



CENTER FOR URBAN AND MULTICULTURAL EDUCATION

INDIANA UNIVERSITY
School of Education
IUPUI

Evaluation of the Discovering the
Science of the Environment
Summative Report—Year Two

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Introduction

The Discovering the Science of the Environment (DSE) Summer Institute was a weeklong professional development opportunity for teachers to experience components of the Natural Habitat Gardens (NHG) and Earth Partnership for School (EPS) curricula. DSE project staff is comprised of scientists and education specialists from the Center for Earth and Environment Science (CEES) at Indiana University-Purdue University Indianapolis (IUPUI), CEES interns, and the Director of Pervasive Technology. Additionally, DSE contracted an evaluation team to participate in program development, and develop an evaluation plan to examine the extent to which program implementation aligned with stated plans and to measure the impact of DSE programming on participants (teachers, students, and community participants).

The multidisciplinary collaborative met throughout the past year to design the Institute within the broader goals of DSE. According to the CEES website,

The Discovering the Science of the Environment program is an experiential, inquiry-based, outdoor laboratory focused science education program for 4th-9th grade classes in central Indiana. Utilizing a mobile resource trailer equipped with interactive technology tools, web interface, and GIS mapping capabilities, the DSE program travels to your school to provide free educational programming at school ground natural areas. All programs are tied to Indiana State Standards in science, mathematics, social studies and language arts and resources. Scientific equipment and measurement probes are provided by DSE. (<http://www.cees.iupui.edu/>)

Institute Participants

Teachers applied for participation in the Summer Institute not as individuals, but as members of a team comprised of colleagues and staff from their respective schools. The number of participants in each team ranged from two to four people. The teams represented the following Indiana schools: Linton-Stockton High School (4), Lincoln Middle School (2), Stout Field Elementary (2), Craig Middle School (3), Harris Academy (2), and IUPUI (4). The team from IUPUI included two graduate students enrolled in the GK-12 Program and two CUME evaluators. Institute participants included representation from suburban, urban, and rural schools. All participants were full time teachers with responsibilities ranging in elementary to high school and content areas including science, social studies and math. The top reasons cited for attending the Institute including (a) internal motivation to gain knowledge, (b) experience that could potentially improve teaching, (c) receiving graduate credit, and (d) potential for obtaining external resources to support their teaching.

Institute Content/Experiences

The content of the Institute was based largely on the NHG and EPS curricula based out of the University of Wisconsin-Madison. Program staff incorporated content and data from Indiana to increase the local relevance of the experience. Additionally, Project WET certification training was added to the Institute agenda, and technological supports were incorporated that are not traditionally a part of the NHG or EPS curricula. The DSE staff modeled various pedagogical

approaches which included direct instruction aided by PowerPoint presentations, experiential learning in the field in whole group settings, and cooperative learning experiences by which teams created action plans for the upcoming school year. These activities took place inside and around the Earth Discovery Center (EDC) at Eagle Creek Park. The site provided an appropriate balance of proximity to outdoor environmental education space and access to technology for teams to complete their work. Time was allocated every day for teams to develop the action plan for creating/maintaining a Natural Area at their respective school. Each participant received a large binder of activities and curricular materials (including relevant Indiana State Standards) that could be incorporated into their action plans and school lesson plans. Indy Parks also provided teams with laptops to work on action plans and activities. To facilitate team planning time, DSE staff provided each team with a USB storage device for saving their team action plans and other collected materials.

Evaluation Methods

The evaluation plan followed an ethnographic design that systematically moved from a more observational perspective toward a participant observation approach. The evaluation team was primarily interested in understanding how teachers experienced the spring and summer programs and to provide evidence of the strengths and challenges of implementing various components of the DSE Program. In order to do justice to process, evaluators were trained in the respective programs, and then observed spring program activities at the school sites. During the programming evaluators interacted with program participants in multiple formal and informal ways collecting data that resulted in voluminous field texts. Focus group discussions, interviews with DSE staff, and a review of relevant Institute documents (curriculum materials, team action plans, Institute applications, and daily schedule of activities) provided a second lens into the objectives and experiences of DSE. Finally surveys were generated for summer program participants to (a) examine perceptual changes over time, (b) elicit participation satisfaction with various components of the summer institute, and (c) compare participants' perspectives with year 1 participants. Two overarching questions guided the evaluation of this component of DSE:

- To what extent are DSE activities with teachers and schools implemented as designed?
- How did participants describe their experiences in the DSE activities?
- What are the similarities and differences in DSE participant perspectives in Year 1 and Year 2

Institute Planning and Institute Observations

Two observers were present for all 45 hours of the Institute, where they took copious notes and participated in activities. The field texts represented a summary of activities throughout the day along with an interpretive summary of other participant experiences during that time. At the end of the week, the team reviewed their field texts implementing a constant comparative method to first generate a coding structure and second to look across field text to generate patterns.

