3.3.1.1. Educational Programs, to include student learning outcomes

Morehouse School of Medicine 2010 Recapitulation on Student Learning Outcomes by Program			
Program	**Student Learning Outcomes**	**Assessment Plan**	**Activities**
MD	-See the 2009-11 Academic Catalog, i.e., *Learning Objectives*, pages 49-51, and *Curriculum*, pages 53 – 64, included in supporting documentation and available on the MSM Internet	- Passing grade in each course - USMLE exam scores, Part I and II - OSCE Objectives (clinical courses) - Attached below, is a recapitulation of the curricula review/revision process for the MD program	- Curriculum & Evaluation Committee reviews - Program Directors meetings - Student Academic Progress & Promotions Committee (SAPP) - Student Retention and Graduation Rates - Outcome measurements of graduates
GEBS	-See the 2009-11 Academic Catalog, i.e., *Overview*, pages 73-74; *PhD Requirements*, pages 78-80, and c*urriculum*, pages 80-81; *MSBR Objectives,* pages 81- 83; *MSBT Curriculum*, pages 83-84; *MSCR Overview*, pages 87-89 and *Curriculum*, pages 89-90, which are included in the supporting documents and available on the MSM Internet.	- Passing grade in each course -Attached below, is a recapitulation of student assessments for curricula revision of the PhD program	- Curriculum & Evaluation Committee reviews - Student Academic Progress & Promotions Committee (SAPP) - Student Retention and Graduation Rates - Outcome measurements of graduates
MPH	-See the 2009-11 Academic Catalog, i.e., *Overview*, pages 113-124, *Curriculum*, pages 124-135, are included in supporting Documents and available on the MSM Internet -Attached below, is a recapitulation of Student Learning Outcomes.	- Passing grade in each course -Quality of theses/dissertations	- Student Academic Progress & Promotions Committee (SAPP) - Student Retention and Graduation Rates - Outcome measurements of graduates

Program Legend

MD = Medical Education Program

GEBS = Graduate Education in the Biomedical Sciences Programs (two degree programs include a Doctor of Philosophy in the Biomedical Sciences (PhD), and a Master of Clinical Research (MSCR), and two new certificate programs, i.e., Master of Biomedical Research (MSBR) and Biomedical Technology (MSBT)

MPH = Master of Public Health Program

Morehouse School of Medicine
2010 Recapitulation
MD Curricular Integration at MSM

WHY? -- Because we need to

- Course effectiveness
- Total amount of scheduled time
- More effective linking of topics

– External factors

- LCME
- LCME-driven trend to combine courses
- Promote self-directed independent study

National changes

- Interdisciplinary courses

  Data—"name" (biochemistry, anatomy) courses drop from about 90% of US medical schools in 2000 to about 30-40% in 2006
- Clinical context teaching
- Limited scheduled time
- Limited lecture time

Some evidence that all of these have a positive effect on outcomes measured as Scores on standard tests and Satisfaction of students

Too much scheduled Contact time at MSM

MSM averages about 30 hours/week scheduled contact time

National average about 20 hours/week

NOTE—there is NOT enough time in the week for our students to be properly prepared for any class. This means that class time will be inefficiently used.

Can address this with self-directed PP or web-based experiences, use of archived streaming lectures,

Can increase use of focused tutorials for students with special needs

VISION DO MORE BY DOING LESS

Better organized instruction—cross disciplinary integration

Decrease unplanned redundancy

Increase utilization of non-lecture methods (faculty designed self-directed materials including PowerPoint, streaming lectures, web-based materials, web-based self-directed learning units, and so forth)

Process of planning

Linking Curriculum Committee, course directors, and faculty

Those who teach will re-design order of topics

Current plan"Molecules, Structures and Mechanisms" ("MSM")

I. Basic principles (includes metabolism, lipids, etc)
II. musculoskeletal (back and arms, muscles, bone, connective tissue) skin hem/lymph cardiovascular-pulmonary
III. GI/nutrition/metabolism renal/endo/reproductive (includes leg)
IV. Neuro, (head and neck, behavioral)

Morehouse School of Medicine
Graduate Education in the Biomedical Sciences
2010 Recapitulation of
Student Learning Outcomes and Assessment

Following is a recapitulation of the graduate program's assessment of the steps taken relative to student performance outcomes and their impact on program content that resulted in development of a Critical Thinking sequence of classes in the Fundamentals of Professional Science course.

