

Final Evaluation Report
Ohio Science and Engineering Alliance

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Introduction

The Ohio Science and Engineering Alliance (OSEA) is a 15 university consortium whose main purpose is to increase the retention of underrepresented minorities (URMs) in STEM (science, technology, engineering, and mathematics) fields. A secondary purpose and one that would emerge over time would be to enlarge the pool of students pursuing advanced degrees in STEM and thereby lead to greater numbers eventually entering the STEM professorate. Funding for the endeavor began at the end of 2003 and concluded in Autumn of 2008. The National Science Foundation was the source of support.

While OSEA had high level primary investigators (PIs) from the various campuses, its work was carried out by a leadership group at The Ohio State University (OSU) and guided by a Steering Committee (SC) of key faculty and administrators from each of the 15 universities. The SC reviewed OSEA activities, helped in establishing its policies, and provided input into programs and their evaluation. The SC met approximately 3 times a year with most members traveling to Columbus to take part. Aside from providing guidance, SC members publicized OSEA Research Forums, recruited student participation in them, conducted on occasion specialized workshops on retention topics, and were active in other OSEA efforts.

This report is organized as follows. OSEA activities will be first described and then the nature of the evaluation will be explained. After that selected evaluation results will be presented, and summarized followed by conclusions and some recommendations. Given the volume of data it should be stressed that only highlights from the evaluation will be presented.

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OSEA Sponsored Endeavors

Four main things were done by OSEA over the 5 years of its existence:

1. Statewide Research Forums. These were yearly events offered in 2004, 2006, and 2008 at OSU; 2005 at the University of Akron; and 2007 at Wright State University. Students, generally junior and seniors in STEM or STEM-related disciplines prepared and gave posters and made presentations at the 1 and 1/2 day conference. Each meeting had an introductory session followed by workshops on topics such as taking the GRE examinations, the nature of graduate school, sources of financing, etc. In addition, well known role models from minority groups either in STEM or who were acquainted with issues regarding retention provided motivational keynote addresses.
2. Internships. Small stipends under the aegis of OSEA were offered to students throughout the State for Academic Year (Fall through Spring) or Summer internships that helped them in working with faculty members. These were for active involvement in research projects and getting active hands-on experiences. Students participated on their home or other OSEA campus as explained below in point 3. Due to the small size of the stipends, faculty mentors many times located additional supplemental funds to assist the mentees.
3. Internships across Campuses. An interesting feature of OSEA is that it would help in arranging for a student to pursue research on another campus during the summer. Without the coordination of OSEA it was highly unlikely that this would have taken place. While this was not the most chosen option for the internship by students, some did take advantage of this unique opportunity.
4. Faculty Training Sessions. On at least two occasions, OSEA provided or facilitated the provision of training for interested faculty and staff members from the 15 schools.

Other activities did take place as result of OSEA being in place. They included: some joint proposal writing by groups of OSEA institutions; informal collaborations and advice interchanges among SC members and OSEA staff; various types of evaluations of OSEA programs as well as closely related ones. (Indeed, the evaluators of OSEA have worked with one of the campuses in regard to evaluations of a current program and two that were being proposed.) Over the five years the evaluations led to the creation and summarization of a large amount of data as is overviewed in the next section.

Evaluation Overview

The purposes of evaluation were to determine how students and faculty/administrators viewed the implementation and outcomes of the Forums and what their perceptions were of numerous retention services provided at the universities. Another purpose not as prime as the others was to see what skills were most important for students, their level of competency in relation to them, and the extent to which they felt they using or employing them in their educational programs. Other assessments were conducted but the above were the main things investigated. Data about enrollment and graduation was collected but not by the evaluators. A brief summary of it, as available, will be incorporated into this report.

In Table 1 the nature of the OSEA evaluation is given. The table contains times when data was collected, methods used, sampling, and comments as pertinent to getting a picture of the evaluation landscape. It should be noted that subtle variations were made in instruments each time they were used. It was necessary to do this based upon what was learned from the previous administration of an instrument and due to changing dimensions of OSEA programs (each year the Forum was slightly different that of the year before). This is indicated in the table.