Focus Group Discussions with Institute Participants

Focus groups were conducted with participants twice during the Institute, at midweek and on the final day. Focus groups consisted of members from two or three teams, and lasted approximately

30 minutes. Sample prompts included, “*Describe your overall impressions of the Institute,*” “*What activities/experiences did you get the most out of?*” and “*What aspects of the Institute could be improved?*” The discussions were audio-taped and transcribed verbatim. The evaluation team carefully reviewed the transcripts, coding and generating patterns within and across the focus groups.

Pre and Post Institute Surveys

The pre-surveys were administered in the days prior to the Institute while the post-survey was given on the last day. The surveys included 25 (pre-survey) and 45 (post-survey) questions scored on a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree/Nor Agree, 4 = Agree, 5 = Strongly Agree). Each survey also contained open-ended questions so that participants could further elaborate on their perceptions prior to and subsequent to their experience at the Institute. The EPS curriculum subscale asked participants several questions about their concerns with implementing natural area curricula. A second subscale examined participants’ expectations and subsequent experiences in the Institute. Sample questions from the pre-test included, “*Based on your school context, list three strengths that will support implementation of natural area curricula*” and “*Based on your school context, list three barriers that will challenge implementation of natural area curricula.*” The post-survey included the EPS subscale and participant satisfaction with various components of the Institute. Sample questions from the post-survey included, “*Appropriate balance between presentation and interaction was achieved,*” “*My team would have liked to have more time during the Institute to work on our school plan,*” and “*Describe the most valuable features of the Institute.*” Survey response data were entered into Statistical Package for the Social Sciences (SPSS 15.0). Descriptive statistics were calculated for each item and paired t-tests were conducted on the EPS concerns subscale to see if participants’ perceptions changed during the course of the Institute. Open-ended responses were analyzed for common themes and compared with themes generated from observations and focus group discussions. Finally responses on survey items that were commonly administered in year 1 and year 2 were compared via independent t-tests.

Action Plan Review

The evaluation team reviewed the action plans created during the Institute. Of particular interest were plan descriptions of the types of NHG, types of activities teachers planned to implement with students, and timelines presented. Looking across plans, the evaluation team identified commonalities as well as unique approaches in each of the three areas.

Results

The results are organized in three sections according to theme. The first section, DSE Institute Preparation, reports on participant expectations of the Institute and draws heavily from participant pre-survey items. The second theme focuses on implementation fidelity or the extent to which the Institute followed its curriculum plan. Data supporting these findings were derived from analyses of field text, post-survey responses, and focus group discussions. The final theme was overall participant satisfaction, which includes evidence from all data sources.

DSE Institute Preparation

Teachers provided important information about their expectations for the Institute on the pre-survey. The items elicited participant perceptions of supports and barriers to implementing a NHG, their concerns about incorporating NHG in their schools, and the essential components of an effective week. The focus group discussions provided additional support and validation for attitudes noted on the pre-survey. Conversations made it clear that the majority of schools had a natural area around their school, but the level of use varied substantively.

Existing support structures and potential barriers comprised a large portion of the pre-survey. Compiled responses to these questions were arranged into categories by type of support and/or barrier. The following results are reported according to the number of times each barrier or support was mentioned. Barriers mentioned included: Staff/Administrative Support (8), Money (6), Time (6), and Student Attitudes (3). Other barriers reported at least twice were: Safety, Reaching across Disciplines, and Teacher Comfort. Mention of supports included: Staff/Administrative Support (10), Available Natural Space (7), Flexible Curriculum (7), and Student Attitudes (6). Another support that was mentioned was *enthusiasm for curriculum* shown by the facilitator. Staff/Administrative Support emerged as both the most frequently noted support *and* barrier, and strong opinions were presented on both ends of the spectrum.

