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ESME Portfolio

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PERSONAL STATEMENT

Let me open this statement by sharing some of the key moments and events in my life that have helped define who I am, and thereby fulfill the personal statement requirement for the portfolio. I am, originally, a Moroccan woman. Being number four in a family of eleven, and the daughter of a noble Moroccan farmer and landlord, I was expected to acquire a minimal education, marry, and have a sizeable family – all males if possible. However, I soon became aware that there was more to life than learning how to take care of babies and manage a household. At the age of 14, my father made me understand that the route to success requires perseverance; that excellence cannot be discriminated against based upon gender; that the easy things in life are not worth obtaining; and that, more importantly, the key to success is knowledge. Against all odds, I graduated from high school with a scholarship, and went on to earn a Master's and Doctorate in Science from university in France. Upon returning to Morocco, in 1988, I was offered a college teaching position, which I occupied as a tenured associate professor until May 1994.

In August1994, I came to the U.S. to start a family. It was also an opportunity to learn English and hone my research skills. I spent the next ten years acquiring the language, writing research grants, teaching on ground and online, fulfilling the roles of wife and mother, and assuming the responsibilities of co-managing a home. In 2004, I had the good fortune to be hired by the founding academic dean of Touro University Nevada to teach biochemistry to medical students. In 2006, the same dean entrusted me with the responsibility of department chair.

I think that it is crucial for any effective educator to set goals for every teaching session, to be prepared to teach to these goals, and to know what one is expecting learners to know and understand. I am very passionate about teaching, and I try to make sure that students walk away, from every lecture, with a good understanding of the topic of the day. I encourage students to read before coming to class, as well as to indicate any questions they may have in the margins of their textbook pages, or within the PowerPoint slides. I also tell them that the questions should be addressed after I have lectured and discussed the topic with them in class. In case that does not occur, I encourage them, again, to ask questions, or if they are intimated by their classmates, to send me a message, or to stop by my office for clarifications. I fully support the open door policy established by my institution and make myself available to students at all times that I am not teaching.

I am a fervent advocate of technology, when it serves the purpose of better facilitation of teaching. I was the first in the chemistry department at the University of Nevada Las Vegas (UNLV) where I taught from 1996 to 2004, to prepare PowerPoints for every lecture, and to make them available, in advance, on WebCT. At Touro University Nevada (TUN), I was one of the first two faculty members that used the TuningPoint technology to make lectures interactive. Indeed, I intercalate, in the majority of my lectures, questions to keep students' attention and assess their understanding of the topic at hand.

I am known to be demanding, but fair. I believe in maintaining high standards through my teaching and assessments, thereby making students feel that they need to do their best, and more if their best is not enough. I try to inculcate ethical behavior, professionalism, assiduity, and perseverance. In their evaluations, students have indicated that they did better just because I told them that they could, if they worked harder. As a scientist by training, I keep myself abreast of the advancements of science, especially in the discipline that I teach. And, I update my lectures accordingly. I encourage students to always read peer reviewed papers, especially in the

area of medical diagnosis and treatment, as board exam questions tend to be related to current epidemiology issues, and hot topics in medical research.

Teaching, and education in general, were never been considered as being "fun" when I was pursuing my education in Morocco, as an undergraduate student, nor in France, as a graduate student. I definitely moved away from the stern way of teaching that my mentors had adopted, when I came to this country, and started teaching. My students think of me as entertaining and yet very serious. A witty remark, within context, here and there during the lecture is necessary to maintain the interest and relax the atmosphere when I know that students are thinking "And I am supposed to remember all this? How?" Creating an enjoyable learning environment should be one of the "good teacher" attributes. Teaching serious sciences does not require an intimidating learning environment.

Knowing that students in medical school tend to be very competitive in a selfish way, I foster collaboration between students by creating small group activities. I try to transmit my enthusiasm for science that explains the functions of the exquisite machine called "the human body" and I enjoy it when I see the light bulb come on. I motivate those whose grades indicate that they need motivation, and I inspire ambition in those who lack but can certainly acquire it. However, I make every effort to discourage domineering competition that expresses itself during small group sessions.

In the area of medical teaching, I believe in collaboration between basic science faculty members and those of clinical departments. I think that we should put our efforts together to make the dry sciences more relevant and therefore more "digestible" to students. I am planning on implementing this philosophy, gradually, in the new curriculum I have designed.

