

## **GraSUS-II Year Two Formative Evaluation Report**

**Project Period: August 2005 - August 2006**

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This formative evaluation report is written to provide the GraSUS-II project leaders with feedback on how successfully year two moved toward achievement of project goals. Additionally the information is provided to review progress since year one. Data analyzed in this second project year formative evaluation included: (1) summaries of written evaluations of the 2005 Summer Academies, (2) notes from interviews and focus group sessions along with the follow-up report of the project site visit during the fall semester 2005, (3) survey data collected from teachers, students, and fellows in May 2006, and (4) fellow-produced classroom activities/lessons and pre/post learning assessment data associated with the activities.

At a general level, the survey data collected from all GraSUS-II participants indicates that very positive progress toward achievement of the first four project goals is occurring (see Table 1 below). The percentages in Table 1, calculated from survey data, show that 2005-06 was evaluated even more highly than the successful first year of the GraSUS-II project.

The positive impact of GraSUS-II on the following project goals:	Survey responses from grades 6-12 teachers		Survey responses from NDSU fellows		Survey responses from grades 6-12 students	
	2004-05 (n=16)	2005-06 (n=14)	2004-05 (n=12)	2005-06 (n=11)	2004-05 (n=645)	2005-06 (n=532)
Enrichment of student learning in grades 7-12	.90	.93	1.0	1.0	.82	.83
Improved skills and competencies of NDSU fellows	.97	.86	.86	.93	.81	.88
Professional development of science and math teachers	.94	.92	.89	.89	-	-
Growth of a partnership between NDSU and schools	.75	.91	.45	.60	-	-

Table 1. Percentage of respondents who chose Likert responses representing positive or very positive impact on factors related to the first four project goals. The percentages were calculated by averaging the responses to all survey items related to each goal. Student surveys did not include items related to the goals of teachers' professional development and growth of a NDSU/school partnership.

## Goal I: *Enriched Learning by Grades 6-12 SM Students*

**Goal One Evaluation Summary: Grades 6-12 students are learning science and mathematics from the fellows and the curriculum materials that they create.**

Table 2 below shows the number of grades 6-12 students that participated in the second year evaluation of GraSUS-II. The large numbers of student participants suggests that the fellows are impacting the science and mathematics educational experiences of many precollege students in the Fargo-Moorhead and surrounding areas.

<i>Grades 7-12 GraSUS-II Students</i>	<b>2004-05</b>	<b>2005-06</b>
Math	124	196
Science	521	336
<i>TOTAL</i>	<i>645</i>	<i>532</i>

Table 2. Numbers of grades 6-12 students who participated as respondents in the 2004-05 and 2005-06 GraSUS-II evaluation surveys.

The grades 6-12 students generally had favorable perceptions of the NDSU fellows and their work in the students' science and math classrooms (see Table 3 below).

	<i>% of students who somewhat or definitely agreed</i>		<i>% of students who somewhat or definitely disagreed</i>		<i>% of students with no opportunity to observe</i>	
	2004-05 n = 645	2005-06 n = 532	2004-05 n = 645	2005-06 n = 532	2004-05 n = 645	2005-06 n = 532
The NDSU student helps us solve problems and do our work.	.90	.93	.09	.05	.01	.02
I have learned some things about science or math from the NDSU student.	.85	.95	.14	.05	.01	.01
I do not like science.	.21	.21	.77	.78	.01	.01
I do not like math.	.24	.36	.73	.62	.03	.01
I think I am a pretty good math student.	.79	.75	.18	.24	.03	.01
I think I am a pretty good science student.	.85	.88	.13	.10	.02	.01
I like the activities that the NDSU student does with us.	.83	.89	.17	.10	.00	.01

Table 3. Grades 7-12 students' responses to Likert-scale survey items about their own learning and the NDSU fellows' impact on their learning, Spring 2005 and Spring 2006 data.

Also, when asked in open-ended questions on the survey about examples of activities that the NDSU fellows completed with them during their lessons, many students responded (see Table 4 below).

