

**** Award Finalist**

DEVELOPING CASE-BASED ASSESSMENTS TO INTEGRATE BASIC AND CLINICAL SCIENCES AND IMPROVE PERCEIVED RELEVANCE OF TAUGHT MATERIAL

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Students find it difficult to see the relevance of, and have trouble integrating, some of the basic science course material when taught in isolation from the clinical courses. Integration of disparate material is perceived to be a challenge and this problem is compounded by assessments in which a single discipline is tested at a time – mostly in a multiple choice format. As assessment has been shown to strongly affect student learning, and as it has been shown that clinical cases can help students associate course material with “real” patient situations, it was decided to change the assessment methods in the first two years of the chiropractic program at CMCC into a case-based, integrated format. Instruction in the first two years at CMCC has therefore been divided into 4 modules per year, each having a distinct theme. Assessment occurs at the end of every module. This poster describes the development of integrated assessment theory papers, each having four cases reflecting the overall modular theme. The development of common cases to serve the needs of various disciplines is described. Faculty from various disciplines then develop and link assessment questions relating to these “real life” cases. Following this, questions are strategically placed under the various cases. Peer review of the entire integrated theory paper is then done for quality assurance. The integrated assessments had large resource implications. However, student satisfaction has improved and no complaints about relevance or integration were received through various quality assurance methods involving student feedback.

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DOES THE CONTENT EXPERTISE OR TUTORING SKILLS OF THE TUTOR AFFECT STUDENT EXAM PERFORMANCE IN A PBL CURRICULUM?

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A potential weakness of small group PBL curricula that use tutors with varying skills and expertise is the possible variation in the experience of the students in each tutor group. The pre-clerkship curriculum at Southern Illinois University employs a backbone of small group PBL cases. A limited number of large group lecture/discussion sessions and other curricular methods such as student self-assessment questions are used to augment the PBL sessions. A multidisciplinary curricular unit entitled “Hematology, Immunology and Infection” begins the second year curriculum. Basic scientist tutors are drawn from the disciplines of Microbiology, Immunology, Pathology and Pharmacology. Clinician tutors in the unit are Infectious Disease sub-specialists. At the completion of the unit a multiple choice question (MCQ) exam (ca. 200 questions) is administered covering aspects of Microbiology, Immunology, Pharmacology, Pathology and Infectious Disease. We have analyzed overall MCQ exam performance and performance on MCQ’s from each discipline as a function of each tutor group and the discipline expertise of each group’s tutor. The results from four years experience (290 students) indicate that there are no significant differences ($p < 0.05$) in overall student MCQ exam performance or in student MCQ performance in any discipline that could be attributed to the tutoring skills or content expertise of each tutor. These results are likely to be due to features of the curriculum that have been instituted to equalize student exposure to the curricular objectives.

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**A CLOSER LOOK AT STUDENT REASONING WHEN ANSWERING
SELECTED MULTIPLE CHOICE QUESTIONS**

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A reality of undergraduate education in medicine and the health sciences is the use of multiple choice questions for summative evaluation. This study explored student reasoning when answering multiple choice questions by extending the question format to include a Part B in which students were asked to provide written justification for answers selected in Part A. Two student populations and two exam structures were included in this study. The first exam involved a question on lung ventilation for which 173 first year students were required to answer *both* Parts A and B. The second exam involved 110 third year students studying blood physiology; these students had to answer Part A, a multiple choice question about Rh factor, but could *choose* to answer either Part B or an entirely different question. It is proposed that the provision of an option for Part B in the second exam may have selected for those students who are more confident that they picked the correct answer in Part A. With regard to lung ventilation, 53% of students answered the multiple choice question correctly, but of those students just 23% were able to fully and correctly justify their choice. Interestingly, 17% of students who selected the correct multiple choice answer could not obtain even partial credit when attempting to justify the choice they had made. With regard to the Rh factor question, 65% of students answered the multiple choice question correctly and within that subset, 61% (50 students) chose to answer part B. Correct reasoning was shown by 46% of those 50 students while 10% of students were completely unable to justify their answer, despite having selected the correct response in part A. Perusal of student written responses provided valuable information regarding common student misconceptions that can be addressed in subsequent lectures and can also be used for the development self-testing exercises that promote improved student comprehension of physiological processes and their regulation.