From my 20 years of teaching in three different countries and in three different languages, and before reading about it this past semester, I knew that the transmission philosophy of teaching is not the most effective way to impart knowledge and make lifelong learners of students. What I lacked was the scientific proof of this fact and the methodology and the savoir-faire to design a curriculum that would combine transmission, transaction, and transformation philosophies. I know now that I possess some of the tools, the knowledge, and methodology to make it work. I am also expecting that some things, as with during the implementation of any new curriculum, may not go as smoothly as hoped. However, I believe in the usefulness of assessments, feedback, and evaluations. I will make use of available technology to me to prepare and conduct surveys of both students and faculty members to ameliorate/improve my teaching.

In conclusion, despite the fact that I usually obtain, what others would define as, "stellar" student evaluations I keep tweaking my teaching methodology to better serve my students. I believe that there is no fixed technique for good teaching since medical education continues to evolve with advancements in technology, health care systems, accreditation agencies requirements, and in response to learners and community needs. The only constant thought that I keep in mind, is to prepare the medical students that cross my path, in the best way I can, by contributing, with dedication, my part in making of them outstanding physicians to serve, to lead, and to teach the community.

BACKGROUND

One of my roles, as the course director of the Introduction to Medical Biochemistry course, is to collect students' feedback, analyze it and act on it when possible. For the last four years, students have frequently complained about the way material is taught in a short period of time (five weeks). Given this condensed version of 45 hours of lecturing, students did not have the opportunity to deeply understand and retain the material. Moreover, students voiced their opinion regarding the lack of connection between the basic sciences in general and the clinical relevance of the material taught in the first year.

After taking the Essential Skills in Medical Education (ESME) course, I came to realize that there are competencies that each educator has to possess in order to be a successful. To try to implement some of these competencies, I designed a new curriculum for Introduction to Medical Biochemistry. In this portfolio, I will describe the steps I took to try to make this course a successful medium to impart knowledge in a way that focuses on the final product; the type of physicians that will graduate from this institution. I will therefore address the first themes of the ESME course: what should the learner learn, how should the leaner learn it, how can the learning be organized in a curriculum, and how do we know if the learner has learned it?

These four themes will illustrate the following ESME's competencies: Skilled Educational Planner, Effective Teacher, and Informed Assessor/Evaluator.

IV> Theme 1 – What should the learner learn? - Learning Outcomes

Outcome-based education was the focus of the lecture and the reading for this part of the ESME course. I made clear to the faculty participating in teaching this curriculum that it is a requirement to determine the learning outcomes and the performance indicators for every lecture in this new curriculum. Knowing what a medical student should know is the first step to being a skilled educational planner and one of the essential competencies any teacher should possess.

I tried to inculcate in my colleagues' minds the necessity to plan ahead what they want student to know and to be tested on. Based on the lecture and the handout material as well as additional readings regarding curriculum design and program development, there is an increased emphasis on outcome based education in medical schools. Therefore, we have come to the consensus that each of us has to identify learning outcomes and performance based indicators for the section we teach of the medical biochemistry course. The table below encompasses the result of our efforts.

	Week	Topics and Assignment Reading		Learning Outcomes	Performance Indicators
August	1	***Workshop 1 (3 Hours)*** Group A Friday 10-12 Group B Friday 1-3	Course Introduction Water, Acid, Bases, and Buffers Membrane Lipids	○ Define the properties of water and its functions in biological systems ○ Understand the role of water in the different compartments of the body ○ Understand the role of buffers in the body ○ Know the connection between the structure and the function of lipids ○ List the most commonly encountered fatty acids in humans ○ Describe how amphipathic/ amphiphilic cholesterol can be converted to a totally hydrophobic compound ○ Describe the difference between sphingolipids and other phospholipids	▪ Describe the process by which water acts as a solvent and thermal regulator ▪ Understand the role of osmolarity in water movement between compartments ▪ Cite the causes and consequences of excessive water loss ▪ Be able to cite the different buffers in the human body ▪ Explain the process by which strong and weak acids act on the pH ▪ Indicate the system that regulates intracellular pH ▪ Be able to explain how the structure of lipids determines their function ▪ List the essential fatty acids, and give their function and location in the cell ▪ Give the reason for cholesterol esterification ▪ Differentiate between passive and active transport

