

**POSSIBILITIES OF A COMPREHENSIVE STUDY OF THE PELVIS USING MULTIMEDIA TECHNOLOGIES**

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Problems associated with the injuries of the pelvis would include “early” problems as fractures of the pelvis, rupture of the organs located there, injury of vessels associated with bleeding, lesion of neurogenous structures including the vegetative plexus and postoperative infections. After resolving the “early” problems and a seeming cure, the patients may face disorders of the continence of urine and stools, persisting pain and disorders of the sexual functions. Therefore it is necessary to consider carefully the potential consequences of the injury of the pelvis as early as during the primary treatment. Based on this finding, we have established CISP, allowing the students to study the pelvis as a functional unit requiring a multi-disciplinary approach to the therapeutic process. An educational programme has been developed using the multimedia concept that comprises modules focused on both developmental and acquired diseases of the orthopaedic, urologic, neurological and surgical nature, the interlinkage of which allows students to get a comprehensive picture of the problems of injuries in the region of the pelvis. Final tests will assess both the quality and quantity of the information acquired by students during the study. The educational process offers also the possibility of transmission of surgeries from operating theatres. An integrated approach to the injuries of the pelvis incorporated in the pregraduate education will contribute to a comprehensive therapeutic approach of physicians to this type of injury in the clinical practice.

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**HANDS-ON TEACHING OF THE CRANIAL NERVES AND THEIR FORAMINA USING AN EVO-DEVO SYSTEMS APPROACH**

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An evolutionary developmental approach to teaching gross anatomy offers the advantages of imparting process and pattern to a student's learning and counteracts rote memorization without understanding. Anatomical segmentation of the head and neck is a powerful paradigm for learning. We constructed a detailed model of articulated individual cranial bones with all foramina patent for the 12 cranial nerves and their branches. A teaching module that uses this model with color-coded bristles for self-directed learning is presented. Cranial nerves and their branches can be understood segmentally, I through XII, rostral to caudal, via the structural organizing concepts of somitomeres, pharyngeal arch nerves, somites, pretrematic branches, and related ganglia. The bony foramina of the skull provide a concrete and tangible framework to the nervous system of the head and neck which can be explored with the appropriate color-coded bristles. An understanding of the underlying osteology imparts an appreciation of the soft-part anatomical patterns of the head and neck that the student subsequently encounters in the gross anatomy laboratory. This skull model is also adaptable to teaching and learning exercises for other systems, such as the vasculature of the head and neck.

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**DEPARTMENTAL SEMINARS: EDUCATIONAL OR ADVERSARIAL?**

*Carol-Ann Courneya, Ph.D., University. British Columbia, Vancouver B.C, CANADA V6T 1Z3*

Regular departmental seminars are the hallmark of basic science departments. Most consist of data-rich Power point presentations given by a visiting or local researcher to an audience made up of graduate students, post-doctoral fellows and faculty members. Regular attendance at these seminars is generally an obligation for graduate students, and often a tacit expectation for post-docs and faculty members. The goal of these seminars is “To provide talks on a variety of cutting edge research topics given by experts in the field” . In essence this is an invitation to learn. Good in theory, however a recent series of focus groups conducted with post-docs, faculty and graduate students revealed that most seminars 1) do not include a general introduction or link to the “big picture”, 2) are suffused with un-defined jargon, and 3) are pitched to content experts only. In part this is because from the faculty perspective, seminars are often seen as an opportunity to impress colleagues with the breadth and full extent of their work, and are not seen as an opportunity to teach. Another impediment to learning during seminars was revealed in these discussions, and centered around the perceived existence of a culture of intimidation, where the graduate students post-docs and some junior faculty are afraid to ask questions which might expose them as stupid, or to not know the fundamentals. This is an increasing problem in large (merged) departments where a variety of disciplines are represented and no one is a content expert in all fields. Details of these focus group discussions are elaborated on in this poster. In addition a prototype for a departmental seminar is described which was seen by the audience as both educational and encouraged learning.