One specific support mentioned by several participants as vital to the success of action plan implementation—in both the survey and focus groups—was cohorts. Participants were pleased and excited about the prospect of working with their colleagues. The teaming concept allowed for collaboration within the week and was noted as a source of support that would be available in the school year to come. One participant clearly articulated this sentiment when they stated:

I think if you were here by yourself absorbing all this information and tried to take it back and relay everything to them, [it would be difficult]. I think coming up with an action plan all by your lonesome would be too much.

Another participant expressed their own opinion on working as a team:

I think that [working as a team] is important because if I came in here by myself, I might feel overwhelmed and very apprehensive about trying to start this kind of project on my own...If you feel like you are the only one butting your head against the wall, it is a lot easier to just say I cannot spend this much time and energy on trying to get other people to jump on board.

Table 1 shows the means and standard deviation on the pre-survey items that reflect participants' knowledge and concerns about implementing a NAC in their school. One hundred percent of participants either 'agreed' or 'strongly agreed' with the statements, "*I am interested in learning about NAC*" ($M = 4.50$), "*I would like to develop working relationships with community members outside of my school using NAC*" ($M = 4.36$), and "*I would like to know what resources are available if we decide to adopt the NAC*" ($M = 4.36$). On the other end of the spectrum, 71.4% of participants disagreed with the item, "*I am not concerned about NAC*" ($M = 2.23$). Half of the participants disagreed or strongly disagreed with, "*I don't really know what NAC is*" ($M = 2.79$), indicating that they came to the Institute with general knowledge of NAC. A few

mentionable items include, “*I am concerned about incorporating new technology into my current curriculum*” ($M = 3.29$), and “*I have the knowledge that I need to develop a NAC*” ($M = 3.38$). Incorporating new technology into classrooms is one of the goals of DSE. Also, many of the participants neither disagreed/nor agreed with having the knowledge to develop a NAC.

Table 1.

Pre-survey potential concern of participants in the summer 2008 Institute.

Item	M (SD)
I am interested in learning about NAC.	4.50 (.52)
I would like to develop working relationships with community members outside my school using NAC.	4.36 (.50)
I would like to know what other teachers are doing in this area regarding NAC.	4.36 (.63)
I would like to know what resources are available if we decide to adopt the NAC.	4.36 (.50)
I would like to use feedback from students to change my use of NAC.	4.31 (.63)
I would like to familiarize other departments or persons with the progress of this new approach.	4.29 (.61)
I am motivated to use the NA as a place for teaching.	4.29 (.61)
I would like to coordinate my effort with others to maximize the NAC's effect.	4.29 (.47)
I would like to know how my role will change when I am using NAC.	4.29 (.61)
I would like to know what the use of NAC will require in the immediate future.	4.21 (.43)
I would like to have more information on time commitments required by the NAC.	4.21 (.43)
I would like to modify our use of NAC based on the experiences of my students.	4.17 (.58)
I am comfortable with the use of technology in my current curricula.	4.08 (.95)
I am concerned with my ability to manage all the NAC requirements.	3.93 (.83)
I would like to know how NAC is better than what we have currently.	3.93 (.73)
I am concerned about revising my use of NAC.	3.85 (.80)
I am concerned about students' attitudes toward NAC.	3.77 (1.24)
I would like to know who will make the decisions about NAC.	3.57 (.85)
I am concerned about not having enough time to organize myself each day.	3.50 (.94)
I am concerned about how NAC will affect student learning.	3.43 (1.16)
I am concerned about time spent working on nonacademic problems related to NAC.	3.43 (.85)
I have the knowledge that I need to develop a NAC.	3.38 (1.19)
I am concerned about incorporating new technology into my current curricula.	3.29 (1.27)
I do not really know what NAC is.	2.79 (1.05)
I am not concerned about NAC.	2.23 (1.09)

Participants reported on benefits they expected to garner from the Institute. Responses to the prompt, “The Institute will be worthwhile if...” included a) we get to experience the outdoors, b) we leave with hands-on curricula materials to incorporate into class lessons, and c) we receive ideas and tools to inspire students to learn about the environment. Despite these articulated goals for their week at the Institute, teachers revealed during focus group discussions that they were not sure what to expect from the program. When asked about their thoughts coming into the week, several teachers responded,

Honestly, I guess I really just had a small inkling of what we were going to do. I figured that we would be talking about environmental education.

I was going to say that I didn't know what to expect. I came with no expectations except that I knew that we were planning on learning about how to better teach the environment to our kids, however that is to be presented. It was going to be new to me.