During the five years and during the context of the evaluation, the evaluators were asked to generalize their work to some activities related to OSEA but not funded by it. These are in the table as the mentoring evaluation.

Another consideration in thinking about the evaluation are that some of the individuals acknowledged as assisting with the evaluation donated their skills and experience at different times in the project (Lee (2003 -2005, White 2005 – 2008 after being the first graduate research assistant on the project, Yilmaz 2008, and Zhu (2005 - 2008)) in exchange for having the chance to generate manuscripts for publication. To date their efforts have led to 5 articles in refereed journals. The evaluation team has also taken advantage of the data that came from this project to submit and have accepted papers for presentation at the annual meetings of the American Evaluation Association. Thus OSEA and its data have been on the program of a respected national venue for 5 straight years. One of the meetings was an international one (Toronto) in conjunction with Canadian Evaluation Society and a team member was invited to make a presentation based on the OSEA evaluation to a national conference held in Sweden in 2006. Lastly, the evaluation of the project was presented at an annual conference of the Ohio Program Evaluators' Group (OPEG).

Table 1 Overview of the OSEA Evaluation 2003-2008

Evaluation Activity	Year(s)	Sampling	Instruments	Comments
Enrollment and Graduation counts	Every year	All URM students in OSEA institutions	Database obtained from Ohio Board of Regents	Counts made against standard STEM codes of NSF, as feasible

Evaluation of the Yearly Research Forum	2004, 2005, 2006, 2007, 2008	Students and Faculty in attendance	Related but separate survey forms for each group distributed at the Forum	Data collected over 5 years but forms are not exactly identical
Major OSEA Evaluation Survey	2005 and 2007	Randomly selected Students and purposive sample of Faculty	Forms tailored to perspectives of each respondent group	Forms changed and improved after first use Electronic distribution
Mentor/Mentee Evaluation	2006 and 2007	Purposive sampling of mentees/mentors (some not in OSEA)	See above column	Electronic distribution
Evaluation of specialized training and workshops	2005, 2006 (as needed)	Faculty in attendance	Surveys	Forms in accord with content of training
Focus Group Interviews	2005 and 2008	One group of students at Forum in 2005 Two student groups and one faculty FGI at Forum 2008	2005, approximately 5 questions 2008 approximately 11 total questions for student Approximately 9-10 questions for faculty	2008 FGIs conducted so that there were overlapping questions across student and faculty groups Each of the groups also were asked independent questions
Research studies in the context of the evaluation	2005 (n = 2) 2008, 1 planned	2005, one for randomly sampled OSEA students 2005, use of evaluation survey data for a follow-up study of student & faculty respondents to evaluation survey	Survey about persistence factors for study one Open-ended follow-up form for results of the evaluation survey	All surveys were electronically distributed

When the table is viewed in its entirety, there were more than 18 surveys done over the five years, four FGIs, and two research studies. Almost all of these techniques were continually revised and fine tuned throughout the entire evaluation process and in the research studies. SC input was sought and obtained for their development. As results were produced they were provided to the SC on the website as well in the face –to-face meetings during the year. There was much interest and a lot of discussion was prompted.

Not shown in the table is the detailed content of some of the surveys. For example, on the major evaluation surveys that were administered in 2005 and 2007, triple scaling was used for numerous questions leading to a voluminous data set. Multiple scales were used for questions about essentials skills (importance for achievement, competence, and frequency of use) and for services available to students (importance, satisfaction, and frequency of participation). Additional questions dealt with various features of campus life (scheduling courses, quality of teaching, others) and student demographic background.

The amount of data collected and analyzed is to some degree overwhelming. Therefore only results for key or highlighted aspects will be given in the next section.