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Examples of Labs/Activities Developed and Directed by the GraSUS-II Fellows that were  
Mentioned by Grades 6-12 Students in Survey Responses

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Animal Behavior Using fish  
Speaker Lab to Demonstrate Circuits  
Ecology Using Bugs  
Measuring Fossils and Rocks Lab  
Space and Time Travel  
Energy and Alternative Fuels  
Ballistics Pendulum with Paint Ball Gun  
Laser and Light Lab  
Car Crashes and Safety Belt Lab  
Field Trip to NDSU Labs  
Bacteria Lab  
Jeopardy Review in Math  
Natural Selection by Picking Seeds Lab  
Evil Kinieval in a Can  
CO2 Cart – Newton’s Laws of Motion  
Bernoulli’s Principle  
Pile Driver Exercise

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Table 4. Examples of labs and activities conducted throughout the year by GraSUS-II fellows as recalled by the grades 6-12 students, 2005-06 data.

Additionally, when asked whether science or math class was different when the NDSU fellow helped the teacher, grades 6-12 students provided a variety of responses. Of 308 written responses to the question, 68% responded that class was *different*. Their responses included: (1) our activities were more hands-on and educational, interesting, and fun, (2) the NDSU student explains things better because of his/her different viewpoint and experiences, (3) there was an extra person to ask questions, (4) the abilities of the NDSU student to better “relate” to them as “kids”, and (5) the activities were more challenging. Some excerpts from students’ responses are shown:

*Jeopardy review was challenging. The questions weren’t written the same way as what we practiced in the book. So, we really had to know what we were doing and had to understand the problems. I liked that because it showed that I really learned and understood the material.*

*The Price-is-Right activity was really fun. I was amazed at how the chances of winning a certain game are actually a lot less than I would expect. I also liked how we would talk about probability based on something random vs. having an idea about a price, which could change the probability.*

*I like when Mrs. B would be teaching something and James would talk about how what we were learning relates to what he does as an engineer. He would tell us why it was important to learn our math and that we would need it later on. Sometimes he would use engineering in his activities to help us understand what we were learning.*

The teachers were similarly positive in their evaluation of the fellows' influence on student learning in their classes (see Table 5 below).

Survey Items	% of teachers who agreed or strongly agreed		% of teachers who disagreed or strongly disagreed		% of teachers with no opportunity to observe	
	2004-05 (n=16)	2005-06 (n=14)	2004-05 (n=16)	2005-06 (n=14)	2004-05 (n=16)	2005-06 (n=14)
My students are enthusiastic about the lessons/activities developed by my fellow.	.88	1.00	.13	.00	.00	.00
My students are not interested in my fellow or his/her studies at NDSU.	.13	.14	.88	.86	.00	.00
The lessons/activities developed by my fellow are helping to increase my students' abilities to solve problems.	.94	1.00	.06	.00	.00	.00
The work of my fellow does little to increase my students' confidence to learn science or mathematics.	.06	.00	.94	.86	.00	.14
I have seen little or no evidence to suggest that my students learn anything from my fellow or the activities or lessons that he/she develops.	.13	.07	.88	.93	.00	.00

Table 5. Teachers' responses to Likert-scale survey items about the fellows' impact on student learning, 2004-05 and 2005-06.

The fellows themselves also consistently felt in years one and two that the grades 6-12 science and math students were interested in them as college students and that they influenced students' attitudes about science and mathematics (see Table 6 below).

	% of fellows who agreed or strongly agreed		% of fellows who disagreed or strongly disagreed		% of fellows with no opportunity to observe	
	2004-05 n=12	2005-06 n=11	2004-05 n=12	2005-06 n=11	2004-05 n=12	2005-06 n=11
I believe that I am influencing students' attitudes about science or mathematics.	1.00	1.00	.00	.00	.00	.00
The students are interested in the fact that I am a college student in science, mathematics, or engineering.	1.00	1.00	.00	.00	.00	.00

Table 6. NDSU fellows' responses to Likert-scale survey items about grades 6-12 students' interests and attitudes, 2004-05 and 2005-06 data.