	2	***Workshop 2*** Group B on Thursday 10-12 Group A on Thursday 1-3	Amino Acids in Proteins Structure Function Relationships in Proteins Enzymes as Catalysts Regulation of Enzymes	○ Give the fundamental properties of the amino acids (aas) ○ Indicate the type of interactions aas can form ○ Define the four structures of a protein ○ Define the function of enzymes in biological systems ○ Understand the mechanism of enzyme action on chemical reactions ○ Cite six major classes of enzymes ○ Know the difference between holoenzymes and apoenzymes ○ Indicate what factors affect enzyme function ○ Define the mechanism-based inhibition ○ Describe how enzymes are regulated ○ Define allosteric activators and inhibitors and their mode of action ○ Define the rate-limiting step of a metabolic pathway	▪ Classify amino acids according to the polarity of their side chains ▪ List the four different forces of interaction that can exist between amino acid (aa) side groups ▪ Name and describe techniques used in protein separation ▪ Name the types of bonds involved in primary structure ▪ Name the types of bonds involved in secondary structure ▪ Cite the different secondary structures ▪ Differentiate between bonds formed in secondary and tertiary structures ▪ Name the interactions involved in tertiary structures ▪ Describe hemoglobin and collagen in terms of their quaternary structure ▪ Describe the effect of denaturation on quaternary structures ▪ List aas with alcohol, sulfhydryl, amide, and phenol side groups ▪ Name cyclic, aromatic, and branched aas ▪ Describe the catalytic function of an enzyme ▪ Name at least three enzymes catalyzing phosphorylation in different pathways ▪ Define a holoenzyme ▪ Describe the mechanism by which enzymes recognize their substrates ▪ List the functional groups involved in catalysis ▪ Explain how pH and temperature affect the efficiency of enzymatic reaction ▪ Explain the difference between the three types of enzyme inhibition ▪ Indicate how each type of inhibition affect the Km and Vmax ▪ Define feedback inhibition ▪ Give two examples of allosteric regulation ▪ Give the name of enzyme catalyzing a rate limiting step
	3	***Workshop 3*** Group A: Friday 10-12 Group B: Friday 1-3	Formation and Degradation of Glycogen Pentose Phosphate Pathway Cell Signaling Generation of ATP from Glucose: Glycolysis	○ Indicate the precursor of glycogen ○ Explain the mechanism of regulation in glycogen synthesis ○ Cite the key steps of the pentose phosphate pathways ○ Indicate the use of pentose phosphates in dividing cells ○ Name the conditions under which glycolysis can operate ○ Explain the process by which glycolysis is regulated	▪ Name the enzymes that are the site of glycogen synthesis regulation ▪ Indicate what substance induces glycogen synthesis or degradation ▪ Name the hormones involved in the regulation of glycogen synthesis or degradation ▪ Cite the products of a pentose phosphate pathway ▪ Indicate the consequences of Glucose 6-phosphate Dehydrogenase Deficiency ▪ List the three irreversible steps in glycolysis that must be circumvented ▪ Name the two reactions in which substrate level phosphorylation occurs in glycolytic pathways ▪ Indicate the consequences of lactic acid accumulation on functions of the body ▪ Explain why the rate of glycolysis is high in cancer cells

	4	***Workshop 4*** Group B: Thursday 10-12 Group A: Thursday 1-3	Gluconeogenesis and Maintenance of Blood Glucose Levels	○ Identify the steps of gluconeogenesis ○ Differentiate between gluconeogenesis and glycolysis ○ Starting with pyruvate, name the enzymes catalyzing the reverse of the glycolytic pathway back to glucose via gluconeogenesis	▪ Explain why gluconeogenesis and fatty acid oxidation occur simultaneously ▪ Indicate the importance of Cori cycle and Alanine cycle ▪ List the two enzymatic reactions required to reverse the pyruvate kinase reaction ▪ Name the cofactor required for the pyruvate carboxylase reaction ▪ Describe the allosteric regulation of pyruvate carboxylase ▪
September	**5**	***Workshop 5*** Group A Friday 10-12 Group B Friday 1-3	Tricarboxylic Acid Cycle Oxidative Phosphorylation Mitochondrial Function, and Oxygen Radicals	○ Indicate the importance of the TCA cycle in the metabolic pathway ○ Explain how the TCA cycle is regulated ○ Explain the connection between the TCA cycle and oxidative phosphorylation ○ Summarize the steps of ATP synthesis ○ List the components involved in ATP synthesis	▪ Give the steps where a form of energy is produced within the TCA cycle ▪ Cite the enzymes that are point of control ▪ List the substances that induce or inhibit the TCA cycle ▪ Explain the process by which they function ▪ Cite the products of the TCA cycle ▪ Restate the role of each component in oxidative phosphorylation ▪ Describe the process of regulation by coupling and uncoupling ▪ Name each disease, and explain the mechanism by which these OXPHOS diseases occur
	6	***Workshop 6*** Group B on Thursday 10-12 Group A on Thursday 1-3	Purines and Pyrimidines Metabolism Structure of Nucleic Acids (DNA) Structure of Nucleic Acids (RNA) DNA Synthesis	○ Recognize bases, nucleosides, and nucleotides ○ Describe the purine synthesis pathway and its regulation ○ List the disorders caused by enzyme deficiencies in the purine salvage pathway ○ Describe pyrimidine synthesis pathway and its principle difference from purine synthesis ○ Give the different ways by which this synthesis is regulated ○ List the different disorders resulting from the malfunction of pyrimidine synthesis ○ Discuss the use of pyrimidine synthesis inhibitors as anticancer drugs ○ Describe the structure and properties of DNA ○ Describe the structure and function of chromosomes ○ Indicate the functions of enzymes involved in DNA replication	▪ List five functions of nucleotides: urines and pyrimidines ▪ Name the first committed step in purine synthesis ▪ Explain why the purine salvage pathway is so important for the function of some cell types ▪ Discuss the consequences of HGPRT deficiency ▪ Indicate the consequences of the absence of lymphocytes in individuals with ADA1 deficiency ▪ Explain AMP deaminase deficiency results in muscle fatigue during exercises ▪ Cite the regulated steps in pyrimidines synthesis ▪ List two causes of orotic aciduria ▪ Indicate the consequence of deficiency in UMP synthase ▪ Describe the prevention and treatment of gout attacks ▪ Name enzymes inhibited by cancer drugs ▪ List different levels of DNA packing ▪ List the most common chromosomal abnormalities and their causes ▪ Cite the classes of DNA polymerases and their functions

