SOUTH DAKOTA BOARD OF REGENTS

Committee on Academic and Student Affairs

AGENDA ITEM: I – G

DATE: October 8-9, 2014

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SUBJECT: Office of STEM Partnerships Update

Background

The South Dakota Board of Regents Office of STEM Partnerships was established by the South Dakota Board of Regents in partnership with South Dakota Experimental Program to Stimulate Competitive Research (SD EPSCoR) in September of 2012. The purpose of this partnership is to increase opportunities for all South Dakota students to pursue and be successful in STEM careers and build South Dakota's STEM workforce.

There are three focus areas from which the Office of STEM Partnerships targets to achieve this effort. First is working directly with K-12 schools identifying, supporting and expanding informal STEM programs. Second is interacting with all South Dakota's institutions of higher education to provide students an easy transition into post-secondary STEM education programs and ensure successful graduation. The third focus area is working with industry. In this area there are two segments of work underway: 1) support to local schools and communities to foster greater understanding of STEM careers in or near their communities and 2) support of STEM programs in those communities. At the post-secondary level, the key is establishing greater communication between academia and industry. This will serve two key areas. First, students will have a better understanding of what industry expects of graduates entering the workforce outside of general academic skills. Second, faculty will have opportunities to work directly with industry to enhance not only their instruction methods but also gain opportunities to generate industry support in research programs they may be involved in.

A final and very important component to the efforts underway is to ensure that all programs and activities have a focus on diversity. South Dakota's population consists of many rural and tribal areas where students are often overlooked, yet are critical in building a viable workforce to meet the need of highly qualified STEM professionals and to make South Dakota competitive in the global workforce. The following is a synopsis of the work conducted over the past 2013-2014 year.

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RECOMMENDED ACTION OF THE EXECUTIVE DIRECTOR

Information only.

SD EPSCoR Diversity Consortium

The Director of STEM Partnerships is the SD EPSCoR Diversity Officer facilitating the SD EPSCoR Diversity Consortium. The Consortium is made up of two groups. A Diversity Council that is comprised of 30 members from 20 post-secondary institutions who have some role in diversity efforts at their institutions. The other group is comprised of professionals from industry. This group is referred to as the Consultatory Board and currently has 14 members. It should also be noted that each Consultatory Board member has provided a written pledge, signed by them and their supervisor, to commit at least 30 hours of diversity outreach and engage their company's resources either directly or indirectly to meet the goals and objectives of the Consortium.

The goal of the Consortium is to identify common challenges in recruiting diverse students, successful completion of programs of study by the students, and ultimately employment. The Consortium members meet twice a year. Each year the members identify a challenge and a goal to meet that challenge. An action plan is developed and all members work collaboratively to meet that goal over the year. The Consortium also hosts an annual Diversity Summit that is usually held in the early spring that is organized by Consortium members.

Current effort – Development of an 'Industry Guide to Best Practices' along with regional workshops will be provided to industry to assist in maximizing their involvement with students in internships and research opportunities. The guide will be a collaborative effort between industry and South Dakota's post-secondary institutions to serve both industry and students entering the workforce.

SD EPSCoR Statewide Database System

In South Dakota, much like every other state, post-secondary institutions recruit students based on academic performance while industry looks to employ students that are academically successful. However, there is no mechanism that identifies students' interest in pursuing STEM careers at either the high school or post-secondary level. There is no system in place that allows industry to identify and groom potential employees, and no system that is able to determine why students choose STEM careers. That was the premise in developing the SD EPSCoR statewide database system.

The South Dakota Board of Regents publishes a yearly "Fact Book" that outlines a complete data analysis of all students within the public universities. The South Dakota Board of Education compiles student achievement data, school performance data, and data regarding teacher's accountability in the classroom. This data is also made available to the South Dakota Board of Regents. A critical area that has been missing is the type of data collection and analysis mentioned above to determine what factors contribute to students pursuing STEM careers. The SD EPSCOR statewide database tracks students who participate in all South Dakota informal STEM programs. The collection of this data will allow the Board of Regents to compare SD Department of Education student achievement levels with student participation in informal

STEM programs. It will also allow cross referencing with student enrollment in public universities and determine the impact of these informal STEM programs in students choosing STEM degree programs. This system will also allow industry and universities to actively pursue and support these students through their K-12 and post-secondary education. Lastly, the system will also provide students with years of program involvement and awards they might have received that they can use in applying for admission to a post-secondary school, applying for scholarships, internships, and ultimately in their employment application.

The SD EPSCoR statewide database is designed to meet the individual needs of each participating informal STEM program being conducted at all South Dakota schools. Customizing each site's registration system allows the database to collect student information that includes the types of STEM programs they are involved in.

A unique and favorable aspect of this statewide database system is its ability to link colleges, universities, and industry directly to students. Specific college and university departments would be able to identify students engaged in STEM programs in their field and mentor them to ultimately enroll in and be successful at their institutions. Industry would also benefit by identifying and mentoring students conducting research and internships related to their workforce needs. It also strengthens industry efforts allowing them to target students early on for internships rather than having to select applicants from a general pool.

In addition to the statewide database system, a dedicated web site will be established that describes and links every informal STEM program offered throughout the state. This web site would also provide links to registration pages of each program. This will provide every student, teacher, and parent the opportunity to see and learn about STEM programs in their communities that students can participate in. More importantly, through this statewide database system, once a student, teacher or parent has registered in any one of the state's informal STEM programs they will receive regular emails about new programs, upcoming events, scholarship opportunities, and other STEM initiatives throughout the state.

