Materials	4.08 (59)	0.81	4.32 (32)	0.57	2.61	0.11
Enthusiasm	4.10 (59)	0.94	4.34 (32)	0.94	0.28	0.60
Future interest	4.00 (59)	0.91	4.25 (32)	0.76	0.004	0.95

*1 = Very low, 2 = Low, 3 = Ok, 4 = High, 5 = Very high.

Table 3
Focus group data coding

Open codes	Axial codes	Selective codes
Enjoyment Excitement Favorite	Positive experience	Teachers' positive feeling of Lagoon Quest
Increasing awareness Understand local environment	Students' performance	
Tramping in the Lagoon	Impact	Teachers' concern about Lagoon Quest
Too many mosquitoes	Negative experience	
Asking questions Reflection	Critical thinking skills	Academic Value of Lagoon Quest
Making connection of human impacts Connections of experiences and lessons	Hands-on experience	
Benchmarks and standards Scientific methods such as hypothesis Units of Inquiry	Fit school's science requirement	
Great Water Odyssey Trip to Merit Island Wildlife Refuge	Supplemented by other materials	
Helps me with teaching	Supportive colleague	Collaboration
Not enough staff in trips Extra work	Outside support	
Familiar with one activity	Sharing schedules	
Not much science time School schedule conflict	Time	Challenges
Not kids friendly Number of activities Concepts are too difficult Every activity is too long Not enough supply No access to information	Materials	

excitement and interest. One teacher said: "In the end of the year, students have to pick their favorite activity in the semester and most of them pick Lagoon Quest." Teachers also reported that they conducted pre-trip activities in preparation for the study trip, and their students remembered and talked about the study trip through out the semester. A teacher stated: "This is the study trip that the kids always talk about and remember. They talk about it all the time. Students still come back to me and [say] that was the best trip we have ever had. They remembered it and they were excited about it."

Teachers' Concern About Lagoon Quest

Even though she was supportive of the program, one teacher expressed concern about the impact of the children on the Lagoon. She worried that more than 5000 students visiting lagoon within two or three months would damage the ecosystem. She stated, "I have wondered [that although] we are teaching about the preservation of the estuary, we are tramping in 50 to 70 kids everyday. I wonder what we are doing by sending a lot of people tramping [in the lagoon]. I actually wonder if we are doing harm. My kids asked that: Don't we hurt [aquatic organisms if we] step on them?"

Academic Value of Lagoon Quest

Some teachers appreciated the way the classroom activities emphasized science process skills. For example, a teacher said: "I really like the use of the scientific method in the Lagoon Quest classroom activities. The hypothesis and the procedure development [make the

program] more like science. The activities are more like labs."

Teachers with science experience made an effort to connect students' Lagoon Quest experience with other components of the curriculum, encouraging students' critical-thinking and problem-solving skills. Teachers indicated that understanding the environmental issues and learning skills to solve environmental problems in their own community are relevant to students. For example, a teacher said: "We want to connect to their experiences. Because most of the kids have been around the lagoon for years, we want to tie in what they already know or have observed."

Collaboration

Many teachers suggested that working with their colleagues not only helps them understand the concepts better, but also helps them save time in preparing Lagoon Quest lessons. If each teacher were responsible for only two or three activities, she can become familiar with it and gain special expertise. For example, one teacher said: "We had one teacher emphasize one [activity], [so we] do not have to collect [all] the materials for every single activity. We rotated [our] students."

Challenges

While talking about the challenges of implementing Lagoon Quest, some teachers expressed difficulty incorporating the program into their limited schedule. However, they tried to focus on this unit before and after the study trip. One teacher said: "[After the study trip] we did a couple of follow up activities, and then we kind of wrapped it up [because we did not have more time]. We haven't even touched our science book because we have been doing [Lagoon Quest]."

These science teachers were clearly using the Lagoon Quest materials as they had been intended, and seeking ways to make the concepts relevant to students. Even though they had challenges completing all the activities, they were comfortable with the content and enthusiastic about the program.

Teachers Who Did Not Have Prior Experience in Teaching Science

Teachers who did not have science experience were not as talkative or forthcoming about their experience and were more likely to express their concerns about Lagoon Quest. They expressed their attitudes through comments about their concerns for Lagoon Quest; the need for collaboration among experienced teachers, inexperienced teachers, and zoo staff, and their challenges with Lagoon Quest.

Teachers' Attitudes Toward Lagoon Quest

Even though some of these teachers did not feel comfortable teaching the program or participating in the study trip, they still thought the program was good for their students. For example, one teacher indicated: "I got really bitten up by mosquitoes very badly. It was awful. But, it was interesting for the kids. A lot of them actually haven't been there before."

Collaboration

Some teachers explained that they did not have enough time, knowledge, or materials to adequately conduct Lagoon Quest activities. If the staff from the zoo can work with them, they will be willing to assist [the zoo staff]. One said: "Maybe they could have somebody come out from the zoo and do a presentation before we go to the trip. Let [students] know what exactly they are doing [on the study trip]. If we have people from the zoo coming to do it, they will have the materials, and they will have it ready to be distributed, and we will be able to help."