In open response items on the survey, most of the fellows responded to the following question: In what specific ways, if any, have you impacted student learning or attitudes? Several excerpts from the fellows' responses are given below:

*I believe the students relate with me more than their teachers because they know I am still a student and they feel that I am closer to their age. This gives me the advantage to reach and better interact with the students. I think I have provided students with information on research in today's world, a link between the classroom and their environment, and a deeper understanding of why science is important. Also, the students have been subjected to a high level of teaching in certain subjects [with which I have expertise] such as: animal behavior, animal morphology and physiology, and aquatic and terrestrial ecology.*

*In talking with many of my students, many of them are considering areas of study in engineering. If this is a direct result of me, I am unsure, but there were more [students interested in] engineers than I expected. I also know that I have sparked interest in some of the students because some stay around after class to do a lab or to settle their dispute about a problem on an assignment.*

Finally, as in the first year of GraSUS-II, several fellows and their teachers conducted pre and post assessments when implementing the activities/labs that the fellows created during the 2005-06 school year. Examples of these results are included in Table 7. Generally, the assessments provide evidence that students are learning science and mathematics from the fellow-created materials. Additionally, teachers commented in open response questions on the spring surveys that the activities created by the fellows were valuable additions to their curricula.

<i>Topic of the Activity</i>	<i>Course</i>	<i>Number of Students</i>	<i>Pre Test Ave (percentage)</i>	<i>Post Test Ave (percentage)</i>
<b>2004-05</b>				
Probability	Algebra I	53	56 %	69 %
Scatter Plots and Best Fit Lines	Algebra I	51	65 %	86%
Hydrates	HS Chemistry	26	79 %	96 %
Forces	HS Physics	24	59 %	79 %
Scientific Method and Graph Interpretation	Life Science	91	56 %	87 %
Rivers & Dams	Sixth Grade Science	80	75 %	84 %
Plant Structures	Life Science	46	60 %	92 %
Arc Length	Algebra II and Pre-Calculus	47	87 %	98 %
Transcription and Translation	HS Biology	18	64 %	93 %
Enzymes	HS Biology	17	39 %	76 %
Population Growth & Carrying Capacity	HS Biology (ELL)	27	52 %	95 %
<b>2005-06</b>				
Light and Color	HS Physics	79	41 %	66 %
Projectile Motion	HS Physics	17	65 %	87 %
Circuits	Physical Science	17	50 %	75%
Isotopes	Physical Science	79	31 %	69 %
Blood Cell Types	HS Biology	186	46 %	76 %
Lab Safety	General Science	10	63 %	86 %
Regression	Algebra II	54	32 %	78 %
Variance and Standard Deviation	Advanced Math	78	14 %	84 %

Table 7. Pre and post assessment score averages from classes that completed activities created by GraSUS-II Fellows, 2004-05 and 2005-06.

## Goal II: *Improved Communication and Teaching Skills of GraSUS Fellows*

**Goal Two Evaluation Summary: The project is resulting in improved teaching and communication skills of the NDSU GraSUS-II fellows.**

Table 8 below shows the distribution of GraSUS-II fellows by major and graduate or undergraduate status for years one and two of the project.

	<b>Total</b>	<b>2004-05</b>		<b>2005-06</b>	
		<i>Undergrads (n=7)</i>	<i>Grads (n=7)</i>	<i>Undergrads (n=6)</i>	<i>Grads (n=7)</i>
Biological Sciences	6	1	2	1	2
Chemistry	2	1	0	1	0
Civil Engineering	2	1	0	1	0
Construction Engineering	1	1	0	0	0
Entomology	2	0	1	0	1
Industrial Engineering	1	0	0	0	1
Mathematics	4	1	2	1	0
Mechanical Engineering	7	2	1	2	2
Pharmaceutical Sciences	2	0	1	0	1

Table 8. Distribution of NDSU GraSUS-II fellows by majors.