	7	***Workshop 7*** Group A: Friday 10-12 Group B: Friday 1-3	Synthesis of RNA (Transcription) Synthesis of Proteins (Translation) Regulation of Gene Expression	○ Describe the differences and similarities between RNA and DNA ○ Describe the structure and functions of various RNA ○ Explain the importance of transcription in the flow of genetic information from DNA to protein ○ Identify the differences between eukaryotic and prokaryotic primary transcripts ○ Discuss the consequences of mutations in noncoding regions on the gene expression ○ Define translation ○ Describe the mechanism of transcription and sorting of proteins destined for delivery to different cellular compartments or secretion ○ Cite the advantages of regulating gene expression ○ Explain the mechanism of nuclear receptor action in the regulation of gene expression	▪ Cite three main types of RNA ▪ Explain the mechanism of small interfering RNA (siRNA) in posttranscriptional gene silencing ▪ Cite three eukaryotic RNA polymerases and the corresponding RNAs they produced ▪ Define the functions of template and coding strands in transcription ▪ Cite three major steps of transcription ▪ Describe the role of transcription factors in initiation of transcription ▪ Describe the structure of bacterial operon and corresponding polycistronic transcript ▪ Give examples of diseases resulting from mutations in noncoding regions ▪ Name the four main types of mutation ▪ List the properties of genetic code ▪ Name the four necessary components for translation ▪ Explain the mechanism of diphtheria toxin affect on translation ▪ List three antibiotics and their targets in translation ▪ Indicate the cause of I-Cell disease ▪ Name two mechanisms of regulation of gene expression in prokaryotes ▪ Explain the regulation of expression on the level of transcription using ferritin and transferrin receptor synthesis as examples.

	8	***Workshop 8*** Group B: Thursday 10-12 Group A: Thursday 1-3	Use of Recombinant DNA Technology in Medicine Classical Genetics Molecular Biology of Cancer	○ Define the function of restriction enzymes in recombinant DNA techniques ○ Describe the techniques for DNA synthesis, amplification, separation, and identification of its sequence of interest ○ Explain how the use of antigenic proteins in vaccines are safer than other types of vaccines used thus far ○ Describe the methods used in gene therapy ○ Define the terms commonly used in medical genetics ○ Explain how genes can cause disease ○ Draw the pedigree of a disease based on a given inheritance pattern ○ List some tools used in genetic counseling, and explain how they are used to help patients ○ Relate the importance of specificity and sensitivity of testing for genetically inherited diseases ○ Name three major types of tumors ○ Describe causes of cancer, as well as the properties of cancer cells ○ Describe three phases of apoptotic mechanism	▪ Differentiate between Genomic DNA and cDNA ▪ Delineate Southern, Northern, and Western blotting ▪ Describe the two methods for DNA amplification: Cloning and PCR ▪ Define DNA polymorphism, and explain how it can be used to diagnose a disease ▪ Cite the type of mutations resulting in polymorphism ▪ Identify the steps of detection of mutations by Allele-specific oligonucleotide probes and PCR ▪ Describe the process of "DNA fingerprinting" and indicate its usefulness ▪ Explain the use of DNA chips in genetically based diseases ▪ Cite some of the diseases that can be genetically explained through the use of DNA microarray ▪ Explain how some therapeutic proteins are produced ▪ Indicate when genetic counseling may be advised, indicating its primary goal for a prospective parent and/or fetus ▪ Give the advantages and disadvantages of both vectors in gene therapy thus far ▪ Distinguish between dominant and recessive genetic traits ▪ Describe sex-linked inheritance ▪ Differentiate between sex-linked and sex-limited or sex-influenced inheritance ▪ List some important inherited diseases, classify them as recessive or dominant, and give their characteristics ▪ List two groups of genes contributing to the development of cancer ▪ Name at least four major classes of oncogenes ▪ Describe the action of tumor-suppressor p53 to control cell cycle and apoptosis ▪ Describe the function of apoptosis ▪ Explain why failure of apoptosis to remove damaged cell can lead to cancer ▪ List the caspases involved in cancer initiation ▪ Describe the mechanism of a death receptor pathway ▪ Explain how mutations in a PDGF/Akt/BAD pathway can overcome apoptosis of cancer cells
	Teaching method: 1. Assigned Reading; **2.** Interactive Lectures Using Audience Response System In Lecture Hall; **3.** Small Group Study Cases, and **4.** Facilitation of Learning Group Discussions **Assessment:** ***Formative:*** Blackboard administered quizzes to test for individual and group readiness and understanding at each workshop; ***Summative***: **1.** A midterm on Monday, August 31st from 8 to 10 am **2.** Final exam during the second block exam **3.** Biochemistry Shelf-Exam will be administered after Spring Break. The score of this summative exam is under consideration to be included as a percentage of the BSF2 grade.				