Selected Results and Discussion

1. STEM Enrollment and Graduations for URMs

In table 2, the enrollment and graduation number for all OSEA institutions are given by the five years of the project. They have remained stable for the most part or have dropped a bit since the inception of the alliance.

Table 2. Total Underrepresented Minority Undergraduate STEM Enrollments and Bachelor’s Degrees Earned by Year for Alliance Institutions

	Baseline 2001-02	2003-04	2004-05	2005-06	2006-07
Enrollments	3,743	4,303	3,634	3,548	3,728
Degrees	438	474	463	447	433

Note: 2007-8 data was not available at the time of the writing of this report.

2. Selected Results from the Statewide Research Forums

The forums are a major and time consuming activity of OSEA. Over the five years, starting from a small base they have grown to about 100 students per year across all 15 of the involved OSEA campuses. Twenty to thirty percent of the students give oral presentations and all are required to prepare posters. There are two major luncheons, one dinner with a keynote address from a prominent individual, a breakfast, snack breaks, overnight lodging, arrangements for meeting rooms and poster space, and so forth. The

work behind the scenes is significant. Besides the students, staff and faculty mentors attend swelling the total numbers to 130-140.

The Forum was a way of creating a whole out of disparate pieces and as the years passed it became seen as a unique mechanism for doing something across the universities that they could not do alone. The campuses supported the endeavor not only by promoting student attendance but also by assuming some of the support burden particularly in 2005 and 2007. In those years two universities (University of Akron and Wright State University) hosted the event. With so much invested in and virtually riding on the outcomes of the event, forums were evaluated primarily by means of student and faculty evaluation surveys distributed and collected at them. Student and faculty results for sections of the survey are displayed in Table 3.

Table 3. Forum Ratings across Years (Student / Faculty and Staff)

	2004	2005	2006	2007	2008
Opening Remarks, Alliance & University Welcome	4.38/3.90	4.29/4.64	4.49/4.14	4.11/4.67	4.57/4.60
Student Poster Sessions	4.37/4.50	4.22/4.57	4.49/4.75	4.52/4.75	4.47/4.67
Student Research Presentations ¹	4.52/4.80	4.42/4.61	4.63/4.32	4.49/4.54	4.49/4.54
Workshop: Preparing for the GRE	4.43/NA	4.54/4.78	4.50/5.00	4.59/5.00	3.75/NA
Workshop: Managing time & study skills	3.40/NA	4.24/4.50	4.00/4.50	3.92/4.67	-
Workshop: Selecting and applying to grad school	4.33/NA	4.25/4.43	4.40/4.50 ²	4.50/4.40 ³	4.19/NA
Workshop: Obtaining financial support for grad school	4.44/NA	4.46/4.55		-	-
Workshop: Exploring career interests	4.50/NA	4.82/4.80	4.53/4.00	-	-
Workshop: A day in the life of a graduate student	-	-	-	4.00/4.00	3.82/5.00
Workshop: Project 1000	-	-	-	-	4.60/4.67
Panel/ Small Group Discussions: Graduate school ⁴	4.28/3.87	4.41/4.50	4.53/4.88	4.01/4.39	
Small Group Discussion: Biological Sciences	-	-	-	-	4.18/4.00
Small Group Discussion: Engineering	-	-	-	-	3.95/4.50
Panel Discussion: Non-academic career opportunities	5.00/NA	3.59/4.00	-	-	-
Dinner Keynote Speaker	3.92/4.40	4.74/4.89	4.71/4.50	4.34/4.62	4.34/4.50
Professional Skill Development Event: Formal Networking	-	-	-	4.14/4.14	4.06/4.40
Grad School Recruitment & Career Fair	4.11/4.10	3.62/3.47	-	-	-
The workshops were interesting/helpful.	4.58/4.50	4.04/4.41	4.21/4.44	3.84/4.55 ⁵	3.96/4.86
The panels were interesting.		3.80/4.44	4.50/4.73	3.95/4.43 ⁶	4.23/4.80
The student presentations were interesting		4.26/4.76	4.40/4.53	4.42/4.50 ⁷	4.43/4.65
The posters were interesting.		4.39/4.79	4.57/4.80	4.27/4.33 ⁸	4.51/4.65
I will be able to use what I learned from the Form.	4.58/4.20	4.09/4.56	4.44/NA	-	-