As in the GraSUS-I project, the teachers rate the fellows highly in the area of teaching and communication skills (see Table 9 below). They also highly rate the fellows' interest in and comfort with the young students. The 2005-06 survey data show a drop in ratings of fellows' abilities to "work independently" and demonstrating a "positive attitude about the work involved with teaching." While the numbers of respondents are relatively small, the drop suggests that careful monitoring of the interactions between teachers and fellows must be maintained by the project's educational specialist.

	% of teachers who agreed or strongly agreed		% of teachers who disagreed or strongly disagreed		% of teachers with no opportunity to observe	
	2004-05 n = 16	2005-06 n = 14	2004-05 n = 16	2005-06 n = 14	2004-05 n = 16	2005-06 n = 14
My fellow has good teaching skills.	1.00	.86.	.00	.07	.00	.07
My fellow demonstrates weak communication skills.	.06	.07	.94	.93	.00	.00
My fellow is comfortable working with my students.	1.00	.93	.00	.07	.00	.00
My fellow is comfortable working independently on projects or lessons that I ask him/her to develop.	.94	.71	.06	.29	.00	.00
My fellow has a positive attitude about the work involved with teaching.	1.00	.79	.00	.21	.00	.00
My fellow demonstrates interest in helping students learn science or mathematics.	.94	.93	.06	.07	.00	.00

Table 9. Teachers' responses to Likert-scale survey items about the NDSU fellows, 2004-05 and 2005-06

The survey data in Table 10 below suggests that the NDSU fellows are also perceived in a positive light by grades 6-12 students. The students reported fellows as being available to ask or answer questions, providing good explanations, and as individuals who like working with them.

	% of students who somewhat or definitely agreed		% of students who somewhat or definitely disagreed		% of students with no opportunity to observe	
	2004-05 n = 645	2005-06 n = 532	2004-05 n = 645	2005-06 n = 532	2004-05 n = 645	2005-06 n = 532
The kids in our class ask the fellow questions about NDSU.	.66	.78	.28	.18	.06	.04
The NDSU student seems to like working with us.	.91	.96	.08	.03	.01	.01
The kids in our class ask the NDSU fellow questions about math or science.	.87	.91	.11	.08	.02	.01
The NDSU student is good at explaining things.	.81	.86	.18	.13	.01	.01

Table 10. Grades 6-12 students' responses to Likert-scale survey items about the NDSU fellows, 2004-05 and 2005-06.

The survey data in Table 11 below shows that the fellows themselves believe that the project is resulting in improved understanding of teaching and learning, communication, and service to the K-12 community. A notable improvement from 2004-05 to 2005-06 is the fellows' perceptions of the importance of the monthly seminars.

	% of fellows who agreed or strongly agreed		% of fellows who disagreed or strongly disagreed		% of fellows with no opportunity to observe	
	2004-05 n = 12	2005-06 n = 11	2004-05 n = 12	2005-06 n = 11	2004-05 n = 12	2005-06 n = 11
A big part of my fellowship work involves developing lessons or activities.	.92	.91	.08	.09	.00	.00
I rarely work with students.	.00	.09	1.00	.91	.00	.00
I am satisfied with the amount of time that I have to work with students.	.83	.91	.17	.09	.00	.00
My teacher and I work well together.	1.00	1.00	.00	.00	.00	.00
I am learning a great deal about teaching.	1.00	1.00	.00	.00	.00	.00
I am learning a great deal about student learning in science or mathematics.	1.00	1.00	.00	.00	.00	.00



I feel that my ability to communicate with students is improving through my work in GraSUS.	.92	1.00	.08	.00	.00	.00
I rarely have the opportunity to answer student questions in class.	.42	.18	.58	.82	.00	.00
I am adequately managing my split time between the fellowship and my student responsibilities.	.83	.82	.17	.18	.00	.00
Our monthly GraSUS seminars are important learning experiences for me.	.50	.91	.50	.09	.00	.00

Table 11. NDSU fellows' responses to Likert-scale survey items about their work with GraSUS-II, 2004-05 and 2005-06.