V> Theme 2– How should the learner learn it? Basic Principles of FAIR

A. Context/Structure/Organization

The ultimate goal in this restructuring of the curriculum is to be an effective teacher using the basic principles of FAIR. Introduction to Medical Biochemistry takes place in the first five weeks of the first year of medical school. It has been a crash course consisting of 44 hours of transmission curriculum taught concomitantly with Gross Anatomy and OMM, and is followed by Basic Science Foundations (BSF). BSF includes more medical biochemistry, histology, and physiology taught in a system-based manner within a transmission curriculum. As course director, I am responsible for assigning parts of the course to the other two faculty members that share the teaching of the course with me. In other medical schools, such us our mother campus, Touro Mare Island, medical biochemistry is delivered in the form of team-based learning (TBL). As you can see from my instructional design included in the table above, my goal is to be FAIR to students. This involves the teaching of medical biochemistry through a transactional/ transformational curriculum, adopting a method very close to TBL without completely doing away with the lectures, but rather embedding them with thought provoking questions and discussions in both large and small group settings. The goal is to minimize transmission, and to maximize transaction and transformation curriculum.

1. Feedback

Students will be randomly organized in a learning group using Excel's data sorting. Groups will be listed on Blackboard on Monday. The learning outcomes and the performance indicators, as well as the PowerPoints slides, will be provided in the same manner at least 72 hours ahead of the scheduled workshop. Additionally, study cases and guiding questions for small group activities will be posted. Weekly announcements will remind students of the reading assignments and the individual/group tasks to be completed.

During the first ten minutes of the workshop a quiz will be given on Blackboard o test students for individual readiness. The same quiz will be then taken in a group. Feedback will be given to student by analyzing the questions and justifying the answers.

Students will assemble in groups of five or six to discuss cases before the discussion integrates the whole class. All three faculty members participating in the teaching of medical biochemistry will be available to monitor the discussion groups, and provide guidance and feedback where necessary. In some cases, an immunology, microbiology, histology, or physiology faculty member may be invited to clarify certain aspects of the case study and assist in teaching the patterns and processes of thinking critically. The final wrapping up of the discussion will be delivered by the faculty member responsible for the topic of the day

2. Activity

After the readiness quiz, students will be asked to discuss the clinical case that was posted on Blackboard, answer the questions and provide, in turns, a concept map of their results.

Additional key elements or information will be given as the discussion progresses. At the end of the workshop, another individual quiz will be administered. More details will be provided in the Assessment section below.

3. Interest or Individualization

Exploration of the different ways of teaching to reach all learners seemed at the moment out of the question when there is so much material to cover in a transmission curriculum. In this blended curriculum that I have designed, I can see posting a survey in order to find out about the learning styles of my students. This may help me become more effective in my teaching, although one cannot cater to all of the different learning styles out there. I don't see everyone, whether faculty or preceptor, changing his or her way of teaching so as to accommodate every learner. It is maybe part of the experience to learn how to learn from or through different styles. However, "individualization" is possible because students are given the chance during the interactive lecture and the workshops to compare their status to that or their classmates or group members. They can, consequently, organize their time to be at the level they desire to achieve.