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**TEAM-BASED LEARNING IN MEDICAL GENETICS: IMPACT ON GROUP AND INDIVIDUAL PERFORMANCE**

*Shoumita Dasgupta, Ph.D., Boston University School of Medicine, Boston, MA 02118 USA*

Students in the Boston University School of Medicine study medical genetics at the end of their first year using a combination of interactive lectures, patient case sessions, on-line discussion boards, and team-based learning (TBL) exercises. The TBL activities are designed to engage students in application of material they have been absorbing through other channels in the course. TBL sessions begin with an individual readiness assessment in the form of an individual quiz. Inclusion of a quiz at the start of the session is meant to encourage student preparation and review prior to the TBL meeting. Next, pre-assigned small groups retake the same quiz, as a group readiness assessment, utilizing the power of team learning to attempt to improve their performance. Finally, the teams are responsible for applying this information to problem solving situations involving pedigree depictions of family history, risk assessment for genetic disorders, interpretation of genetic test results, and recommendations for treatment of genetic conditions. The impact of these exercises on learning was measured in terms of effect on group scores relative to starting individual scores. Furthermore, we wished to examine whether the common student perception, that studying alone is the most effect study method, persisted after these TBL activities. Towards this end, student perspective on learning activities was also assessed.

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**‘THE WAITING-ROOM’: INTEGRATING COMMUNICATION AND CONSULTATION SKILLS IN VOCATIONAL TRAINING**

*Myriam Deveugele, Thierry Christiaens, An De Sutter, Marij Sercu. Department of General Practice and Primary Health Care, Medical school Ghent University, Belgium*

‘The waiting-room’ is a project that integrates both communicative and clinical skills for GP-trainees during the first year of their vocational training. At that moment the students have followed an integrated communication training every year of the medical curriculum, for the past 6 years. They finished clerkships in hospital and have already experienced doctor-patient interaction. Training goals: Integrating knowledge and clinical decision making with clinical/technical and communication skills; learning to do a whole consultation with attention to communicative behaviour as well as to medical aspects like history taking, giving information and prescribing; learning about longitudinal care; managing patient files; reflecting about own behaviour and giving feedback to colleagues. Small groups of 3 trainees (one doctor and 2 observers) conduct a surgery with eight simulated patients, eight times during the academically year. Every simulated patient plays the same patient during the whole project. This patient consults with different complaints, asks for follow-up or presents a chronic disease. The students do the consultation, manage the patient files, give prescriptions, do referral if necessary and conduct successive consultations. Afterwards trainees generate questions, search for guidelines and discuss interventions and communicative aspects. For every topic addressed during the session, a meeting with an expert is provided in the forthcoming days. This project makes an integration of skills learned during the past medical curriculum. Students evaluate this as extremely important. They identify problems they will encounter in practice. They observe colleagues and discuss different consultation behaviour. The project also gives an answer to one important problem in teaching medicine: longitudinal care. General practitioners take care of their patients for many years. The specific influence of this contact is hardly teachable, for students every patient story is new. This project gives the opportunity of building a relationship with the patient and acting accordingly.

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**ENHANCING UNDERSTANDING OF THE APPLICATION OF LEARNING PRINCIPLES IN The DESIGN AND DELIVERY OF A SIMULATED LECTURE**

*Matthew C.E. Gwee, Ph.D.\*, M.H.P. Ed, Zubair Amin<sup>1</sup>, M.B.B.S., M.H.P.E. and Hoon-Eng Khoo<sup>2</sup>, Ph.D., Dip.Med.Ed., Departments of Pharmacology, Paediatrics<sup>1</sup> and Biochemistry<sup>2</sup> and Medical Education Unit, Yong Loo Lin School of Medicine, National University of Singapore, SINGAPORE*