- Increasing requirements for students to think critically, creatively, and independently about the information delivered in their classes has led us to develop critical thinking classes to provide training in the principles of intellectual analysis and critical thinking and their application to the conduct of research.
- Discussions among the core course directors regarding the need to provide training that would improve the students' understanding of the type of thinking that was required of them to succeed in professional science, and about reasonable approaches to that training.
- Suggestion by Dr. Newman [see overview in MSM Teaching Academy below] that a critical-thinking sequence of classes be added to the curriculum to introduce principles of critical thinking and provide hands on exercises that would allow the students to build their critical thinking skills during their first year of graduate training (to prepare them for later entry into the research laboratories).
- Acceptance by Dr. Paulsen of the importance of this idea and trial run of classes, directed by Dr. Newman, as a part of a pre-existing core course entitled Fundamentals of Professional Science (directed by Dr. Paulsen).
- Refinement of critical-thinking class offerings over the first year and the decision to continue based on student acceptance and a general faculty consensus of improving performance on essay examinations and in journal club presentations.
- Further exploration of existing critical thinking training programs elsewhere and identification of useful handbooks and other literature through the Foundation for Critical Thinking.
- Discovery by Dr. Newman of an existing Critical-thinking Assessment Test (CAT) to assess student progress during the course.
- Submission by Drs. Newman and Paulsen of a proposal to MSM's Teaching Academy for funds to cover purchase and external grading of the CAT exams and attendance by Drs. Hibbert, Newman, Paulsen, and Sanford at an off-campus, critical-thinking assessment workshop on administering the CAT exams and evaluating student performance on them.
- Administration of CAT exams to incoming graduate students prior to their beginning the critical thinking class sequence.
- Grading the students performance on the initial exam.
- Readministration of the exams after the critical thinking class sequence was completed.
- This is where we currently stand. Our next step will be to grade the performance on the second administration of the CAT exam followed by analysis of individual and group performance.
- During each grading session we will invite additional graduate faculty members to participate to provide in-service education on the principles of critical thinking and its evaluation and discussion of how they might incorporate these principles into the structure of their courses.

RESEARCH PLAN

A) Abstract: The ability to think critically is a tool required by biomedical scientists to conduct scientific research. Critical thinking (CT) skills include interpretation, analysis, evaluation, inference and explanation, and it has become increasingly apparent to the Morehouse School of Medicine (MSM) graduate faculty that graduate students entering our Graduate Education in Biomedical Sciences program often lack these skills. To this end, the graduate program began a mandatory first-year course in critical thinking in 2008 -2009 for all incoming graduate students. We have, however, no assessment tool, course evaluation or faculty development program to measure the success of the course, or areas of instruction needing improvement. We propose to utilize commercially available CT assessment and evaluation tools to appraise the course as well as to sponsor graduate faculty members wishing to attend national CT workshops. It is the goal of this proposal to enhance both student and faculty experience in the CT course and to eventually expand CT skills into the Graduate Education in Biomedical Sciences core course curriculum.

B) Specific Aims: The Graduate Education in Biomedical Sciences Program instituted into its curriculum a mandatory *Critical Thinking* course for the first year MS and Ph.D. students. The effectiveness of the course, however, is unknown as no critical assessment test was utilized. In order to determine whether the course is achieving its goal of improving the graduate students' ability to think critically we propose to use the Critical thinking Assessment Test (CAT) developed by Tennessee Tech University (TTU) and the National Science Foundation. In addition, the instructors of CT course will attend the faculty development program offered by the Center for Assessment & Improvement of Learning at TTU and then will conduct faculty development workshops in CT for the graduate faculty. The specific aims of this proposal are:

1) To determine whether the MSM Critical Thinking course is enhancing the graduate students' critical thinking skills. The CAT will be administered to students before taking the course and then again upon completion for the 2009 - 2010 academic year. In addition, the previous incoming doctoral and masters students and other graduate students will also be asked to voluntarily take the CAT in order to ascertain the overall ability of our graduate students to think critically.

2) To obtain student evaluation of the Critical Thinking course. A course evaluation assessment will be given to the students at the end of the course to correlate student performance with student satisfaction as well as indicating areas of instruction that need improvement.

3) To involve the Critical Thinking course's graduate faculty in the improvement and development of techniques to effectively teach critical thinking skills. A series of national faculty development seminars and workshops will be made available to those teaching in the CT course. These activities will allow our faculty to interact with other faculty across the US who are teaching and assessing CT skills. After attending these workshops, these faculty members will conduct CT workshops for the MSM graduate faculty in order to integrate CT skills into the core course curriculum.

C) Background and Significance: The trend in NIH research funding, as recently outlined in NIH roadmap for biomedical research,(1) is oriented towards clinical translational research or the "bench to beside" approach. In order to address this approach to research, many doctoral programs have added a biomedical science program to train new scientists in this field. Unfortunately, these programs have often times trained students too focused in one area and created "super technicians" rather than biomedical scientists (2). These students lack training in the basic functions of a cell, organ systems and pathology which are required to integrate knowledge of disease processes (3).