4. Relevance

Being a basic science teacher, in a medical school, is being able to assist students in making the connection between the sciences we teach and the natural functions of the human body. It is sometimes difficult for students to conceptualize basic science as a useful subject in their education that goes further than the exams, allowing them to move into their clinical years. Consequently, I take it as my responsibility to make the connection for them early enough in order to engage them in doing more than memorizing factoids. Research in cognitive psychology has shown that when the connections between biomedical science and its clinical relevance are made by educators, these connections are more permanently imbedded in the medical learners' memory than those they develop on their own in order to facilitate the memorization of the overwhelming amount of information given during the two first years of medical education [43, 44,45].

The workshops are designed to make that needed connection. Each clinical case will illustrate a topic in medical biochemistry. For example the first case is about a pregnant woman without prenatal care and a past of alcoholism presenting with vomiting and hyperventilation, high anion gap and other abnormal blood values. This case illustrates the need for vitamins as cofactors to enzymes. We want the student to understand that the absence of cofactors prevent an enzyme, pyruvate dehydrogenase in this case, from functioning and consequently metabolite may accumulate causing serious ailment, specifically, metabolic acidosis.

VI> Theme 3 – How can the learning be organized in the curriculum?

A. The Plan

One of the most arduous tasks in applying the principles learned in the ESME course was to implement a curriculum with the SPICE model kept in mind. In order of students to be able to make the connection between the biochemical pathways and their regulation and the function of the body in health and disease, I plan to implement the following:

Where **X** represents where we want the curriculum to be and **O** represents where the current curriculum is.

Student Centered--------X------ ---------- O---------Teacher Centered

The current model is more teacher-centered, and I strive to make it student-centered. As indicated in the table above, learning outcomes and performance indicators are now clearly defined. An open door policy has been implemented at this institution, and students are encouraged to ask questions as they are preparing for the interactive lecture and workshop based on the assigned reading the material posted for them on Blackboard Learning System.

Problem Based---------- X ---------- O------Information gathering

I also strive to get away from just 'giving information', in other words, away from transmission curriculum to a more problem or clinical case based curriculum, also known as transactional and translational curriculum. Although the workshops I designed are not exactly TBL or PBL format, they contain the best of the two methods: they are based on clinical cases that illustrate the topic of the week, and students are given the opportunity to work as part of a team thereby learning from each other and developing their communication skills, professionalism, and ethical behavior.

Integrated Teaching---------- X---------- O--------Discipline /system Based

Although, this new curriculum will not be a completely integrative curriculum, it will not be a discipline or system based curriculum either. I plan to call on my colleagues in microbiology, immunology, physiology, pathology, and pharmacology as the need arises with the different clinical cases that will be used in the workshops.
The last part of SPICE (Community Based, Elective driven, and Systematic) are not applicable in this basic science course where cognitive knowledge is the primary component.

B. Educational Resources

Educational planning and strategies should be in place for the new curriculum to be successful. For this part, I consulted Kern et al (1998).

1. Personnel

All of the resources needed are already available except for the third faculty member that we are in the process of hiring for fall 2009.

Faculty: The three biochemistry faculty members will be present for every team teaching session. Each faculty member will be responsible for posting a PowerPoint that includes the assigned readings, learning outcomes, performance indicators, and a case study illustrating the material covered. In addition to the scenarios, the case study will include learning outcomes and guiding questions to be covered in a group (chosen randomly by the course director) setting before the scheduled weekly workshop. The lecture hours have been decreased, and those hours will be

replaced by workshop sessions. Faculty will be given time to adjust their lectures to the new transactional/transformative curriculum format.

Administrative Assistant: There are two administrative assistants in the Basic Sciences Department. One works specifically with first-year students. Her job will be to make photocopies for the workshops and schedule classrooms. These are responsibilities that she is already familiar with, and which she does very efficiently.

2. Time

Since the course will be three weeks longer than it has been for the past five years, I had to work with the Scheduling Subcommittee in order to accommodate these hours. There will be no additional hours, as each lecture hour we are planning to remove will be replaced with a two-hour workshop/lab session. The course, however, will be spread out more evenly rather than being offered as a crash course condensed into five weeks.

Faculty may use the published study cases, or they may be given the time to create a case that fits their learning outcomes. Care should be taken so as not to overload the faculty with administrative responsibilities until the curriculum is well established.

3. Facilities

We will be using the Interdisciplinary Lab, or one of the six classrooms that can hold half of the class (67 students), in order to ease formation of the groups. I have been reassured by the Associate Dean and the Department Chair that the required space will be available, especially at the beginning of the school year.

4. Equipment

There will be no additional cost to implement these changes, as the school already has a Blackboard Course management system allowing for dissemination of the material prepared by faculty, and for administration of the quizzes. Students are usually given a training session by the IT Department during the first three days of orientation. A video recording system has just been installed to allow students to view or review the lectures and class discussions on their laptops and iPods, if they so desire. The Audience Response System, TurningPoint, has been in use for the last two years, and it will be used to administer the group quiz, discuss the results, ask questions during the lecture as a means of assessing student understanding of the material presented, and take advantage of any teaching opportunities.