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AN EVALUATION OF GRADING POLICY IN A FIRST YEAR BASIC SCIENCE COURSE

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At the Marshall University Joan C. Edwards School of Medicine, the first year basic science courses are anatomy, biochemistry, cell biology, histology, neuroscience, and physiology. Each course sets its own passing grade, which is 70%, except for anatomy (73%) and histology (72%). It is not known if the current grading policies in these courses reflect performance on the NBME Step 1 exam, in that those students who pass, even with a low grade, will pass Step 1 the first time. The goal of this project was to determine if those students who had a low passing grade (70-75%) in a first year basic science course had an increased risk for failing the Step 1 exam. The physiology course was chosen as an example. The physiology grades were divided into failing (<70%), low passing (70-75%), passing (76-79%), and high passing (>80%). The number of medical students who received each of these grades from 1998-2004 and failed Step 1 the first time was determined. This was compared to the total number of medical students who received each of these grades during this time period. Of the students who failed physiology, 12% failed Step 1. Of those students who had a low passing grade, 26% failed Step 1. Of those with a passing grade and a high passing grade, 11% and 6% failed Step 1, respectively. These data indicate that those students who passed the physiology course with a low passing grade are at the greatest risk for failing Step 1. The data also provide support to change the grading policies in the first year basic science courses by raising the passing grade.

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STUDENTS' SELF-ASSESSMENT AFTER PRAGMATISM OF PBL IN EMERGENCY MEDICINE CLERKSHIP

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Background: PBL has been implemented in many medical schools around the world, and there have been several recommendations and guidelines pertaining to student assessment in PBL. Self-assessment is one of the instruments used in PBL settings. **Aim:** To study the assessment in PBL tutorials after the pragmatism of emergency medicine clerkship by students' self-assessment. **Methods:** 47 6th years medical students filled in a questionnaire after their emergency medicine clerkship and rated 10 parameters for their abilities in PBL tutorials. Evaluating self-assessment included their behaviour and perceptions on PBL tutorial process using a Likert-type rating scale. **Results:** The analysis revealed that students rated themselves as having higher average scale in all parameters included "overall rating" for their abilities in PBL tutorials process. "can participate actively" is the parameter that students rated the highest score. The scores for rated themselves were lower in "be stimulated interest in learning and produced a positive group atmosphere". **Conclusions:** These results suggest necessity of adopting different strategies for improvement in PBL tutorial process and have direct implications for faculty development. **Take-home messages:** Self-assessment is one of instruments used in PBL settings that can reflect and evaluate the progress of the students in PBL tutorials.

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STUDENTS' OPINIONS AND SCORES IN A COMPREHENSIVE OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE)

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Before Thai Medical Council introduce objective structured clinical examination (OSCE) as part of comprehensive examination for certification of medical license, we would like to study the students' opinions on many aspects of this examination and their scores. The students were group according to their scores into the upper half and lower half group. Their opinions came from their self-administered questionnaires. There were 51 out of 56 students got higher score than the minimal passing level of 60%. All of the students agreed that the examination covered wide range of knowledge and 85.7% felt that tasks were consistent with the actual curricula they were taught. This OSCE induced stress to 60.7% of the students and the upper half felt more stress than the lower half group. However, the 38.3% of upper half accepted that OSCE induced stress less than another type of examination compared to 28.6% of the lower group, and 35.7% of the upper group need more time for each station compared to 18.5% of the lower group. From these findings, we found that even though OSCE is one of the best way to assess the students competency, it induced a lot of stress to the students and the better competent students got more stress.

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COMPARISON OF CLINICAL SKILLS CENTERS IN THE UNITED STATES AND RUSSIA: THE EAST CAROLINA UNIVERSITY/KAZAN EXPERIENCE

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A collaborative effort between East Carolina University in Greenville, North Carolina, USA and Kazan State Medical University in Kazan, Russian Federation produced the first dedicated Clinical Skills Center in Russia. The clinical skills center opened in 2004. This poster will describe the events leading up to the establishment of the center in Russia, and the progress that has taken place over the past two years. This poster presentation includes analysis of strengths, weaknesses and opportunities of an international collaboration, as well as a comparison of the two programs as they exist now.

International collaboration is expanding in the clinical skills assessment and education arena. Similarities in student and patient populations were explored prior to the collaboration. Differences in the medical school models exist. This poster will examine the similarities and differences between the curriculums and clinical skills teaching and assessment at two International sites.