Workshop participants (n= 25 nurse practitioners) evaluated (1=poor, 5=excellent) ten educational outcomes after the delivery (using Power Point) of two different lecture styles (X and Y, 15 min each) on the same topic ('Anticholinesterases'). Lecture X focused primarily on delivery of the full lecture content. Lecture Y incorporated several learning principles: stating learning objectives in the introduction, stimulating epistemic curiosity, activating prior knowledge, progressive and systematic linking of concepts, use of questioning and humour, summarizing key points at the end of the lecture and encouraging self-directed, collaborative, small group learning through the "homework assignment". Lecture **Y** received much higher mean ratings (**4.0-4.7** vs 1.8-3.4) in all ten educational outcomes evaluated: audience attention (3.4, **4.7**), stimulating interest (2.7, **4.0**), deep understanding 2.9, **4.4**), knowledge retention and recall (2.4, **4.0**), knowledge application (2.4, **4.4**), higher-order thinking skills (2.4, **4.1**), fun and joy of learning (1.8, **4.5**), motivation to learn (2.3, **4.4**), encouraging self-directed learning (2.2, **4.0**), encouraging taking greater initiative and responsibility for own learning (2.2, **4.3**). The consistent results provide clear evidence that our participants acquired higher quality educational outcomes as a consequence of incorporating learning principles in the design of lecture Y. Thus, actively engaging learners in evaluating a simulated lecture specially designed to highlight key learning principles can be expected to enhance understanding of the application of learning principles in lecture design and delivery.

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**INTEGRATION OF BASIC SCIENCE, NURSING AND CLINICAL SCIENCE IN MULTISTAGE AND INTERDISCIPLINARY COURSES USING SUPERCASES.**

*Hans Gyllenhammar, M.D., PhD\**. *Agneta Månsson-Broberg, M.D., Birgitta Björck, Coordinator. Karolinska Institutet, Institution for Medicine, Karolinska University Hospital Huddinge. S-14186 Stockholm, Swede.*

Integration of basic science with clinical science is a problem in modern medical or nursing education. Students in the clinical stages tend to forget or even actively repress basic science in their enthusiasm for the clinical problems. Students in early stages tend to report difficulties in understanding the practical application of their often excellent knowledge of basic science. This is one often cited reason for curricular reform. However, effects are difficult to evaluate on the curricular level.

Thus, we have addressed this issue on the course level within the confines of a more traditional curriculum with 4.5 initial terms of basic science followed by 6.5 terms of clinical science. In one line of study we have offered an elective covering the basic mechanisms for inflammation as well as clinical aspects of inflammatory diseases for students in the 3<sup>rd</sup>, 7th and 11th semester of their medical education. Students with no clinical experience and students with several years of clinical training were part of the course. In another line of study we have integrated nursing students term 2-3 with medical students term 6. In both lines of study we have applied the supercase method to facilitate the concurrent presence of these diverse groups of students. This method (detailed e.g. in B. Björck et al, IAMSE 2005) is based on selecting, or letting the students select, a case that forms the bases for their study during a 1 to 2 week period. In these courses we selected the cases that all were current patients in our clinics. The students were divided in groups of 3 to 6 students, each group with students from each stage or program. Each student was to be the expert on his or her field i.e. basic science or clinical science or nursing science within each group and to facilitate the others learning in the respective field. The cases were coordinated and results evaluated by a case-coordinator, separate from the teachers.

The students found that this method facilitated their learning. The students from early stages of the medical curriculum found numerous basic science aspects of the patients and combined these with the clinical aspects found by the older students. In the second line of application nursing students introduced medical students to nursing problems of the selected patients while the medical students gave the nursing students a better understanding of the clinical problems. Teachers found the method made student cooperation very positive, facilitated a deeper understanding of problems and was very rewarding as a teaching experience.