5. Funding

No additional funding will be required, as all resources necessary to bring this project to fruition have been budgeted for (i.e., additional faculty member), or are already available.

C. Support

The only support needed for this course is internal support. As mentioned above, this course has the support of the Associate Dean for Curriculum and Academic Affairs as well as that of the chair of the Basic Sciences Department. The Curriculum Committee has approved the implementation of this new curriculum, and the Academic Dean is expected to sign the Curriculum Committee's letter of recommendation soon. Since the Dean is very supportive of any initiative to take the curriculum from a transmission to a transaction and transformation format, he will undoubtedly champion this curricular change.

D. Curriculum oversight

1. Administration of the curriculum:

Being the course director, I will be responsible for a smooth transition to this new delivery of the medical biochemistry course. There will be ongoing communication with colleagues at the Touro Mare Island campus, where a total curriculum change has been implemented over the past two years.

2. Communication

A weekly meeting with the faculty involved in teaching this course, the Department Chair, and the Associate Dean will be scheduled to discuss any problems or concerns students may have expressed in order to make the necessary adjustments to address them. Although the technology is supposed to work smoothly, regular verification of the setup may be required by the IT Department, and frequent updates will be communicated to all concerned.

E. Barrier

1. Faculty Inexperience

As indicated above, although the faculty members have been accustomed to the transmission curriculum, faculty development sessions and meeting rehearsals will bring the majority up to speed so that they feel comfortable with the transactional and transformative curriculum or FAIR principles.

F. Introduction

This new curriculum is scheduled to be fully implemented in August 2009. It is imperative that we succeed in showing that an early connection between Basic Sciences and the practice of medicine is the key to a successful transformational curriculum. We also hope to show that empowering students to be engaged in their own learning is not only beneficial but is the only way to make them lifelong learners. Used as a pilot for the remaining courses of the Basic Science Foundations (physiology, histology, pathology, pharmacology, microbiology, and

immunology), this change in curriculum may ultimately encourage others to follow suit, thereby bringing the transition to transactional and transformational integrative, competency-based curriculum at the level of Touro University a little closer. We are aware of the fact that things will need some tweaking, and even some major modifications, as the implementation is taking place, but we are convinced that the only way to achieve perfection is to get the process underway so that we can make progress towards the ultimate goal.

VII> Theme 4 – How do you know if the learners have learned it?

This last theme addresses the most crucial competency of an educator, that of: skilled assessor or evaluator. Adequate assessment instruments are put in place to find out whether the learning outcomes and the performance indicators have been met.

a. Formative

The assessments given in class using the Audience Response System will provide formative student assessment. When the majority of students do not correctly answer one or more questions posed during the lecture, they will be given feedback that entails going back to the point of the instruction and reiterating or emphasizing the concept of the information. The quizzes given during the weekly workshop will also serve as the basis for a formative assessment. The first quiz is set to assess the readiness of individual students. The second one is, in fact, the same as the first one. The only difference is that this time it assesses the readiness of the group of students as a whole as they will be given time to engage in discussion before answering the question. The last quiz will be related to the information given in the case studies. Students will be given feedback as the discussion progresses. Under this section, faculty could gather clues as to the reasons behind a lack of good performance by students. Our aim, at this point is to evaluate the methods we are using to facilitate learning. The most difficult aspect of student evaluation pertains to professionalism. We are thinking of not only relying on observations of student behavior during class time and the weekly workshops where they are called upon to work in groups, but also on the weekly peer review that each student has to complete on each group member. The gist of the peer evaluation will be communicated to the concerned party in an effort to rectify the behavior prior to the end of the course.

The analysis of the data by the Director of Instructional Research will assist in identifying students to be referred to the Office of Academic Services and Institutional Support (OASIS) so that they can be set up with a tutor. They will be offered guidance and counseling, as well as assistance in improving time management skills.

b. Summative

The midterm and the final exams will be considered summative assessments, as they will evaluate an individual student's qualifications in terms of passing the course. Although the grade for both midterm and the final examinations are considered final, students will be given the

opportunity to have an exam review session. This review, which takes place in the lecture hall in the presence of the entire participating faculty, will allow them to see what they have missed, and will help determine the reason for their failure to find the correct answer. It is also an occasion to appeal questions that were either badly worded or misleading. The last point is helpful in evaluating faculty skills in writing valid questions, thereby allowing for improvement in this area of assessment.