Teachers recognized potential barriers to their projects (money, time, administrative support) but were equally aware of support structures available to them in their community and/or corporation (administrative buy-in, available natural areas, and students' attitudes). Overall teacher attitudes were positive and optimistic going into the week.

Implementation Fidelity and Participant Satisfaction

The next component of the evaluation focused on day-to-day interactions of participants and staff during the Institute. Major sources of data for this section were derived from evaluator participation observations, focus group discussions, and some of the post-survey items. Observations specifically explored how participants collaborated in team settings and the ways in which participants reacted to and/or involved themselves in scheduled activities and presentations throughout the week.

Satisfaction. Participants were pleased with the content, activities and overall experiences at the Institute. Virtually all reported that the Institute was well organized and that the facilitators did an outstanding job of balancing time between presentations and hands-on activities in the field. When asked about time allotments throughout the week, one participant simply stated, “*There is plenty of time [for each activity].*” Others commented:

It's not fully them standing up lecturing to you all day long. It's a nice blend.

I liked the beginning information. It was short and to the point and then you are doing something and you are interacting with people then hearing other people's perspective. That is what I've enjoyed about it. Then you come back and share. There has been a lot of movement; a lot of information. I've been very pleased with it too.

Besides being pleased with scheduling, participants also commended the overall logistics of the Institute—activities themselves, presentations by guest speakers, breaks. Several also mentioned being impressed with the organization of the DSE staff.

Observers noted that most participants were active listeners throughout the various presentations. Notably all of the participants were active during group and outdoor activities. Further evidence for these observational findings emerged on the post-survey (Table 2) where all components of the Institute were rated favorably. The Compass Basics and Water Quality Monitoring obtained the highest ratings with 100% of participants reporting that they were *satisfied* or *very satisfied* with the experience. Thirteen of the 25 items listed below have a rating of *satisfied* or *very satisfied*. The following items received the lowest mean scores: GPS ($M = 3.50$), Bison Skin Art ($M = 3.25$), and Community Resource Fair ($M = 3.08$). There were seven items pertaining to Project WET with an average of 3.54. A single item measure overall satisfaction with Project WET received a mean score of 3.83.

Table 2
Participant satisfaction with various components of the summer 2008 Institute.

	Not Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied	M (SD)
Compass Basics	0	0	8.3% (1)	91.7% (11)	3.92 (.29)
Water Quality Monitoring	0	0	8.3% (1)	91.7% (11)	3.92 (.29)
Project WET (Overall)	0	8.3% (1)	0	91.7% (11)	3.83 (.58)
DSE Discovery Trailer	0	0	16.7% (2)	83.3% (10)	3.83 (.39)
Measurement Tools	0	0	16.7% (2)	83.3% (10)	3.83 (.39)
Nature Walk	0	0	16.7% (2)	83.3% (10)	3.83 (.39)
Starling Nature Sanctuary	0	0	16.7% (2)	83.3% (10)	3.83 (.39)
Ecosystem Comparisons and Biodiversity	0	0	25.0% (3)	75.0% (9)	3.75 (.45)
Sweeping Discoveries	0	0	25.0% (3)	75.0% (9)	3.75 (.45)
Drop in the Bucket- WET	0	8.3% (1)	16.7% (2)	75.0% (9)	3.67 (.65)
Wetland in a Pan- WET	0	8.3% (1)	16.7% (2)	75.0% (9)	3.67 (.65)
School Tours	0	0	33.3% (4)	66.7% (8)	3.67 (.49)
Noting Notable Features	0	0	33.3% (4)	66.7% (8)	3.67 (.49)
Wetland Metaphors- WET	0	0	33.3% (4)	66.7% (8)	3.67 (.49)
Idea Pools	0	8.3% (1)	25.0% (3)	66.7% (8)	3.58 (.67)
Geometry in Nature	0	0	41.7% (5)	58.3% (7)	3.58 (.51)
GPS	8.3% (1)	0	25.0% (3)	66.7% (8)	3.50 (.90)
Journaling Activity	0	8.3% (1)	33.3% (4)	58.3% (7)	3.50 (.67)
Prairie and Garden Selection	0	8.3% (1)	33.3% (4)	58.3% (7)	3.50 (.67)
Snapshot in Time- WET	0	0	50.0% (6)	50.0% (6)	3.50 (.52)
Design to Data- WET	0	16.7% (2)	25.0% (3)	58.3% (7)	3.42 (.79)
Wash it Away- WET	0	25.0% (3)	16.7% (2)	58.3% (7)	3.33 (.89)
Guest Speakers	0	16.7% (2)	33.3% (4)	50.0% (6)	3.33 (.78)
Bison Skin Art	8.3% (1)	8.3% (1)	33.3% (4)	50.0% (6)	3.25 (.97)
Community Resource Fair	16.7% (2)	8.3% (1)	25.0% (3)	50.0% (6)	3.08 (1.16)