I am planning to attend future Alliance programs/Forums.	4.37/4.60	4.15/4.75	3.44/4.74	4.21/4.75	-
The presentation was a good opportunity to report my research.	4.29/NA	4.56/NA	4.69/NA	4.71/NA	4.67/NA
I received adequate assistance in preparation for the presentation.	3.88/NA	4.31/NA	4.55/NA	4.60/NA	4.40/NA
The presentation was helpful for my studies.	4.22/NA	4.44/NA	4.61/NA	4.67/NA	4.59/NA
I will be more confident about networking at future events.	-	-	-	4.30/NA	4.25/NA
The Overall Forum	4.37/4.30	4.36/4.55	4.46/4.69	4.35/4.78	4.57/4.75

The vast majority of the results in Table 3 are very positive for the students and the Faculty/Staff who participated in the Forums. This indicates that OSEA was able to maintain a consistently high level of quality while continually modifying and changing schedules and content.

3. Selected Results from the Major Evaluation Surveys 2005 and 2007

The responses to the survey are magnified since multiple scales were employed for each question. In the next tables, selected results for students and faculty are shown. Due to rewording and improvement of questions it is not possible to make a one to one comparison across the two time periods. However, some patterns are evident in the descriptive data.

One is that the skills were seen as being important (but to different degrees) for the students in the two time periods. There is a noticeable drop for the two student groups from importance to competence and then to frequency of use but the picture is more mixed and less clear as to the last variable (see Table 4.) In Table 5, generally the faculty and students see similar importance for the skills but there are instances where they do not agree. Moving to competence and frequency of use the two groups have quite disparate perceptions. Looking at the 2007 data for Pre-College services, it's apparent that some views are alike and others are sharply different and for the latter the first two entries illustrate the unique worlds of students and faculty. Except for a few cases the evaluators have not been able to date to conduct more intense studies of what underlies such views.

In terms of the academic services the students in 2007 had different values than those in 2005 (see Table 6.). But note that when the importance and satisfaction scores are compared there seems to be an analogous drop in going from the former to the latter. Overall, it is a more complex and difficult picture to interpret when studying the results for the two time periods. Finally, note from Table 7 that students and faculty have differences of opinions about academic services on the campuses.

Each set of results and data from different years and groups have consistently been reported to the SC and at conferences. In every instance has led to in-depth

discussions about meaning and the potential for improving programs or its value in uncovering issues and problems.

Table 4. Student Perceptions of Skills Across Years (Percentage of responses from upper end of scale only)

	Importance		Competence		Frequency of use	
	2007	2005	2007	2005	2007	2005
Academic Skills						
Thinking critically & creatively*	88	81	78	61	82	69
Integrating ideas*	88	82	63	54	66	60
Analyzing & solving problems*	94	89	80	59	86	74
Understanding scientific & technical material **	90	85	65	49	78	51
Understanding mathematical concepts*	80	80	66	58	70	70
Communication Skills						
Communicating in writing*	78	76	67	69	57	58
Communicating orally*	87	79	68	72	67	51
Leadership & Team-building Skills						
Planning & managing time***	92	87/94	62	66/55	82	72/79
Multi-tasking	77	86	68	71	75	83
Delegating & sharing responsibility***	71	69/90	71	46/87	38	42/69
Trusting others to perform*	64	76	43	52	29	49
Fulfilling commitments to others*	87	88	85	86	62	77
Cooperating & team building***	87	91/84	75	91/69	54	82/57
Coping & Interaction Skills						
Assertiveness	78	76	56	57	45	54
Resolution & negotiation of conflict***	78	79/77	67	75/70	30	51/47
Flexibility & adaptability***	84	84/90	76	82/77	66	63/67
Management of stress*	90	87	50	59	76	64
Socialization with others*	77	78	60	66	66	67
Other						
Class attendance	95	90	84	91	92	88
Punctuality	90	84	83	83	85	86