### Goal III: Professional Development Opportunities for Teachers

#### **Goal Three Evaluation Summary: The project results in professional development for science and math teachers.**

All project participants agree that the work that fellows and teachers engage in results in teachers' increased subject matter and pedagogical content knowledge. Teachers find very little to be critical of with regard to GraSUS-II. The survey results (see Table 12 below) mirror the comments made by teachers during the site visit and on the written seminar and Summer Academy evaluations.

	% of teachers who agreed or strongly agreed		% of teachers who disagreed or strongly disagreed		% of teachers with no opportunity to observe	
	2004-05 n = 16	2005-06 n = 14	2004-05 n = 16	2005-06 n = 14	2004-05 n = 16	2005-06 n = 14
I believe that the August Summer Academy was a successful use of our time.	.93	.85	.07	.07	.00	.07
Our work in the August Summer Academy had no relation to our state or national science or mathematics education standards.	.06	.07	.88	.71	.06	.21
My own understanding of science, mathematics, or technology is expanding as a result of working with my fellow this year.	1.00	.79	.00	.14	.00	.07
Our monthly GraSUS seminars are important learning experiences for me.	.94	1.00	.06	.00	.00	.00

Table 12. Teachers' responses to Likert-scale survey items about their professional development, 2004-05 and 2005-06.

The survey data on Table 13 shows the fellows' perceptions of their work with and for teachers in the project.

	% of fellows who agreed or strongly agreed		% of fellows who disagreed or strongly disagreed		% of fellows with no opportunity to observe	
	2004-05 n = 12	2005-06 n = 11	2004-05 n = 12	2005-06 n = 11	2004-05 n = 12	2005-06 n = 11
I believe that my teacher has an opportunity to learn more science, math, or technology as a result of my work with him/her.	.92	.91	.08	.09	.00	.00
My teacher does not utilize my talents very well.	.00	.27	1.00	.73	.00	.00
My teacher values my work with him/her.	.92	1.00	.08	.00	.00	.00
I believe that the Summer Academy was a successful use of our time.	.75	.91	.08	.09	.17 (did not attend)	.00
The Summer Academy resulted in some valuable planning between my teacher and me.	.58	.82	.25	.09	.17 (did not attend)	.09 (did not attend)

Table 13. NDSU fellows' responses to Likert-scale survey items about their teachers' professional development, 2004-05 and 2005-06.

Below are some excerpts from responses to open response items on the fellows' surveys regarding specific ways in which they have influenced their teachers' professional development:

*I relieve some of the stress on the teachers to setup, construct, lead, and design new labs and lessons, and old labs and lessons. I provide the teachers with new ideas and a deeper understanding in some fields of the biological sciences. The teachers benefit from my presence because I am a specialist in a field of science that they are not as familiar with. Therefore, students ask me questions that their teacher may not have been able to answer, which provides a situation for the students and the teachers to learn.*

*I have been able to enrich the curriculum for my teacher this year for his conceptual physics class. I have added labs and worksheets that deal with the Internet, computer spreadsheets, and have developed ways to utilize students' high-function calculators, which was not done before.*

## Goal IV: Strengthened Partnerships Between NDSU and School Districts

**Goal Four Evaluation Summary: Project participants perceived positive progress toward this goal as evidenced by the survey results from this year and the prior year. However, for the recent project year, documentation was missing to support these perceptions.**

The survey data from teachers and fellows suggest that these project participants' perceptions of university faculty members' roles in the project have improved from year one to year two. However, among the fellows, there is room for improvement of this important activity and the fellows' perceptions of it. The project's education specialist and the PI indicated in interviews that more interactions between faculty and teachers were occurring now than in earlier project years. However, documentation of these interactions needs to be collected in an ongoing and systematic way as a part of the permanent evaluation record. It could well be that the fellows did not perceive these interactions as evidence of "involvement" in the project (see tables 14 and 15 below). This documentation would help explain this inconsistency in perceptions.