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**ADAPTIVE LEARNING IS NO LONGER AN IMPOSSIBLE DREAM IN MEDICAL EDUCATION**

*Professor Ronald M Harden\* OBE MD and David Davies, PhD International Virtual Medical School, Tay Park House, 484 Perth Road, Dundee DD2 1LR, Scotland*

A presentation at the 2005 IAMSE meeting demonstrated how adaptive learning learning centred round the needs of individual students - might be facilitated through an approach to instructional design that includes a bank of learning objects, a curriculum map and a virtual practice. Experience during the last year in the International Virtual Medical School (IVIMEDS) has demonstrated that medical schools and individual students choose a range of learning strategies. Some students prefer a directed learning approach working through the guided learning modules and using the virtual patients as examples of the application of theory in practice. Other students choose a problem-based approach starting with the virtual patient, identifying learning issues in the context of the curriculum map and locating learning objects relevant to their identified learning needs. Some students adopt an exploratory approach, browsing the map and the bank of learning objects. Using the guided-learning modules students adopt different learning styles and work at different rates and times and in a range of locations. Some prefer working individually, others in pairs, or engaging in other peer-to-peer learning activities. Students varied too in their choice of presentation formats. The IVIMEDS approach to instructional design and flexible learning illustrates the first step in an adaptive learning programme. Further developments will provide intelligent student support where, as a student uses the programme, resources are selected to meet their individual needs.

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**\*\* Award Finalist**

**TEACHING AND MEASURING PROFESSIONALISM USING THE CLINICAL SKILLS EXAM: IMPACT OF FEEDBACK**

*Heidi Lane, EdD, East Carolina University, NC, USA; Pamela Larsen, DrPH, DNSc, FNP; Patrick Merricks, MBA; MJ Barchman, MD; and Kathleen V. Previll, MD, all of East Carolina University, NC, USA*

M3 clerks in the Pediatric and Medicine Clerkships participated in two different types of feedback interventions focused on professional behavior over the past four years. The Pediatric Clerkship used a self-analysis model: Students reviewed a completed clinical skills exam (CSE) videotape using a guided form which allowed self analysis of professionalism and communication skills. The Medicine Clerkship used a focus-group feedback model: At mid clerkship, the entire cohort with faculty input reviewed snippets of a “practice” CSE case and the CSE professionalism instrument. Individual Professionalism Scores (IPS) were extracted from CSE data. IPS data were grouped into two categories: no intervention versus interventions by either the self analysis or the focus-group feedback model. Of the 399 IPS extracted, 40 experienced only the Pediatric intervention and 138 experienced only the Medicine intervention. Analysis of variance was calculated. The focus-group model significantly improved (p value 0.012) the clerk’s IPS. The self-analysis model used in Pediatrics however did not improve the clerk’s IPS (p value 0.031)

The perception of a student’s professionalism as evaluated by a standardized patient reflects closely the categories of caring, compassion, respect, accountability, and integrity as outlined by the AAMC and NBME. These professionalism scores (PS) are close to defining the art of medicine.

We analyzed the individual professionalism scores of M3 clerks before and after participating in two different types of feedback interventions. During the past five years 360 students participated in 864 CSE in Medicine and 864 CSE in pediatrics. In Year I of our study (1999-2000) no interventions were given to either group. The Medicine clerks experienced focus-group intervention in Year II, III, and IV of the study. Pediatric clerks experienced self-analysis in Year III, and IV. To test our hypothesis, Individual Professionalism Scores (IPS) were calculated from standardized patient ratings. An IPS represents the mean of standardized patient professionalism ratings on three CSE cases performed either in Medicine or Pediatrics. Individual Professionalism Scores were extracted from the CSE data and were grouped as no intervention versus type of intervention. 317 (IPS) were extracted which met this criteria. There were 138 clerks who experienced only the Medicine intervention, and 40 clerks who experienced only the Pediatric intervention. Analysis of Variance was calculated. The focus-group model used in Medicine significantly improved (p value 0.012) the clerk’s individual professionalism scores. The self-analysis model used in Pediatrics did not improve the clerk’s professionalism scores (p value 0.031) but rather decreased the scores. Formative feedback helps students improve professional behavior as measured by standardized patients.