The graduate faculty at MSM has recognized this deficiency and recently overhauled the graduate curriculum to address this problem. All doctoral students are required to take a full year of core courses consisting of biochemistry, cells and tissues, organ systems and biomedical genetics. We have, however, observed that many incoming predoctoral students lack the ability to think critically and for the academic year 2008 - 2009, we instituted a year long CT course. This course covers topics on how to critically review scientific papers and understand experimental design and technologies. However, we lack an essential component, an assessment tool, to determine whether our efforts to teach CT skills are successful.

Three components are required for teaching and improving the content of any course: 1) a test to measure student progress, 2) a student evaluation of the course and 3) faculty engagement and development (4). This proposal is designed to use all three components to enhance both the CT course and the graduate program's core curriculum.

1) Critical Thinking Assessment Tool: Testing for CT skills is difficult, but several tests are available. We have selected the CAT developed by Tennessee Technological University and the National Science Foundation. It is unique in that it utilizes essay questions rather than a multiple choice format. It is a one hour test covering the following abilities:

"to separate facts from inferences
to identify wrong conclusions
to understand the limits of correlational data
to identify facts that support or contradict a hypothesis
to identify information needed to make conclusions
to separate relevant information from the irrelevant when solving a problem
to understand complex relationships in an unfamiliar situation
to interpret numerical relationships and to separate them from inferences
to use math skills to solve real world problems
to analyze and integrate facts from different sources to solve complex problems
to recognize how new information can change the solution to a problem
to communicate analysis and solutions effectively" (5).

We will receive CAT institutional reports that provide information about our student scores that include descriptive information (mean scores, concept analysis) as well as a breakdown of the distribution of the scores, what the question is measuring and national norms. At our request, more in-depth reports concerning student achievement can be obtained.

The CAT has been evaluated for cultural bias and it was found that there were no

predictors (e.g., gender, race, ethnic background) of performance on the test. Positive correlations, however, were found with the other CT tests as well as with the SAT, GRE and GPA of test takers (5). Another advantage of the CAT is that the faculty teaching the course will grade the essays after being trained by a purchased training module. This will allow the faculty to immediately identify specific areas needed for improvement for each individual student (5).

2) Student Evaluation: Student evaluation is another important component of assessing and improving a course. We propose to use the Student Evaluation Form developed by the Foundation for Critical Thinking. This evaluation will give the faculty instructors input as to how the students perceive the course as well as how well we are delivering the material. If the students do not like a course or its content, then the faculty teaching efforts will be in vain. This evaluation will be given at the end of the course and will be individualized for each instructor.

3) Faculty Development and Training: The National Science Foundation is supporting several workshops for institutions implementing the CAT into their curriculum. Participating institutions will be able to attend a 2 day train-the-trainer workshop that covers training on how to score the test, assessment models, effective practices and how to use them to improve CT practices of the students. We will be supplied initially with a Training Module which is a computer based activity that teaches the faculty how to score the essay questions. Several times during the year, TTU will analyze scoring accuracy of our faculty and provide feedback and specific recommendations for improving scoring skills.

D) Research Design and Methods

1) Specific aim 1: To determine whether the MSM Critical Thinking course is enhancing the graduate students' critical thinking skills. Students entering the 2009 - 2010 academic year, both masters and doctoral students, will be given the CAT test prior to them taking the CT course as well as after the course completion. In addition, all other graduate students will be asked to voluntarily take the test using a luncheon as an incentive. Scoring will be performed by trained faculty participating in the course, two graders per questions. If the two graders are significantly different, a third grader will be asked to score the test question and/or test. The three grades will then be averaged. In addition, these tests will be sent back to TTU for their evaluation of the answers and the competency of the graders.

Comparisons between the pre and post tests will be analyzed to determine whether the CT course significantly improved their test scores using a student's paired t-test. We will also compare scores from the other graduate students grouped by years in the program to determine whether years of training improve CT skills. An unpaired students t-test will be used for this analysis. Significance will be set at $P<0.05$.

Specific aim 2: To obtain student evaluation of the Critical Thinking course. At the end of the course, the graduate students will be given a mandatory course evaluation form with 10 statements and a numeric scale of satisfaction from 1 to 5. Overall course evaluations scores will be correlated to overall performance levels on the CAT using a multiple regression analysis. All graduate faculty participating in the class will review these results and student comments, to determine how improvements can be made to the curriculum.