Table 5. 2007 Student and Faculty Perceptions of Students' Skills (% of responses from upper end of scale only)

	Importance		Competence		Frequency of use	
	Student	Faculty	Student	Faculty	Student	Faculty
Academic Skills						
Thinking critically & creatively	88%	90%	78%	23%	82%	30%
Integrating ideas	88%	93%	63%	38%	66%	34%
Analyzing & solving problems	94%	93%	80%	45%	86%	59%
Understanding scientific & technical material	90%	97%	65%	31%	78%	45%
Understanding mathematical concepts	80%	93%	66%	31%	70%	38%
Communication Skills						
Communicating in writing	78%	97%	67%	10%	57%	34%
Communicating orally	87%	90%	68%	48%	67%	48%
Leadership & Team-building Skills						
Planning & managing time	92%	90%	62%	34%	82%	62%
Multi-tasking	77%	48%	68%	34%	75%	66%
Delegating & sharing responsibility	71%	62%	71%	24%	38%	21%
Trusting others to perform	64%	41%	43%	31%	29%	21%
Fulfilling commitments to others	87%	79%	85%	45%	62%	31%
Cooperating & team building	87%	79%	75%	41%	54%	34%
Coping & Interaction Skills						
Assertiveness	78%	76%	56%	34%	45%	21%
Resolution & negotiation of conflict	78%	45%	67%	17%	30%	7%
Flexibility & adaptability	84%	83%	76%	38%	66%	28%
Management of stress	90%	86%	50%	24%	76%	41%
Socialization with others	77%	69%	60%	60%	66%	69%
Other						
Class attendance	95%	79%	84%	55%	92%	72%
Punctuality	90%	93%	83%	31%	85%	66%

Table 6. 2007 Student and Faculty Perceptions of Pre-college Service (Percentage of responses from upper end of scale only)

	Importance to students' decision to attend college		Importance to students' academic success	
	Student	Faculty	Student	Faculty
High school academic counseling	36%	70%	35%	59%
H.S. teacher mentoring	40%	81%	51%	89%
Mailings from colleges	42%	48%	28%	33%
Campus visits	64%	70%	38%	48%
Pre-college programs on college campus(es)	42%	41%	36%	15%
College staff recruitment visits (to your H.S.)	38%	67%	26%	26%
Pre-college programs in your local schools /community	38%	93%	36%	56%

Table 7. Student Perceptions of Academic Services Across Years (Percentage of responses from upper end of scale only)

	Importance		Satisfaction		Frequency of Use	
	2007	2005	2007	2005	2007	2005
Peer study groups	47	67	30	56	63	32
Tutoring	56	76	46	53	64	31
Supplemental instruction*	52	72	40	56	64	29
Cohort groups in classes*	33	59	27	55	53	43
Living learning program in residence halls*	18	60	17	45	28	33
Drop-in center*	22	70	19	62	34	36
Summer Research Internships*	44	78	27	57	31	23
Academic Year Research Internships*	40	71	26	41	28	26
Faculty mentoring	52	71	39	56	52	28
Peer mentoring	32	57	26	47	41	24
Grad student mentoring	27	46	16	36	26	14
Industrial rep mentoring	16	65	5	37	7	15

Table 8. 2007 Student and Faculty Perceptions of Academic Services (Percentage of responses from upper end of scale only)