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**USE OF WEEKLY COMPUTER-BASED QUIZZES FOR FORMATIVE ASSESSMENT IN A MEDICAL SCHOOL GENERAL PATHOLOGY COURSE**

*Margret S. Magid, M.D.\**, and *Merril K. Schindler, M.A, MSLS*, Department of Pathology and the Levy Library, Mount Sinai School of Medicine, New York, NY 10029 USA

Frequent testing, facilitating timely review of recently presented course material and prompt feedback, provides a valuable means of formative assessment. Computer delivery of quizzes offers additional advantages of topic flexibility, image display and immediate feedback. We hoped to further enhance the value of frequent computer quizzes by offering open-access scheduling and permitting open-book format to encourage directed course review. Weekly computer-based quizzes were introduced in a medical school General Pathology course. Quizzes were released for several days following each of 5 weekly modules and represented, in total, 10% of the final grade. Quizzes could be taken independently at any site with Internet access, scheduled at the student's discretion, and were open-book. Frequent question-linked images reinforced the students' recognition of morphology. Data were generated on specific questions and on the entire quiz by individual student and class. Prompt analysis of results permitted timely remediation of problematic topics and identified students at risk. In the 3 years of study, student feedback has been highly favorable, particularly with respect to the impetus to "keep up" with course material. Weekly quizzes, enhanced by self-scheduled computer delivery and open-book format, are an effective teaching tool for formative assessment.

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**A TEAM-BASED LEARNING SESSION INTEGRATING MICROBIOLOGY, PATHOLOGY, PHARMACOLOGY, AND PROBLEM-BASED LEARNING**

*Gail A. March, Ph.D. \*, Adrienne E. Rogers, M.D., Thomas C. King, M.D., Ph.D., Stephanie M. Oberhaus, Ph.D., Carol T. Walsh, Ph.D., and Karen L. Reed, Ph.D., Office of Medical Education, Boston University School of Medicine, Boston, Massachusetts, 02118-2526 USA*

Team-Based Learning (TBL) focuses on team performance skills beneficial in preparing medical students to articulate and defend clinical assessments as needed to work in medical teams. This study evaluates the students' use of TBL in a BUSM-II problem-based learning (PBL) class to combine concepts taught in the Pathology, Microbiology, and Pharmacology courses and to apply the concepts as a team in solving a clinical case on diarrhea. One week before class, the students were given their designated team (19 teams of ~8 students each), a reading assignment and directions for the session. The class began with each student answering the Individual Readiness Assessment Test (IRAT) of eight multiple-choice questions based on the pre-class assignment. Next the team answered the same test as the Group Readiness Assessment Test (GRAT). Then the facilitators confirmed the best answers and discussed challenges. Next the teams combined the concepts learned from their pre-class work and from the course material and applied them to a two-part application exercise (AE) to formulate a differential diagnosis, plan diagnostic tests and describe therapies for a patient presenting with bloody diarrhea, abdominal pain, and fever. Then the facilitators provided feedback on the best answers and on challenges. The GRAT scores were higher than the IRAT scores and indicated that the TBL team effort can increase student knowledge. The same teams applied their knowledge to a clinical case and the AE scores were lower. This one-time TBL session showed that the students need more practice applying concepts to a clinical problem as a team. TBL is an effective teaching strategy favorably evaluated by students, and the integrated session demonstrated clinical relevance and integrated the basic science information taught in the four courses.

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**IS LECTURING EFFECTIVE? THE MEDICAL STUDENT PERSPECTIVE**

*Carol Nichols, Ph.D. \*, Andria Thomas, Ph.D., T. Andrew Albritton, M.D., Walter Moore, M.D., Peggy Wagner, Ph.D., and Stephanie Wragg, Ph.D., Medical College of Georgia, Augusta, GA 30912 USA*

