2007 FOLLOW-UP REPORT ON THE CONTINUOUS IMPROVEMENT OF THE BS PROGRAM IN BIOLOGY EDUCATION

Prepared by

Ronald H. Matson, Ph.D.
Michael Dias, Ph.D.

Department of Biology and Physics

College of Science & Mathematics

03 December 2007

1. Provide evidence of quality enhancement of the program since 2003.

Curricular changes have been made to enhance the quality of our program. In particular, we have modified Area F of the Biology Education program to match that of the BS in Biology degree (a BOR requirement). This includes adding Physics 1112/2212 as a degree requirement. It will better prepare these students in case they are requested to teach a physics/physical science course in high school. We also modified the area D math requirement by including Math 1190. Furthermore, we have split SCED 4415 (TOSS) into two separate courses (SCED 4416 and SCED 4417). Evaluation of this course indicates that we will be able to more accurately assess and represent candidate performance in the separate domains by changing SCED 4415 to the 6 credit-hour SCED 4416 Teaching of Science and the 3 credit-hour SCED 4417 Teaching of Science Practicum. Finally, the total number of credit hours is being reduced from 128 to 126 to bring this program closer in line with the biology program. This should help make obtaining a degree in Biol Ed more attractive.

We continue to have a strong faculty. As of Fall 2007, there are 39 Full-time faculty (although one is not filled and two are filled with full-time temporary faculty). Of the 36 remaining faculty, four are lecturers holding a Masters degree while the other 32 have earned doctorates. Four of the faculty hired between 2003 and now have expertise in the area of Biology or Physics education. All can contribute to the Biology Ed program in different ways, including being able to teach TOSS and/or supervise student teachers. Between 2004 and now, these faculty have produced approximately 60 peer-reviewed papers in national or international journals. Biology and Physics faculty continue to receive recognitions for advising, scholarship and research.

2. Provide evidence of productivity enhancement of the program since 2003.

The number of declared Biology Education majors has increased from 40 in Fall 03 to 60 in Fall 07. The number of graduates has remained approximately the same although there was a slight increase from 8 in 2003 to 11 in 2007. In spite of these low numbers, data provided on the USG website shows that KSU is producing more biology teachers (CIP code 13.1322) than the other two schools that have a similar program (Georgia Southern and West Georgia). Between 2004 and 2006, 60% (21/35) of the biology education graduates in the state came from KSU.

During the Spring semester of 2007, program changes for the B.S. degree in Biology Education were approved through the committee review process. These changes were necessary due to state-mandated Area F changes and afforded the opportunity to add a few BIOL course content options to alleviate registration constraints that hinder student progress through the program, while still maintaining the content standard requirements of NCATE/NSTA for this degree program.

Dr. Michael Dias currently serves as advisor for 61 undergraduate Biology Education majors progressing through the program at varying rates.

3. Identify the action plans and priorities from the 2003 Follow-Up Report that have been accomplished.

In the 2003 report, several areas of improvement were noted and have been addressed as follows:

A) Provide alternative routes for initial teacher certification for individuals who have already earned a bachelor degree in science.

In Fall 2007, we submitted a proposal to begin a MAT in Science teaching with tracks in Biology, Chemistry and Physics. The Master's of Arts in Teaching (MAT) degree is grounded in the mission of the institution and in the already established excellent reputation and practices of the Professional Teacher Education Unit and the Bagwell College of Education. The program is designed for completion in four semesters for those well qualified students who want an accelerated path into teaching. Students also have the option of spreading the program over two or three years, which is the advised path for those teaching on nonrenewable certificates. Course work will be delivered in a variety of formats including face-to-face meetings and online, and in a variety of locations including in computer and science labs, in university classrooms, and in partner schools.

B) The most significant recommendation is to initiate intense, focused recruiting efforts to increase the number of majors and graduates from our programs in order to meet a currently unfilled need for science teachers in the state of Georgia.

In August 2005 Biology Education Coordinator Mike Dias wrote an action plan of specific goals for increasing enrollment, retention and graduation rates for the Biology Education program at KSU. Initiatives completed during academic year 2005-2006 included:

1. Require advisees to map out their planned sequence of courses toward degree completion and sustain a dialogue of advisement and encouragement with advisees each semester, through individual and group advisement opportunities.
2. Continue with requirements in line with NCATE/NSTA standards and enhance teachers' starting competence through a variety of problem-based teaching experiences in both the middle school and high school level, in contexts that present the challenges of meeting the needs of diverse students. (Assessed through Candidate Performance Inventory, Candidate Portfolio Evidence, Course Evaluations).
3. Recruiting efforts will include presenting the program to all students in BIOL 2108 and BIOL 3300.

The development and implementation of BIOL 4490 Science Teaching Reconnaissance for Maymester 2006 was a pilot course development project to promote the biology

teaching career to KSU Biology majors. This school-based experiential course required leadership in establishing a collaboration with three area high schools, the development of protocols and rubrics to allow students to evaluate their dispositions for teaching, analyze their school-based experiences, plan and implement a lab-lesson, and synthesize course experiences for the final paper. Two of the students in this course are currently teaching high school science and an additional three participants are current Biology Education majors at KSU. The novel nature of this course merited its presentation at the two professional conferences:

.

Dias, M., & Rushton, G. (2006). Secondary science teaching reconnaissance: An experiential course to help university science majors evaluate teaching as a career choice. Panel presentation at the Fall Conference of The Renaissance Group, October 9, 2006, Arlington, VA.