	% of teachers who agreed or strongly agreed		% of teachers who disagreed or strongly disagreed		% of teachers with no opportunity to observe	
	2004-05 n = 16	2005-06 n = 14	2004-05 n = 16	2005-06 n = 14	2004-05 n = 16	2005-06 n = 14
The university faculty member on our team is not very involved with our GraSUS work.	.25	.07	.75	.71	.00	.21

Table 14. Teachers' responses to Likert-scale survey items on faculty involvement with GraSUS-II, 2004-05 and 2005-06.

	% of fellows who agreed or strongly agreed (n = 12)		% of fellows who disagreed or strongly disagreed		% of fellows with no opportunity to observe	
	2004-05 n = 12	2005-06 n = 11	2004-05 n = 12	2005-06 n = 11	2004-05 n = 12	2005-06 n = 11
The university faculty member on our team is not very involved with my GraSUS work.	.55	.30	.45	.60	.08	.10

Table 15. NDSU fellows' responses to Likert-scale survey items on faculty involvement with GraSUS-II, 2004-05 and 2005-06.

## Goal 5: Dissemination of the Outcomes and Impact of GraSUS-II

### **Goal Five Evaluation Summary: GraSUS-II project leaders have made significant progress on dissemination of project outcomes and impact.**

This is the goal toward which the project has demonstrated the most progress since the first year of GraSUS-II. There are five factors supporting this claim: (1) 2005-06 was the first year for the planned annual publication of a project newsletter, (2) 2005-06 was the first year for the planned annual GraSUS-II project poster session, (3) 2005-06 marked the activation of an external project advisory board, (4) 2005-06 was the second year of an effort to organize research and dissemination on GraSUS-II by a core team of project leaders, and (5) 2005-06 represented a year in which there was an increase in the number of submissions for presentations at national/international conferences. Each of these factors is elaborated in the following paragraph.

The newsletter was professionally prepared and highly informational. It highlighted interesting work and accomplishments by several fellows and teachers. The project leaders are commended for preparing and publishing a high quality newsletter, particularly since it was their first one. The poster session, according to the project's educational specialist and the PI, was well attended and resulted in increased awareness of the project among NDSU campus students, faculty, and administrators as well as among school administrators and school board members. The community advisory board met for its first formal meeting to discuss the project and to brainstorm how the board could assist in supporting efforts to continue the collaboration beyond the life of the NSF grant. Another board meeting is planned for December 2006. Several of the project leaders who serve as a core group interested in publishing and presenting results of the GraSUS-II project meet regularly to collaborate on proposal preparation and manuscript brainstorming. This resulted in a presentation by Bill Martin (Co-PI) at the spring 2006 conference of the American Educational Research Association (AERA), a highly regarded international educational research organization. Another paper, proposed in the early summer of 2006 by several of the project leaders, has been accepted for at the 2007 spring conference of the AERA (Lisa Montplaisir, another project Co-PI was the lead author of the proposal).

With regard to dissemination practices that need improvement, two areas stand out. The first area that needs improvement is the number of submissions for publication that the dissemination faculty group completes. The group has prepared one manuscript that they are continuing to revise. There are substantial evaluation data now available for use by the project leaders in developing articles that report on the impact of the project. More effort could be directed toward this important project activity.

A second area that needs improvement with regard to dissemination is the maintenance of the project web site. The site could be a significant source of information about the outcomes and impact of GraSUS-II. However, as it currently exists, it is in need of updating and expansion. For example, no annual reports from the PI or the project evaluator have been added to the site since 2003. A new link was added recently showing some of the project posters presented by 2005/06 fellows. But, this new link is an exception. Additionally, the site does not invite people who may be curious about the project to "explore" what really makes the project successful. Basically, the site serves as an electronic bulletin board for reports, survey results, and fellow/teacher lessons and

activities. The website is an underdeveloped resource for dissemination to a broader community that may be interested in ideas about collaboration between universities and K-12 schools in promoting and improving science and mathematics education.