Lecturing is the primary mode of instruction for many medical schools, including the Medical College of Georgia (MCG). However, its effectiveness for adult education has been questioned in recent years. To determine their perception of the effectiveness of various teaching methods, including lecturing, MCG freshman and sophomore medical students (approximately 180 per class) were asked to complete a written survey, “Interests, Attitudes, and Approach to Learning” and participate in student-led focus groups to discuss several academic topics. Survey results showed that more than 60% of freshman and at least 50% of sophomores found lecturing to be an effective teaching method. Students thought case study discussions and independent learning were useful adjuncts or even alternatives to lecturing. Student leaders and a six-member faculty evaluation team arranged focus group data by major themes. Enthusiastic lectures that include models, demonstrations, and interactive elements such as calling on students were considered most effective. Ineffective lecture elements included excess research commentary and reading from slide presentations. Students recognize and appreciate effective teaching skills and prefer them to content expertise. Overall, students perceive lectures to be effective for teaching basic sciences if they include sound teaching principles and active learning strategies.

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**\*\*Award Finalist**

**NEXT GENERATION COMPUTER ASSISTED INSTRUCTION: A SERIOUS GAMING/IMMERSION ENVIRONMENT FOR MEDICAL EDUCATION**

*Thomas M. Nosek, Ph.D.\**, Mark Cohen, M.D., Anne Matthews, Ph.D., Klara Papp, Ph.D., Nancy Wolff, M.D., Gregg Wrenn, B.S., Andrew Sher, B.S., Kenneth Coulter, MFA, and Georgia L. Wiesner, M.D., Case Western Reserve University, School of Medicine, 10900 Euclid Avenue, Cleveland, OH 44106-4963 USA

We are creating an interactive, simulated “Tower of Learning” for the self-paced learning of Clinical Cancer Genetics by medical students (go to: [casemed.case.edu/cancergenetics](http://casemed.case.edu/cancergenetics)). The environment uses gaming theory to engage the students into achieving specific learning objectives as a prerequisite for advancement to “higher levels” in the learning hierarchy (see Foreman, Educause Review, July/August, 2003, pg 12). The first few levels include reference areas and virtual laboratories where students achieve the basic underpinnings of Cancer Genetics. A virtual microscope and hot links to learning resources (many originally created for this application) help the students achieve the learning objectives. The next seven levels apply these principles to clinical practice. A virtual attending physician and four virtual patients, available for questioning through virtual video conferencing, enrich each floor of the tower. The physician and patients also challenge the students with questions that they answer in the system. The pinnacle clinical simulation challenges the learner to integrate all information in the application to demonstrate mastery – to “win” the game. Our hope is that this next generation immersion environment will be so captivating to students comfortable with modern information technology, that it will motivate them to engage the total milieu actively and enjoy the challenge and intellectual satisfaction of mastering difficult material. (Support: PHS, NCI R25 CA092357-01A2)

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**EVALUATION OF DRUG INFORMATION AS A NOVEL LEARNING TOOL IN PHARMACOLOGY: DOES GENDER MAKE A DIFFERENCE?**

*Graham A. Patrick\** and *Gail T. Galasko*, Florida State University, Tallahassee, Florida, USA

To encourage critical thinking and application of basic pharmacological principles, a few weeks after the start of their initial pharmacology course, second-year medical students were assigned to evaluate a drug advertisement of their choosing. Written guidelines suggested that their discussions should include: what medium they chose (print, TV, or other); whether precautionary or warning statements were included; whether the drug was compared to similar products; whether the information appeared to be evidence-based; whether the advertisement was misleading in any way.

The evaluations were divided into 2 groups by gender (29 males [M], 28 females [F]), and observations concerning the evaluations were recorded. Of the 57 students, 53 chose print media (28 M:25 F), 3 (3F) chose television, and 1 (M) chose an online ad. No statistically significant differences were determined between the two groups, but several trends were observed. Female students wrote slightly longer evaluations on average (46 lines F: 41 M). Both genders identified more advertisements as targeted toward females than males (11:1 F, 7:4 M). More females evaluated advertisements related to drugs for depression (4F:1M), Alzheimer’s disease (3F:1M), elevated cholesterol (3F:1M), and female hormone therapy (3F:1M). More males evaluated advertisements related to drugs for asthma (3M:1F) and gastroesophageal reflux disease (4M:1F). Similar numbers in each group considered the information in the advertisement to be evidence-based (10 F:8 M) or to be misleading (12 F:10 M). These trends suggest gender differences in the evaluations which may become significant with larger samples.