Focus group discussions provided greater insight throughout the week in support of data collected on both the pre- and post-surveys. Teachers commented on all aspects of the Institute and provided praise, recommendations, and constructive criticism. Several of their statements referenced curriculum activities, resources, and presentations. Participant attitudes were generally positive.

Resources. Several teachers expressed that the resources materials provided in the Institute binder and the curriculum guides were extremely beneficial. Some had trouble navigating the binder, but the majority felt everything was well put together. As one participant stated, “I think they [DSE] are extremely well organized. They got it down. I know they are new. This is the second year? So to be so organized and running smoothly, I think they are doing a great job.” Other teacher commented,

I think it is a good balance of resources with the binder and all the resources in there and the curriculum guide. Those are really good resources.

I think that it is good that we have so many resources that we have acquired this week that contain the lessons. And I think actually seeing these lessons in front of us; that is a very good display.

Teachers also discussed their appreciation for the flexibility of the lessons. They felt comfortable modifying activities and concepts to different age levels and/or disciplines. Some examples included,

I like the fact that the lessons are very adaptable. If there are things that you want to change according to your own teaching style you can. There are things that you have seen modeled so of course you are like...that is not going to work, this may work, maybe I will try this.

I think there have been some really good activities that we can utilize with any grade level. I teach first grade but I am also our science club sponsor for 1st through 6th grades. If I can't use it with my first graders, I'm going to be able to use it with my science club.

It has also raised my consciousness of the resources out there and some of the really cool ways to integrate technology and nature and the environment all into one.

Participant interest and excitement about the activities permeated all focus groups. A few participants also spoke of the benefit of having guest speakers and referenced both presentations given by IUPUI affiliates and past Institute participants. One member commented on a presentation given by CEES researcher, Robert Barr. She stated,

The gentleman that came in gave us a scenario and he kind of told us the different choices that they had and he was a pretty dynamic speaker. He was interesting to listen to. And he had a lot of good information that we could use for our sites.

Another participant shared their thoughts on a presentation given by past Institute participants from Creekside Middle School: *"Some other participants from last year came and shared exactly step-by-step what they did, so that helped with the action plan."* Other teachers agreed that this perspective was helpful because it provided "real-world" evidence of success in the face of barriers and set-backs. Other participants discussed the security of having DSE staff behind them throughout the entire process. Because the majority of teachers had not previously undertaken a project of this magnitude, they were relieved to have the assurance of constant support. For instance,

You just feel like not only is there support throughout the day while you are trying to implement it into actual language, but there is a guarantee that they will be out there. It made me feel awesome to know that if we have a question they are there.

Though generally satisfied with the Institute, participants suggested a different time of day to work on their action plan with their team. One participant mentioned, *"It was hot and then we come back in and it's back to the idea you want to put everything into this and you're like I have nothing left. I have given everything all day. Our school day has ended."* Another participant made a statement that drew agreement from fellow teachers. He stated,

I think it might be good to do the action plan in the middle of the day perhaps after lunch. You are recharged with the fuel from your lunch. I think the first day, just from personal experience, the first day I thought what is this action plan? What do I have to include?

Talking subsequently about the immediate needs that participants would require from the DSE staff, several teachers focused on technology as a main need. Some mentioned the equipment loan process that was proposed at the beginning of the week:

I think that the technology and some of the resources that they have would be really beneficial because it is a big push to integrate technology into your classroom and learning. And we don't have those materials. And when our administrators, our teachers, see that our kids are using all of this cool equipment they are going to be say 'oh yeah we need that.' I think that showing, and not so much telling, would make a big difference.