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PROGRAM EVALUATION: FRAMEWORKS FOR ASSESSING EDUCATIONAL EFFECTIVENESS IN THE BASIC SCIENCES

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Evaluation is a systematic process of data collection and analysis to examine and report the status of activities, achievement of goals or expected outcomes, and/or the merit or value of courses associated with a project, program, material, or process. The application of program evaluation models for examining the effectiveness of courses or curriculum are guided by questions or expectations important to key stakeholders (e.g., faculty and students). The evaluation process identifies what needs to be measured, how measurement occurs, and how evaluation results will be used. Evaluation results might define content, teaching/learning processes, curriculum sequences and responses to political influences or the “hidden curriculum”. Two common models will be highlighted: Stufflebeam’s CIPP model for program evaluation (Context, Input, Process, and Product) and Kirkpatrick’s model for evaluating training effectiveness (reaction, learning, performance and impact). A set of standards for evaluating the quality of program evaluation studies, established by the Joint Commission on Educational Standards includes criteria within accuracy, proprietary, feasibility and utilization standards. The poster uses a graphic display of program evaluation standards, to illustrate how the CIPP and Kirkpatrick models can be effectively applied to evaluating medical sciences. Example program evaluation question processes may include: What are the goals or expected outcomes? What needs to be measured and how? What are valid and reliable sources of data? Who owns the data? Who has access to evaluation results and how will results be reported? What data methods can be practically applied? What internal and external factors might influence evaluation processes? This proposed poster is designed to complement the focus session on program evaluation that is on the program.

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SCORES FROM DIFFERENT SKILLS IN OBJECTIVE STRUCTURED CLINICAL EXAMINATION

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It is obvious that the test with too difficult question or too easy question will not differentiate the students in their knowledge or skills level. We try to analyze the test in objective structured clinical examination (OSCE), which required many type of skills to respond the questions, using scores from the test. The students were group according to their grade point average (GPA) into upper1/3, and lower1/3. The middle1/3 was not used for this analysis. Data from the study showed that the highest scores was found in physical examination skill of the upper1/3 group and was significantly different from the lower1/3 group (p-value=0.0231). Scores in clinical skill, and communication skill from the upper1/3 group were also higher and significant different from the lower1/3 group (p-value=0.0100 and 0.0105). In X-ray interpretation skill, scores from the upper1/3 group was higher but not significant different from the lower1/3 (p-value=0.1786). Compare to another type of skill; mean scores from X-ray interpretation skill was lower. The overall scores for this test was also significant different between the upper1/3 and lower1/3 group (p-value=0.0019). These findings suggested that the questions in physical examination skill, clinical skill, and communication skill may differentiate the students in their skills.

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CONFIDENCE BASED MARKING IN A MEDICAL PHYSIOLOGY COURSE

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Confidence Based Marking (CBM) encourages students to think more carefully before answering MCQs (www.ucl.ac.uk/lapt). CBM scores tests according to the students' level of confidence (LC) in each answer; i.e., 1 (not sure), 2 (fairly sure) and 3 (very sure). Points per question are 1, 2, and 3 if correct and 0, -2, and -4 if incorrect. Students are rewarded for knowing what they know and for what they don't know and punished for being under or over-confident. CBM which gives less credit to a correct answer based on guessing. CBM is valuable training for medical students who later must choose correct diagnoses and treatment. The school benefits by identifying misconceptions in the curriculum; i.e., test items where many students are confident in the wrong answer.

We employed CBM in formative tests of physiology concepts in a 2-semester course. Students worked in teams of 8 – 10 students to answer 10-question quizzes. Immediately prior to the first CBM session students were instructed on the meaning of the confidence levels and how they would impact their score. Considering these were formative tests, compliance with CBM was sufficient to provide pilot information on its value and use. However, we feel that CBM has its greatest impact if test results contribute to the final course grade. Adding CBM did not require additional time per question. Results for most physiology areas show higher CBM scores than raw scores. The next phase of the study will follow individual performance to test the hypothesis that CBM scores will improve from semester 1 to 2 as students learn to more carefully assess their knowledge base.

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**GENDER PLAYS NO ROLE IN STUDENT ABILITY TO PERFORM ON
COMPUTER-BASED EXAMINATIONS**

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The purpose of the study was to see if there is a difference in performance when students switch from traditional paper-and-pencil examinations to computer-based examinations, and to whether there are gender differences in student performance in these two examination formats. The study involved first year medical students at the University of Illinois at Urbana-Champaign over three Academic Years 2002-03/2003-04 and 2003-05. Comparisons of student performance by overall class and gender were made. Specific comparisons within courses that utilized both the paper-and-pencil and computer formats were analyzed. Data was analyzed utilizing Single Factor ANOVA and various Two-Sample Assuming Equal Variance t-Tests. The overall performance scores for students among the various Academic Years revealed no differences between on exams given in the traditional pen-and-paper and computer formats. Further, when reviewed specifically for gender differences in performance between these two testing formats, none was found. The author concluded that the format for examinations in the courses analyzed does not affect student performance. We find no evidence for gender differences in performance on exams on pen-and-paper or computer-based exams.