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**A SIDE-TO-SIDE CONCEPT MAPPING PROCEDURE FOR STUDYING CASE VIGNETTE QUESTIONS**

*John W. Pelley, Ph.D. \*, Department of Cell Biology & Biochemistry, Texas Tech University HSC School of Medicine, Lubbock, Texas 79430 USA*

Novak and Gowin (Learning How To Learn. New York, Cambridge Press, 1984) drew attention to building visual associations as an aid to analytic thinking and thus coined the term, "concept map." This method produces experiential learning since the student experiences the construction of logical groupings and inter-relationships represented in the map. When applied to the analysis of case vignette questions, concept mapping promotes active discovery of pathophysiologic relationships between the patient data in the question stem and the answer choices. The usual top-down hierarchy for concept maps makes it difficult to represent the wide variety of clinical cases. However, a recently developed side-to-side concept mapping method has been applied to case vignette questions that facilitates active discovery of relationships between the patient data in the question stem and the answer choices. This active analysis of pathophysiologic relationships builds higher-order thinking skills (and long term memory) needed not only on USMLE Step 1, but in the clinical clerkships...and beyond. This poster presentation will provide the cognitive basis for concept mapping and then describe a general template that accommodates the patient data for any case vignette question. The step-by-step process currently used by student USMLE Step 1 study groups in filling in the template from a sample case vignette question will be presented along with some sample maps produced during their study sessions.

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**EXPLORING COLLABORATIVE E-LEARNING AMONG GENERAL PRACTITIONERS**

*Alan J. Salmoni\* and Maria L. Gonzalez, Department of Dermatology, Cardiff University Wales College of Medicine, Cardiff CF14 4XN, United Kingdom*

We contrasted online behaviour between collaborative and non-collaborative group tasks to inform the development of collaborative tools for training in general practice. Eleven students (general practitioners) and 1 tutor made 417 messages over a 3 week period and these were categorised using a system described by Curtis and Lawson (2000) in which there were 5 categories of utterance (planning, contributing, seeking input, reflection/monitoring and social interaction) and 15 further sub-categories. Equivalence between collaborative and non-collaborative tasks was seen for 6 subcategories (help seeking, monitoring group effort, reflecting on medium, organising work, feedback giving, and help giving). Collaborative tasks showed significantly more exchanging of information and resources, advocating effort, social interaction, initiating activities and feedback seeking than non-collaborative tasks. Collaborative tasks also showed fewer challenging, sharing knowledge, explaining/elaborating and group skills behaviours than non-collaborative tasks. We found that collaborative learning behaviours tended to be less confrontational and more supportive during collaborative tasks than non-collaborative tasks. and less information and more information resources were shared. Fewer challenges were made during the non-collaborative tasks, but this may be because more feedback was sought during the collaborative tasks (students thus pre-empting a challenge by soliciting feedback). Collaborative work may therefore involve the use of more accommodating behaviours than non-collaborative group work.

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**SIMULATED FUNDOSCOPY: AN ECONOMICAL MEDICAL EDUCATION TECHNIQUE**

*Arthur Schipul, M.D.\* and Anne White, M.D., Department of Introduction to Clinical Medicine, Ross University School of Medicine, Portsmouth Campus, Commonwealth of Dominica, West Indies*