Teachers consistently mentioned the continuing support of the DSE staff for the implementation of their action plans and looked forward to working with DSE staff in the coming years. Other information gleaned from the post-survey not only validated claims made during focus groups, but also confirmed that participants were quite satisfied overall. Specifically, they noted the support of the DSE staff ($M = 4.91$) and the supportive climate ($M = 4.82$) of the Institute (See Table 3). Participants were also pleased with the clarity of presentations ($M = 4.73$) and were excited about opportunities to network ($M = 4.73$) throughout the week and into the future. The lowest scored items in this section, though over the mid-point on the scale, revolved around the comfort of the facilities ($M = 3.45$) and the need for more time to work on team action plans ($M = 3.09$).

Table 3

Post-survey satisfaction of participants in the summer 2008 Institute.

	Strongly Disagree	Disagree	Neither Disagree/Nor Agree	Agree	Strongly Agree	M (SD)
DSE staff was supportive in the development of your school plan.	0	0	0	8.3% (1)	83.3% (10)	4.91 (.30)
A supportive climate of professional community was created.	0	0	0	16.7% (2)	75.0% (9)	4.82 (.40)
Content was presented clearly.	0	0	0	25.0% (3)	66.7% (8)	4.73 (.47)
Opportunities to network and learn from colleagues were supported.	0	0	0	25.0% (3)	66.7% (8)	4.73 (.47)
An appropriate balance between presentation and interaction was achieved.	0	0	0	50.0% (6)	41.7% (5)	4.45 (.52)
The schedule and pace were appropriate.	0	0	0	66.7% (8)	25.0% (3)	4.27 (.47)
Facilities were comfortable.	0	25.0% (3)	8.3% (1)	50.0% (6)	8.3% (1)	3.45(1.04)
My team would have liked to have had more time during the Institute to work on our school plan.	0	16.7% (2)	50.0% (6)	25.0% (3)	0	3.09 (.70)

Perceptual changes over time. Items from the EPS subscale were also presented on the post-survey to allow for comparison of attitudes and perceptions from before and after the Institute. Overall, the changes reflect that participants gained a wealth of knowledge about Natural Area Curricula and felt more confident with the prospect of implementing their action plans in the following year. A paired samples t-test was conducted between pre-survey and post-survey items to determine their significance (See Table 4). The greatest change emerged in the items “*I do not really know what natural area curricula is*” and “*I am concern about revising my use of NAC.*” Participants were asked about other potential concerns with the NAC—higher scores reflect a higher level of concern. Participants reported concern with whether or not they knew what NAC was ($M = 2.79$) on the pre-survey, to a lower level of concern of ($M = 1.58$) on the post-survey. Revising their current use of NAC was lowered from 3.85 to under 3 ($M = 2.55$), incorporating new technology into their current curricula decreased from ($M = 3.29$) to ($M = 2.75$). The over-time trend in mean scores progressed in the desired direction. In other words, pre-test anxieties were relieved by the end of the Institute.

Table 4

Selected statistically significant changes of concerns over-time

Item	Pre-Survey M (SD) N=14	Post-Survey M (SD) N=12	t-value
I do not really know what NAC is.	2.79 (1.05)	1.58 (.51)	5.74***
I am concerned about revising my use of NAC.	3.85 (.80)	2.55 (.82)	3.82**
I am concerned about incorporating new technology into my current curricula.	3.29 (1.27)	2.75 (.87)	2.69*
I would like to know how NAC is better than what we have currently.	3.93 (.73)	3.25 (.97)	2.60*
I am concerned about not having enough time to organize myself each day.	3.50 (.94)	2.83 (1.19)	2.46*
I have the knowledge that I need to develop a NAC.	3.38 (1.19)	4.17 (.58)	2.14*

*** $p < .001$, ** $p < .01$, * $p < .05$

2007 vs. 2008. Differences in teacher perceptions from the Summer Institute of 2007 and the Institute of this year, 2008, were analyzed using an independent samples t-test (See Table 5). Most notably, teams from the Institute of 2008 did *not* desire more time to work on team action plans. The 2008 cohort felt that there was a better balance between presentations and interactive activities, a more well-defined and followed schedule and pace, greater assistance to students with inquiry projects, and the use of technology to facilitate student learning. One change which showed a decrease in satisfaction was comfort of the facilities. This may be due to the fact that problems with the geothermal unit caused an increase in temperature for the last several days of the Institute. Also mentioned during focus groups was the lack of natural lighting in the room. Both of these factors could have led to this slight decline in satisfaction with the facilities.

Table 5

Changes in participants' perceptions between summer 2007 and summer 2008 participants.