	Importance		Satisfaction	
	Student	Faculty	Student	Faculty
Peer study groups	47%	63%	30%	37%
Tutoring	56%	61%	46%	44%
Supplemental instruction	52%	44%	40%	19%
Cohort groups in classes	33%	48%	27%	22%
Living learning program in residence halls	18%	29%	17%	26%
Drop-in center	22%	43%	19%	33%
Summer Research Internships	44%	81%	27%	67%
Academic Year Research Internships	40%	74%	26%	63%
Faculty mentoring	52%	96%	39%	59%
Peer mentoring	32%	70%	26%	37%
Grad student mentoring	27%	67%	16%	26%
Industrial rep mentoring	16%	22%	5%	19%

4. Results from the Focus Group Interviews

One very preliminary and perhaps a bit more informal FGI with students was completed in 2005. In 2008, two student and two SC sessions were planned to take place in the 2008 Forum but not enough faculty members were available at the scheduled time so only one of those interviews was held. To date, one student and the FGI have been analyzed at somewhat of a surface level. That being said several of the main themes that emerged are corroborative of each other and fit other observations from the project. The themes are given here with the sense of idea generation rather than full findings at this point in the analysis. They are presented in Table 9.

Table 9. Initial Results from Two FGIs

Tentative Theme	Underlying Variables
Target audience for retention efforts	Subpopulations evident in discussions May require somewhat distinct efforts
Views of dropouts/switchers	Some may be appropriate based on interests and background Need to have a careful analysis of the situation and some deep thought about it Certain aspects of prior background are an important key to retention and start long before college
Teaching and instruction	Constant pattern at universities of not being done well There are exceptions but the pattern seems to be there Came up in interviews and has appeared also in OSEA questionnaires More noticeable on the part of student comments May relate to faculty reward structure Classes could be more exciting
Idea of mentors and champions	Comes up in many ways and forms in interviews Champions and mentors for programs and the issue of minority student retention Also in terms of guidance for students -special teacher who suggested that they consider STEM as an area of study
Ideas about retention programs	Some may not fully reach goals Too much pressure and rapidity to them Perhaps a need to slow down the pace and provide a more gradual transition for students
Climate types of issues	Need for more awareness building for students of what is available More public recognition for STEM Building within university climate of cooperation for retention Confidence and empowerment types of concerns voiced by students and faculty

As the evaluation process is completed, it is assumed that sum of the themes will be supported by analyses of all the FGIs and by a more intensive treatment of the data. Also it is possible that some other variables and in turn themes will be uncovered. The data will be explained to the SC and thought provoking issues emanating from it will be brought up for further input. As best as the evaluators are able they will generate a set of conclusions that is integrative of all the data as coming from a complicated and multiple method data set.

Conclusions

1. One conclusion is that the project was not able to recruit and then retain as many minority students as was hoped for at its inception. Upon reflection that goal may have been very optimistic and has to be juxtaposed to what the project has accomplished and against what the situation was prior to the onset of OSEA.
2. In terms of students participating in STEM and OSEA several results underscored a subtle issue. The students tended to come from middle class backgrounds and were more self-selected for STEM based on interest and aptitude. One SC member referred to this as analogous to “preaching to the choir.” Demographic data supported this point as well as numerous comments made by SC members and students in the FG sessions. For recruitment and retention purposes it will be necessary to think more about subgroups within URM populations.
3. It notable that the Forums were so well planned and received especially by student and faculty participants. The results were dramatically consistent for five consecutive years. Going further and building off the first conclusion, nothing like this had occurred before in Ohio and especially on a recurring yearly basis. Underscoring the point is that two universities other than OSU took on the responsibility for leadership in the activity in years 2005 and 2007.

The Forums require a lot of organizational commitment and effort but they have worked well and should be continued. They even have the potential to grow in a number of ways (see the recommendations).

4. Conclusion 3 is partial evidence in support of the idea of interuniversity cooperation and collaboration that was beginning to take place in the alliance although it was still a work in progress. The lead evaluator has been with OSEA prior to its original funding – contributing at initial meetings, helping to write the proposal that led to the first grant, and being at all Forums and SC meetings. Previous to OSEA the campuses were not working together in regard to statewide endeavors for minority student retention.