It is important to work with people who had experience. A new teacher was luckily to have the support of a colleague who had previous experience with science and Lagoon Quest in her school. This teacher shared materials and insights from her experience. She

said: "That was a big help because my students [knew] what might occur down there. They knew exactly what to do when they get to the water area because they had to practice in classroom. It was a big help having someone who had done it before or I would not have a clue what to do."

Challenges

Similar to teachers with more science background, the teachers who had less science experience also indicated that the lack of time for science in their daily schedule made it difficult to cover the Lagoon Quest activities adequately. However, maybe because they lacked competence in science, they were less likely to find extra time or explore better methods to use the Lagoon Quest activities. A teacher described: "They are great activities, but we don't have time on our schedule. [If] you start with one activity and finish it tomorrow, [students] forgot what you did the day before. To do one activity at one time is what you really need to do. If the activities can be [rewritten to be] completed in 20 minutes that will be great!"

The teachers who did not teach science were clearly uncomfortable with the content. They did not know where to obtain the supplies and they could not modify the exercises to fit their allocated science time. Although they were not frustrated or unhappy, they merely did not use the program as it was intended. Because the study trip is organized by zoo staff, they were willing to prepare students for the study trip, attend the study trip, and then return to their other curriculum.

CONCLUSION

This study explores teachers' attitudes toward a newly mandated environmental education program. In pursuing non-responding teachers with questions about their experience, the in-depth discussions revealed that teachers' previous teaching experiences with science could change how they implemented the program. The survey findings suggest that prior Lagoon Quest and environmental education experience do not have any bearing on teachers' attitudes toward Lagoon Quest. Because this finding is based on only 50% of the teachers responding, focus group meetings were conducted to understand teachers' attitudes toward Lagoon Quest. Four of the focus group participants were primarily responsible for teaching science in their schools and have used environmental education materials in their classrooms. Their responses were different from the teachers who had not been teaching science, and this distinction may account for the variation in attitudes toward Lagoon Quest.

This study generates two major findings. First, although there are differences in teachers' reactions to the program, the survey results suggested that these reactions are not a function of previous Lagoon Quest experience because that experience is not linked to interest or skill. One teacher in focus group meeting had prior experience with Lagoon Quest because her principal encouraged her to sign up. Therefore, prior experience does not mean these teachers had an interest in or comfort with the program. Another explanation is that teachers with positive attitudes toward the Lagoon and the environment might have been teaching at a school with limited resources or might be new to the fourth grade and therefore not able to have participated in the program prior to the requirement. In addition, the fairly high attitude score of the less familiar teachers reduces the possibility of a significant finding.

Second, according to focus group meetings, teachers who have taught science may be more likely to use more of the Lagoon Quest activities as intended, are more interested in finding relevant programs or teaching materials to support Lagoon Quest, are more likely to provide suggestions and comments to enhance and improve Lagoon Quest, and are more likely to teach about conservation issues than teachers who have not taught science. The

reason may be that these teachers are more familiar with the subject matter in Lagoon Quest and have greater confidence and passion to teach it than those who do not teach science. Our finding is consistent with previous studies that suggest elementary school teachers who lack experience or familiarly teaching science and environmental education face additional challenges and may need increased support (Moseley, Reinke, & Bookout, 2002).

IMPLICATIONS

A standard state science test has recently been implemented in Florida as part of the Florida Comprehensive Assessment Test (FCAT), and this is changing the expectations for elementary teachers. In Brevard County, Florida, school administrators added Lagoon Quest to the fourth grade curriculum to help students develop an interest in science and also help the teachers become more comfortable with teaching science. Adding environmental education in elementary school curriculum can increase environmental knowledge and awareness among students (Moseley et al., 2002). The school system wisely contracted with a local provider (the Brevard Zoo) to support and coordinate the program. However, the success of environmental education in school curriculum might depend on teachers' knowledge and attitude (Moseley et al., 2002). To promote EE in schools, program provider should connect state's education standards to the teacher guide and activities, reduce teachers' barriers to use EE, and provide workshops to help teachers to implement EE in classrooms (Easton & Monroe, 2002). Additional modifications to the activities and instructions may be needed to assist less experienced teachers. Respecting their limited class time for science and their uncertainty about materials and concepts will be important.

This study suggests that requiring an environmental education program need not generate negative reactions if the experience is perceived as positive and valuable for students. It may not be fully implemented unless the provider can offer training opportunities for all in-service teachers; offer easily used supplemental materials for teachers with reading or writing lessons; design science activities for 20-minute periods; and give sufficient equipment for teachers to implement simple lab exercises. Providing this support will not only help experienced teachers save preparation time but also help least-able teachers build their efficacy to teach science and environmental education.

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