Dias, M., & Rushton, G. (2007). Contextualized analysis of dispositions for secondary science teaching. Paper presented at the Annual Meeting of the Association for Science Teacher Education, January 4, 2007, Clearwater, FL.

C) Develop outreach programs for middle school and high-school students and their teachers that will attract additional students to Kennesaw State University and to our programs.

Five different workshops that included outreach efforts were initiated over the past several years (see Appendix 1 for titles). These programs make local teachers aware of KSU and our programs and facilities. They are then in a better position to recommend KSU to their students. Unfortunately, outreach programs such as those that brought middle grade students to campus to use our lab facilities have had to be curtailed due to space conflicts with our classes.

D) To adjust equipment and travel budgets.

As with the BS in Biology degree program, we've also made improvements in our infrastructure by modifying laboratories and adding more equipment and supplies. These changes help Biology Education majors as well. This was done, in part, by implementing lab fees and a TOSS fee. Furthermore, while our travel budget has remained stagnant, all faculty (including Biology Education faculty) have been able to attend meetings every year.

E) Provide up-to-date and easily understood advising tools in hard copy and on the departmental web site so that students can effectively plan and monitor their own progress.

As noted above, Dr. Michael Dias is our Biology Education advisor. He works closely with the Biology department advisor, Ms. Debra Phillips. She sees several hundred

students per semester and is the initial point-of-contact for all students entering our programs and directs those interested in Biology Education to Dr. Dias. Furthermore, she attends orientation and PREVIEW sessions and works closely with the registrars' office on issues dealing with transfer evaluations, course substitutions etc. She is also responsible for revising our advisement sheets and distributing them/posting them on-line.

4. Identify the action plans and priorities from the 2003 Follow-Up Report that still need to be addressed and indicate a timeline for their completion. If specific action plans and priorities have changed since 2003, please explain.

An area in which the Program Review council rated the Biology program as weak was in the area of operational funding and suggested that we seek extramural funding that is directly tied to Science Education. Unfortunately, our overall budget has remained stagnant since the last program review and, other than the TOSS fee, we don't have any money specifically tied to Biology (Science) Education. And, in real terms, it has decreased especially since we now have more faculty. As mentioned above, the institution of lab fees in 2003-2004 has been a great help. However, we continue to struggle due to lack of faculty and lack of space. We are having a difficult time offering enough classes while trying to get teaching loads for research active faculty down to a 4/3 (and eventually a 3/3) level. We are out of lab space and offices for new faculty. While a new lab building is on the horizon (hopefully to be occupied in 2012), until that becomes a reality we will continue to struggle with increased demands for scholarship from faculty and teaching more classes to support our students.

It should be noted that the Biology Education faculty do apply for, and have received, grants to conduct teacher workshops and to carry out other activities relevant to science education.

5. Address the current status of the program's viability. If viable, justify whether the program should be sustained, reconfigured, or enhanced.

The BS in Biology Education continues to be a viable program. Based on data provided by Enterprise Information Management, the number of biology education majors has increased since 2003 from 40 to 60. Our internal database of advisees indicates an even greater increase. There is shortage of STEM teachers in Georgia and our program continues to help fill that demand. However, in order for us to keep up with demands, our program will need to be enhanced, primarily though the addition of faculty and space. This is especially true given the growth in our other programs and in our increased support of degree programs outside the department (e.g., Early Grades Education; Nursing).

a. Indicate how the program advances specific goals and action steps of KSU's Strategic Plan.

The BS in Biology Education (as well as the proposed MAT) connects directly to Action Step 8 of Goal 1 to "add degree programs that are strategically important to the local community, to Georgia, and to the nation at both the undergraduate and graduate levels". We are already addressing Goal 2, action step 4 with the continuous up-dating and publication of our two year schedule.

b. Identify resources needed to strengthen the program's ability to meet the goals of KSU's Quality Enhancement Plan.

We have begun to engage in more study abroad programs (see above). However, in order to continue the trend of offering more study abroad courses, financial support for both faculty and students will be needed.

c. ***If the program is delivered off-campus, please provide a cost analysis of the off-site delivery.*** Not Applicable

d. Indicate the resources needed to sustain, reconfigure, or enhance the program's quality and productivity.

As indicated above, we need both additional faculty and additional space for both teaching and research. Without these additional resources, we will not be able to continue to support this program and others related to it at current levels.

Appendix 1 – Teacher Preparation Workshops

Dias, M., Hudson, D., & Martin-Hansen, L. (2006, February). Enhancing Inquiry Methods for Middle Grades Earth and Life Science. Workshop presented at the Annual Leadership Conference of the Georgia Science Teachers Association, Columbus, GA.

Eick, C., Dias, M., McCoy, W. (2006, October). Optimizing your doctoral degree to prepare for the science career of your choice. Workshop presented at the Annual Meeting of the Southeastern Association for Science Teacher Education, Macon, GA.

Cobb County School District *Inquiry in Biology* workshop, November 5, 2007 (72 participants).

Cobb County School District, *Promoting Inquiry Methods for the Georgia Performance Standards in High School Biology*, (series of four professional development workshops for the science department of Osborne High School, 2006-2007.)
Dias, M., Eick, C. & Schomer, S. (2005, October). *Using inquiry in the science classroom*. Professional development workshop at the Cobb County School District High School Science Teachers In-Service, Kennesaw Mountain High School, Kennesaw, GA (63 participants).

Paulding County School District, *Promoting Inquiry Methods for the Georgia Performance Standards in Earth and Life Science*, (series of five professional development workshops for all middle school science teachers of Paulding County School District, 2005-2006.)