2007 vs. 2008 Independent Samples	2007, N=20	2008, N=11	t-value
	M (SD)	M (SD)	
My team would have liked to have had more time during the Institute to work on our school plan.	4.15 (.49)	3.09 (.70)	4.94***
An appropriate balance between presentation and interaction was achieved.	3.20 (1.01)	4.45 (.52)	3.84***
The schedule and pace were appropriate.	3.50 (.95)	4.27 (.47)	2.53**
Assist students with inquiry/research projects.	4.05 (.83)	4.73 (.47)	2.50**
Facilities were comfortable.	4.30 (.98)	3.45 (1.04)	2.26*
Use technology to facilitate student learning.	4.10 (.79)	4.64 (.50)	2.03*

***p<.001, **p<.01, *p<.05

The stated Knowledge and Ability goals of the Institute were achieved according to participant reports. Table 6 displays the frequencies and mean for each item. All items were above 4.0 indicating that as a group, all participants *agreed* or *strongly agreed* that the Institute improved their ability in each area. The highest scored item speaks directly to a major DSE goal, that is, to use hands-on teaching techniques with students ($M = 4.82$). The lowest rated ability pertained to *gaining district support* ($M = 4.18$) with two students reporting that they were “in the middle” on their ability to influence administrators and community members to support this effort.

Table 6

Participants' perceptions of changes in their abilities.

	Strongly Disagree	Disagree	Neither Disagree/Nor Agree	Agree	Strongly Agree	M (SD)
Use hands-on teaching techniques with my students.	0	0	0	16.7% (2)	75.0% (9)	4.82 (.40)
Work with team members to develop a restoration site plan.	0	0	0	25.0% (3)	58.3% (7)	4.70 (.48)
Identify areas within my curriculum for improvement.	0	0	0	41.7% (5)	50.0% (6)	4.55 (.52)
Use natural areas as places for students to learn about my subject area(s).	0	0	0	16.7% (2)	66.7% (8)	4.80 (.42)
Explain to my colleagues why our school should develop natural area curricula.	0	0	0	25.0% (3)	66.7% (8)	4.73 (.47)
Gain district support for restoration site development use.	0	0	16.7% (2)	41.7% (5)	33.3% (4)	4.18 (.75)

During the final focus groups participants spoke about an enhanced perspective on getting their students out into the environment:

I think that it [DSE Institute] has given me more ideas for experiences out in the field opposed to the classroom. And more interdisciplinary work, once again because it is not as bad that I take this 45 minutes to an hour and I can start an activity and say this is what our math objectives are and this is what our science objectives are, and really integrate the two so that we would have more time in the field, and just getting the kids outside more often.

Many expressed that despite gaining new knowledge, having support from DSE would be a key element in the success of their plans. One participant stated,

I think just the experience that especially Brooke and Kara could bring. Having them as a resource, even via email, and knowing that they are knowledgeable enough, because I will tell you right now I don't know these plants and I don't know these insects but I want to know.

The most valuable features of the Institute as described by the participants: *"I enjoyed the service learning the most. I already do service learning and this opportunity was a hands-on way to better implement service learning into my unit plans."* And, *"The most valuable feature of the Institute was the guide books provided for participants."*

Teachers reported that the least valuable features of the Institute were the community share fair and the journaling activity which several participants commented was used as *"time filler."* The only concerns mentioned more than once were in regards to the journaling activity— *"I appreciated the journaling time, but on some days I felt that it was used as a filler"*—and the temperature issue with the geothermal unit. Other than the previously mentioned features, all participants were fairly satisfied with all aspects of the Institute.

All of this year's participants reported that they would recommend this program to other colleagues. One participant summed it up nicely when they said, *"They [their colleagues] would be crazy not to!!! Free education beyond any college or graduate experience I have encountered...all packed into a full week!"*

Recommendations

- Demonstrate more activities from EPS binder.
- Adjust team planning time to earlier in the day (or multiple times a day).
- Gear content to majority of participants (who either have or do not have a NHG).
- Organize tabs in binder to be more "user friendly."
- Point out the Indiana State Standards continuously and encourage teachers to share resources.
- Be more intentional about pedagogical approaches. Ask teachers to share their approaches and talk about the ways in which student engagement is different in the field than in the classroom.
- Continue to bring back former DSE attendees (visits and presentations)
- Allocate some of the grant money (\$1,000-\$2,000) as a good faith indication that a solid proposal will likely garner additional support