As with the formative assessment, the summative assessment will be used to identify, early enough in the year (this course takes only the first eight weeks), students that are in need of assistance. Tutors, as well as electronic resources available to students via the virtual library, will help bring students up to the required level.

Planed Summary of Assessments and Evaluations

Component	Instrument	Description	Reviewer	Schedule
Individual Readiness	Regular formative assessments based on learning outcomes and performance indicators	The first quiz is set to assess the readiness of individual students.	Course director and student promotion committee	Weekly
Group Readiness	Regular formative assessments based on learning outcomes and performance indicators	The second one is, in fact, the same as the first one.	Course director and student promotion committee	Weekly
Learners' Performance	Summative exams based on learning outcomes and performance indicators	Students will be given a midterm after four weeks of instruction, and a final exam at the end of the course. Item analysis of the par scores will indicate the weak points of instruction and comprehension	Course director and student promotion committee	Midterm and Final, as well as biochemistry shelf exam
Professionalism and Communication Skills	Direct observation by faculty, peers, and staff	Feedback from faculty and peers will be sought regarding student interactions and behavior during group discussions	Course director and student promotion committee	Weekly
Unintended Outcomes	Analysis of results after implementation	Comparison between before and after implementation will be performed related to student attendance, performance, etc	Dean, Department chair, course director, and curriculum committee	End of the course

V. Reflection on the Lessons Learned

By undertaking the design of a curriculum where I could implement the different competencies of ESME course, I have learned so much about curriculum design and assessment tools that I couldn't include in this portfolio. I will share in this final part my thoughts regarding this process and how I plan to make it successful.

A clear understanding of its goals and mission is paramount to the curriculum's success. All of the stakeholders must be involved and committed to its enhancement. In order to ensure this, each participating element must be evaluated to determine the need for change, enhancement, and maintenance.

The written curriculum must be congruous with the curriculum being taught. Direct observation of the curriculum as it is implemented within the classroom would be one of the means to ensure congruence. The resources provided must be efficiently used. We must determine whether students are reading their textbook. This could be easily determined by studying the performance on the quizzes assessing for readiness (IRAT). We can also verify whether they are accessing the video streaming system by accessing the systems records where the frequency of access is recorded. Whether students are meeting with their group members before each workshop can be determined by examining the scores of quizzes assessing group readiness (GRAT). We must also determine whether the faculty members understand the goals and objectives of the curriculum, have complete mastery of the methods needed to teach to the learning outcomes, and have instilled the importance of a cooperative learning experience in the minds of their students. The faculty evaluations will be designed to address these concerns. We must also demonstrate whether they are reliable in performing their curricular responsibilities. To this end, we must make ourselves accessible to the learners. In this case, the open-door policy of the school must be a functional reality, as an open door to an office with an empty chair is a mockery of the policy. Additionally, faculty members should be evaluated. Evaluation results should be addressed effectively so as to make sure that the learners receive the assistance and the information they need. They should be asked appropriate questions, and should be given timely feedback in the case of formative assessment. Also, given the short duration of this course, a close look at the scheduled content material to be covered will reveal whether we need more time to fulfill our goals. Care should be taken to make sure that what is evaluated is useful and relevant to the goals to be attained by the curriculum.

Again, we can only assess for cognitive knowledge in a basic science discipline. However, having made the effort to create activities that would help with the understanding and the logical retention of the material, we should obtain better results than those obtained with the previous curriculum based on providing information only.

Based on the results and with the assistance of the Director of Institutional Research, we will evaluate the curriculum and its delivery using a survey. A well-conceived evaluation of the learner and the curriculum will indicate which of the outcomes or performance indicators were not met. Discovering the reasons behind any unfulfilled goals will allow for improvement of the curriculum itself and/or the method of its instruction and implementation. Evaluation of students' achievement could be a valid indicator of both the effort made by students to learn and that made by the faculty to motivate those students to learn. The accrediting agencies (AOA and WASC) usually require documenting the reason for any modifications made to the curriculum as well as documentation pertaining to student accomplishment under this curriculum. Evaluations will be designed to fulfill these requirements, and should be designed so as to address any concerns the stakeholders may have. Finally, the evaluations are to be used for the purpose of oral communication in conferences and publication in journals that specialize in medical education.

The life of the curriculum should be sustained by means of regular evaluations and the implementation of curriculum improvements. The curriculum should be responsive to the needs of learners as expressed by both formal and informal feedback. A stagnant curriculum is doomed no matter how well it has been planned and maintained. If it is to avoid obsolescence, a curriculum must evolve in response to the emerging needs of its learners and faculty, as well as

the development of new technology. It must also respond to ever-changing health problems and social needs. The academic dean usually addresses these changes during the monthly faculty council meeting and at the annual faculty retreat.

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