Ultimately this system will provide more than just querying how many students involved in informal STEM programs enroll in postsecondary education**.** By the Fall of 2016 the system will be able to identify countless queries depending on institutional or industry needs. For example, if you are a university and you wish to send recruiting information directly to students, the system will be able to:

- Identify gender
- Ethnicity
- What STEM fields they have identified interest in
- How long they have been involved in informal STEM program, etc.

If your admissions office wishes to target those schools that have the largest participation in STEM programs for outreach recruiting efforts the system will:

- Identify which schools participate and the types of informal STEM programs
- Contact information of teachers

- Number of students (per school population) that have participated in informal STEM programs.

If the institution is trying to build enrollment in specific STEM degree programs, the system will provide similar information. For industry partners, this system allows for querying virtually any information that would be helpful in targeting students as potential future employees as well as consolidating resources to support schools and communities that are directly tied to any particular industry workforce development needs.

As with any system that collects information on individuals, the SD EPSCoR Database System maintains the highest security. The system is housed by an independent contractor that has state of the art security features. The system can only be accessed by the Director of STEM Partnerships and the SD EPSCoR database manager. Any queries must be submitted and approved before any release of information. In regards to student queries, only the student name and date of birth is recorded. No other personal information besides an email, which is not mandatory, is requested of students. No student information is released at any time with the exception that students have the option of signing a release after their 18th birthday to interested parties. Industry and post-secondary institutions wishing to make direct contact with students will need to submit a letter of inquiry to the student that the system manager will forward to the student, who will then choose to respond if they wish.

Teacher information is strictly associated with the school and public records. No personal information is collected. School information is standard mailing address phone, etc. In conjunction with the database system, an annual informal STEM Directors meeting is currently being proposed to further statewide collaborative efforts among all South Dakota's informal STEM programs.

SD EPSCoR/STEM Partnerships Ongoing Efforts

Prior to the establishment of the Office of STEM Partnerships, the informal STEM programs being conducted throughout the state were for the most part a series of yearly events that students participated in. Due to financial constraints and high turnover of management in these programs, many were either stagnant or declining. There was virtually no effort in outreach to build these programs or support teachers and schools participating. The few programs that were showing some signs of growth were limited to very specific geographical areas or specific schools that had resources.

Since the inception of the Office of STEM Partnerships, working closely with SD EPSCoR, it became apparent that not only did these programs provide a valuable resource to increase student interest in pursuing STEM careers but more importantly these programs are the catalyst in preparing students to be successful in entering post-secondary STEM programs of study. Through the 2013/2014 year the Office of STEM Partnerships worked closely with many of these informal STEM programs to begin building their efforts, generating both financial and in-kind support, developing outreach programs, and in the case of South Dakota Robotics

Association, helping them re-structure their association mission, goals, and objectives to increase participation and create a sustainable program.

Much of the effort over this past year has focused on open communication between program directors. This has shown to be very beneficial to all parties and has even led to the sharing of financial resources. This development of communication between directors was a huge milestone, considering that for the past 40 some years many of these programs have been around, they have never talked to each other. Another critical part to building these programs was their adoption of the SD EPSCoR database. Because of the design of the database in establishing each program's registration process they found that their work load decreased by at least 50% and that their organizational structure increased 100%. Simply put, what used to take 400 hours in one program to organize and hold the event was reduced to less than 80 hours.

SD EPSCoR and the Office of STEM Partnerships programs continues to work closely with informal STEM programs to increase student participation and quality of student research or projects. Currently these efforts include over $12,000 of support to each South Dakota regional science fair and approximately $10,000 to support robotics programs in 2014. Other efforts include:

- Joint collaborative workshops for teachers, parents and students
- Participation of high school researchers in undergraduate EPSCoR symposiums
- Lab funding for schools and support to enhance research quality of high schools
- Support for students to participate in INTEL ISEF leading to higher quality research projects
- Re-establish the Timber Lake Regional Science Fair that addresses rural and tribal communities
- Re-establish the South Dakota Jr. Academy of Science – in conjunction with the South Dakota Academy of Sciences
- Support statewide collaboration of Women In Science regional activities
- Support the sustainability of South Dakota Robotics Association

Tribal Efforts

- Assist in establishing certificate programs for communities with job placement and participation in the SD EPSCoR/GOED Dakota SEEDS program
- Encourage and support partnerships with Universities and Tech schools
- Support and expand informal STEM programs in tribal communities
- Continue to work with the AISES Professional Chapter to expand membership and statewide representation

Office of STEM Partnerships Affiliations

- SD Space Grant – an advisory role to help build partnerships at K-12, post-secondary institutions, and industry
- Sanford Promise Advisory Board – an advisory role to assist Sanford high school and undergraduate research and internship programs. Assist in building the Sanford All

About Science Program. This is a STEM open house event with over 40 exhibits and three or more shows that is open to the public with an average participation of over 3000 people annually

- Midwest Regional STEM Partnerships – newly formed group of individuals from eight (8) midwest states that are addressing STEM issues in their states. Annual meetings are conducted to share resources and updates of successful programs. This group also shares insights and best practices throughout the year for folks within the consortium in their individual efforts within their states