Now much more it is clear that working in a collective manner has some beneficial implications but by the same token it has costs such as a loss of some control of one's turf and monetary and coordination demands. Nevertheless, things have happened because of OSEA and without its framework and aegis such a milestone would not have been attained. The alliance has established a foundation for future efforts that are interuniversity in nature. This is no minor accomplishment and possibly should have been thought about and put forward as a major goal of the project at its inception.

As mentioned before some of this has already taken place in an almost subtle way. The evaluation group has interacted with faculty endeavors on two campuses and has been included in some significant successful proposal development. Moreover, there have been other proposals that while not funded do show the emergent working together attitude that would not be there without OSEA.

5. The complexity of retention with minority populations certainly came out from the evaluations and the data produced. Retention and recruitment were held relatively even over the 5 years, the data from the two surveys in 2005 and 2007 with sometimes different student and student to faculty perspectives, and the themes from the FGIs together suggest how complicated the dimensions of the issue are.

Of particular interest are such things as the quite different views of faculty and students about the level of competence in skill areas and some of the sharp distinctions in two specific topics that were asked toward the end of the survey. Students and faculty do not see the same things in Pre-College services and in College services and aspects of being in the College environment. Another consideration is that student scores for the latter variable do give some cause for concern about the quality of what is available.

6. Portions of the results suggest that more in-depth or specially focused studies would be in order and useful. For example, do student views vary by campus and size of institutions, what are the trends for some variables as students go from the early years of the university into their junior and senior year experiences, what about the students who leave the STEM fields but who stay at the university, what might be their perceptions, what prompted their switching out of STEM to another area, what happens to students once they graduate and at a time after they are out what are their views about their education and OSEA, and a myriad of other research routes that could be pursued.

The same kind of thinking could be applied to issues related to faculty. What might they think would improve retention and recruitment of URM

groups, how would they go about characterizing URM students especially those who are not in the already self selected group but who might do well in STEM courses and careers, how should universities go about the process of improving services given student responses on our surveys, and so forth.

Recommendations

1. While continuing to do everything possible in recruitment and retention, it would be desirable to look at what schools are doing to encourage STEM enrollments and learning for minority students. Are new STEM schools and programs within regular schools working and to what degree do they promote continuing interest in STEM and solid student achievement? The pipeline for STEM starts long before the entry to the university and certainly might be the key factor to increasing the pool of students.
2. The Forum results were exciting and very indicating that there is excellent potential in the event but student participation needs to be expanded and more faculty members also need to get involved. They should be continued as possible with broader involvement and support of the 15 institutions, the Board of Regents, businesses and firms in the STEM arena.

To generate new ideas on how to do this, use a meeting across institutions and do some formal brainstorming activities that include inside and outside the box thinking. Creative use of strategies such as the fish bone, fault tree analysis, and SWOTs might be employed.

3. Similar to recommendation 2, implement the same type of thing for how future consortiums or alliances might work. Besides the Forum and activities done by OSEA what might be other things (cross university symposia, distance education, joint research projects, etc.) that could be done by the synergy of working together. How might this relate to the organizational structure of an alliance?

This could also entail examining how to generate enthusiasm within universities with hard pressed faculty members who are aware of the lack of minority students and/or women (in some STEM areas) but who also have to contend with keeping up with the requirements of fast moving fields, publish or perish pressures, the need to bring in extramural dollars, and sometimes heavy teaching loads.

5. In any future endeavors, maintain a strong evaluation stance. This recommendation may appear self-serving but the evaluation done here was well received by participants, enhanced the understanding of the SC,

and led to a deeper consideration of issues. That being said consideration could be given to the use of other methods and approaches to the design of what might be done.

6. As outgrowth of the prior recommendation, a wealth of data has already been collected and is begging for in-depth probing and analysis. Besides that many research questions were posed before as examples of what might be studied in evaluation and/or research. The evaluators have some plans to do so but their efforts will only scratch the surface of what is an exciting vista for investigation. We encourage other interested parties to get involved.