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DOES LEARNING STYLE AFFECT TEST-TAKING BEHAVIORS?

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As computerized exams become more commonplace in the medical curriculum, possible effects of learning style on test-taking behaviors are more easily tested. The Stritch School of Medicine has developed web-based applications for high-stakes exams, which include event logs of individual student actions while taking exams. For this study, logs of 45 randomly selected students were analyzed from a mid-term exam in their freshman anatomy course. We found considerable variation in the number of times students checked questions for later review and in the number of changed answers. The tendency to change answers from wrong to right was about 3 times greater than changing answers from right to wrong. In order to examine possible associations with learning style, log data were sorted according to the Myers-Briggs (MBTI) types (e.g., E vs. I) and Kolb's Learning Style Inventory (LSI). The MBTI Perceiving/Judging dimension had the strongest association with Judgers showing a greater tendency to re-check questions and to change answers marked for review. The Kolb's LSI revealed differences in the frequency of marking questions for review with Convergers showing the greatest frequency. Our study demonstrates how event logs can be used to collect objective and reliable data on test-taking behaviors. These results to date suggest that differences in test-taking behaviors are associated with student learning styles.

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A NOVEL MEDICAL STUDENT EXAMINATION QUESTION APPEALS PROCESS: THE COMMITTEE HAS SPOKEN!

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The College of Medicine, UAMS is in the first year of an integrated sophomore organ-system curriculum. Reorganizing the student examination question appeals process so that it is student driven is part of the curriculum restructuring. The class is responsible for establishing an Appeals Committee composed of their classmates and for determining its structure (i.e., size of the committee, selection of members, length of service of each member, etc.). The Appeals Committee has sole authority in establishing guidelines for what constitutes a “reasonable and appropriate appeal.” The Committee receives all appeals for inhouse examinations and either accepts or rejects them based on merit. Within 72 hours of reviewing the exam, the committee submits a concise professional statement to the respective course director for consideration. The Appeals Committee decides on the format used to present appeals. Medical student disagreements with the appeals process are addressed only by the Medical Student Appeals Committee. The Appeals Committee rejects appeals that are simply “formal complaints” that a question is too difficult, and the rare immature or vitriolic appeal. The sophomore Course directors and the committee members stated that the overall timeframe for the process was lengthy, but their time was used efficiently. Growing pains were an initial problem, but in time all parties were accustomed to the process. Key points from the committee’s perspective: 1) more consistency across courses; 2) firm guidelines from the beginning; and 3) merit of appeals should be determined by faculty and not the committee. Key points from Course Directors’ were: 1) appeals were fewer with better supporting evidence; 2) appeals could be easily forwarded to other faculty members for consultation; and 3) committee members should determine merit. While this last point appears to be an area of disagreement between the two groups, clarifying appeal inclusion guidelines will likely provide a resolution. As the examination questions have been subject to comprehensive faculty review prior to submission for an exam, our students are aware that the appeals process is a privilege and not a right, and importantly that the process is inherently educational. We believe that this process is a novel approach for examination appeals and one which holds the students responsible for professional and mature interpretation of the material presented to them.

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THE EUROPEAN CREDIT TRANSFER SYSTEM AS THE TOOL FOR EVALUATING STUDENT WORKLOAD: THE CASE OF MEDICINE COURSE IN THE FACULTY OF MEDICINE OF THE UNIVERSITY OF PORTO (FMUP)

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The European Credit Transfer System (ECTS) was set up as a scheme within the framework of the Erasmus program (international mobility). The ECTS is a student-centred system based on the student workload, to achieve the objectives of a program of study which has to be specified in terms of learning outcomes and competences. The objective of this study is to present the results obtained in a work developed in the FMUP – 2004/2005 – dealing with student workload in the different disciplines of the program of studies. 879 students answered a questionnaire focusing the number of study hours per discipline which were needed to succeed. The results show: (1) in general, the student workload increase along the medical course; in the basic years (1st-3rd) this value ranges between 13.01 (IC95%, 11.74-14.28) to 12.88 (IC95%, 11.26-14.51), being significantly different from the value determined for the 4th year (mean, 16.16; IC95%, 14.55-17.76) and 6th year (mean, 17.46; IC95%, 14.73-20.2); (2) specifically, a significant difference is found between the basic and clinical cycles. Taking into account these results we can conclude that the major student workload is centred in the clinical cycle, namely located at the 4th and 6th years.

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