### Goal 6: *Sustainability of GraSUS-II Activities in NDSU's STEM Graduate Programs*

#### **Goal Six Evaluation Summary: Progress has been made to build capacity for sustainability.**

Three events that occurred during the 2005-06 project year stand out as particularly important efforts in progressing toward sustainability of the project activities in future years: (1) increased dissemination activities and efforts, (2) financial contributions from the deans of each of three academic colleges within the university, and (3) the initiation of the advisory board meetings.

Increased dissemination efforts, described in the previous section, will certainly result in greater awareness and understanding of the nature of the project and its impact. Goals five and six are closely related and progress in one surely exerts a positive influence on progress in the other.

Another promising event that suggests progress toward the goal of sustainability is the interest shown by the deans of the School of Human Development & Education, the College of Science & Mathematics, and the College of Engineering & Architecture in the spring of 2006 when each contributed \$1,700 for support of a new GraSUS-II fellow. This action represents an important message about the value that the university administrators place on collaborations with K-12 education, particularly with regard to science and mathematics education in schools.

Finally, the beginning of meetings in 2005-06 among the members of the external advisory board holds promise for future sustainability. The board is comprised of two assistant superintendents, one high school principal, one school board member, one NDSU faculty member who is not among the faculty of the GraSUS-II leadership group, , the CEO of a local biotechnology firm in Fargo, and four of the project leaders. The representation of school administrators and local businesses will likely impact discussions that these individuals have with university and business leaders in other venues. Because neither a school district or a university by itself can financially support a GraSUS-II project at the level at which it currently operates, it is imperative that key leaders be aware of WHAT works particularly well in the project and WHY it works. Then, these leaders will be in better positions to develop creative ways of conceptualizing a model for implementation after the NSF grant expires.

## Recommendations

1. Use project evaluation funds to hire a student to work as an internal (on-campus) evaluation assistant with the external evaluator's supervision (via phone and email). The student's work will involve collecting, organizing and summarizing evaluation data. In particular, the survey data, collected in the late spring, should be tabulated in the early summer so that the annual evaluation can be conducted in a timely manner. Also, the student could collect interview and observation data during the academic year when the external evaluator is not present. The maturity of the project requires a stepped-up effort for evaluation, particularly with the growing importance of dissemination in a project at this advanced stage.
2. Improve the project's web site so that it is current and informational for those who might be seeking ideas on successful STEM outreach projects between universities and schools. I suggest that the PI meet with faculty members from a university department of marketing or perhaps communications for assistance with this challenge. If no funds are currently set aside for dissemination, use some of the evaluation funds from the project to hire someone to figure out what information an "outsider" would seek from the project and then to build a web site that provides such information. This could also be an interesting project for a student in marketing or communications (or both). Since dissemination is a key goal that will continue to be evaluated on an annual basis, use of the evaluation funds for this purpose is legitimate.
3. Step up recent efforts to write and submit manuscripts for publication about the project. Focus on key project attributes that have been noted in previous and current evaluations. For example, the key role of teacher leaders in the project is likely to be unique, or at least unusual, when compared to other NSF-funded GK-12 projects. Also, characterizing the nature of school-university interactions enabled by the project holds promise as a topic that many universities may benefit from knowing about. The fellows themselves appear to be the key facilitators of the "reasons" for the interactions.
4. Continue with the current implementation model of summer academies, monthly seminars, and teacher-directed (as opposed to faculty-directed) decisions about how to best utilize the talents of the excellent students who serve as project fellows. Also, the continued regular presence of the project's educational specialist in the fellows' school is an important component of the success that the project has thus far experienced. Finally, continue the good efforts to progress toward goals five and six by utilizing the insights of the advisory board members and publicizing the project through a newsletter and the poster sessions.
5. Become more vigilant about documenting all faculty/teacher interactions facilitated through the fellow or his/her work in the schools. University faculty and administrators are not knowledgeable enough about how to create and sustain productive collaborations with schools and teachers. Data need to be collected in the GraSUS-II project that can be used to describe the nature of the interactions that appear to be contributing to an important partnership between NDSU and area schools with regard to science and mathematics education. This is another responsibility that could be accomplished by an on-campus student assistant to the evaluator.