Specific aim 3: To involve the Critical Thinking course's graduate faculty in the improvement and development of techniques to effectively teach critical

thinking skills. All faculty members teaching in the CT course will initially be given the Training Module CD offered by TTU to learn how to score the CAT. The course directors, will participate in the 2 day workshop held in October, 2009 by the NSF and the mini workshop at the Southern Association of Colleges and Schools (SACS/COC) meeting in December 2009 to be held in Atlanta. These meetings will allow our faculty to meet and discuss effective methods to teach CT skills with faculty from other institutions. In addition, the course directors, upon their return, will meet with other faculty teaching in the course to convey critical information gained at the meetings for improved teaching techniques. Meetings with course instructors will also be held to review the analysis of our scoring techniques of the CAT and the specific recommendations for improvement made by TTU.

Faculty members currently involved in the CT course are in agreement that CT skills are a necessary requirement in the training of biomedical scientists. We would like more involvement of the entire graduate faculty in teaching CT throughout the graduate curriculum, not only in a single course. We are proposing to hold 4 CT workshops at MSM throughout the year to recruit and involve more graduate faculty in teaching CT skills in their classes.

E) Dissemination Plans: Dissemination of the information gained through this project will be conveyed at both the institutional and national level. Specific aim 3, the faculty development piece, will allow course directors to interact on a national level with others utilizing the CAT. The NSF is supporting the effort to disseminate the CAT to "a diverse groups of institutions across the country" and through the national workshops will report the overall results of CT teaching. Faculty members involved in the workshops will then return to MSM and lead the CT workshops for other graduate faculty.

F) Human Subjects: If this project is funded, a protocol will be submitted to the Internal Review Board for approval of the assessment tool and subsequent analysis of the students' performance.

G) Timeline:

Task	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May
Purchase CAT	**X**											
Training CD to faculty	**X**	**X**							**X**	**X**		
CAT to new students		**X**									**X**	
CAT to other grad students				**X**								
Faculty CAT/NSF workshops					**X**		**X**					
Scoring of CAT			**X**								**X**	

Faculty in-house CT workshops		**X**				**X**			**X**			**X**
Student evaluations											**X**	
Final analysis of results												**X**

H) Sustainability: We are proposing to continue using the CAT instrument, analysis and workshops in the future if the results from this first year are measurable and significant. It is anticipated that funds for the continuation of this project will be incorporated into the graduate studies program budget.

I) References

1. Zerhouni,E. 2003. Medicine. The NIH Roadmap. *Sci.* **302**:63-72.

2. Costello,L.C. 2009. The effect of comtemporary education and training of biomedical scientists on present and future medical research. 459-463.

3. Halushka,P.V., and Krug,E.L. 2009. Is the training of biomedical scientists at a crossroads? 421-423.

4. Paul,R., and Elder,L. 2007. Consequential validity: using assessment to drive instruction. Foundation for Critical Thinking. 1-7nnovations in E-learning, Instruction Technology, Assessment and Engineering Education.

5. Stein,B., Haynes,A., Redding,M., Ennis,T., and Cecil,M. 2007. Assessing critical thinking in STEM and beyond. In *Innovations in E-learning, Instruction Technology, Assessment and Engineering Education*. M.Iskander, editor. Springer. 79-82.

Morehouse School of Medicine
Master of Public Health

2010 Recapitulation
Student Learning Outcomes

Public health students will demonstrate proficiency in concepts necessary for protecting and improving the health of people of color, minorities and other underserved populations through the following objectives:

- Knowledge of basic theories, concepts and models from a range disciplines that are used in public health research and practice.
- Knowledge of evidence-based approaches in the development and evaluation of health education and promotion science interventions.
- Ability to demonstrate sensitivity to varied cultural, ethnic and socio-economic backgrounds of individuals and groups, including but not limited to the following areas: education, health literacy, race, gender, age profession, political preferences, health conditions, religion/spirituality, place of origin, sexual orientation and lifestyle.
- Ability to describe and analyze alternative approaches for health care delivery, regulation, and financing at the national and international level.
- Ability to develop /enhance skills in proposal writing, budget preparation, and evaluation of health programs and activities.
- Ability to apply quantitative and qualitative research methods to health issues, including the design, implementation, monitoring and evaluation of health initiatives
- Knowledge of assessing public health systems and conducting evidence-based research built on the concepts of economic analysis, cost benefit / cost effectiveness analysis, financial risk analysis, and financial management and budgeting, to guide decision-making and management strategies.
- Ability to demonstrate an understanding of the principles and relationships between health system administration, health service delivery, program management and evaluation, organizational performance and quality, financial management, policy formulation, public health law interpretation and application, and community based initiatives and collaborations.
- Ability to demonstrate an understanding of data findings to make appropriate interpretations and inferences regarding health outcomes and risk factors
- Knowledge of adequate skills in data collection processes and analytical techniques to conduct research that is sound and ethical