Ross University School of Medicine’s ICM Department is attempting to improve instruction in funduscopy techniques. Building on a teaching aid and technique first suggested by Bradley, UK, in 1999, we created a simple model from a ping pong ball to permit the student to gauge his/her understanding of the techniques of accurate funduscopy. The students first learned to use their ophthalmoscopes and ascertain their personal diopters. They were then asked to examine a cut-out ball containing a single word printed in small font. The opening was taped to give the semblance of an eye ball. Students recorded the words from nine simulated eyeballs. Once students were proficient with this training aid, they were given an unlabeled photo of the retina. Examining it through a small aperture on a second sheet of paper, they used their ophthalmoscopes to locate all the unknown numbered structures (pre-test). They then examined the eyes of paid simulated patients and each other. Next they checked their performance by examining an identical photo with labels and finally they used the unlabeled pictures as a post test, recording their answers. Analysis of the pre and post tests showed a definite improvement in understanding. All students participating in this exercise were properly informed and they completed appropriate consent forms. This technique of simulated funduscopy appears to be an economical and reliable teaching tool.

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**TEACHING CRITICAL THINKING IN BASIC SCIENCES: ESSENTIAL ELEMENTS AND RUBRICS FOR ASSESSMENT**

*Judy M. Silvestrone, M.S., D.C.\* Dean, Center for Excellence in Learning and Teaching, New York Chiropractic College, 2360 State Route 89, Seneca Falls, New York 13148 USA*

Transition from the factual content of basic science education to experiential clinical reasoning is often difficult for students to negotiate. The reasoning that a seasoned, skilled practitioner performs instinctively must be made transparent to the novice. Students must be assisted in understanding how the application of critical thinking to their knowledge of anatomy, physiology and pathology results in clinically sound reasoning and decision-making. When students have the opportunity to practice critical thinking in basic science lecture and laboratory, the transition to clinician can be more logical and natural.

In this presentation, the customary processes of inductive and deductive reasoning are offered, and types of activities and specific exercises that can foster critical thinking are illustrated. Parameters from the literature for best practices in fostering critical thinking are delineated. Finally, a rubric for assessment of competency in critical thinking is provided.

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**AN ASSESSMENT OF THE USE AT OMAN MEDICAL COLLEGE OF WEB-BASED SOUND FILES, “DRUG BUDDY”, AS A GUIDE TO DRUG NAME PRONUNCIATION**

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Pronouncing drug names is difficult for native English speaking students; for non-native English speakers it may be further complicated as they apply pronunciation rules of their native language to drug terms. This study examined whether Drug Buddy, an online drug pronunciation tool, would be useful to a group of non-native English-speaking medical students. Drug Buddy is a compilation of web-based sound files to be used as a resource in the pronouncing generic drug names. It also provides links to drug information including drug chemical structures, Gold Standard Multimedia's Clinical Pharmacology® and the National Library of Medicine's Medline Plus® . Of the 34 medical students studying pharmacology at Oman Medical College, 26 responded to a survey that was designed to determine the effectiveness of Drug Buddy. During the first 5 weeks of the course, 21 students used the resource 1-10 times, 4 used it 11-25 times and 1 used it more than 50 times. On a scale of 0 (Not useful) to 10 (Extremely useful) students rated (mean  $\pm$  SEM) the usefulness of ability to hear drug names spoken aloud as  $9.4 \pm 0.27$ , the usefulness to view chemical structures as  $6.96 \pm 0.76$  and the usefulness of links to Clinical Pharmacology as  $8.98 \pm 0.44$  and to Medline Plus as  $7.52 \pm 0.80$ . These data support that hearing drug names pronounced correctly is a useful approach to learning drug names for non-native English speaking students. Students also appreciate easy access to other pharmacological information resources. 10th Annual Meeting of the International Association of Medical Science Educators, Puerto Rico, June 2006, Smith et al.

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**PROBLEM-BASED LEARNING USING MINI-ROUNDS TO ILLUSTRATE KEYTOPICS IN HISTOLOGY AND EMBRYOLOGY FOR 1ST SEMESTER VETERINARY STUDENTS**

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Small and large animal-based clinical case studies (n=4 per 14 week semester) have been integrated to the curriculum for microanatomy and embryology for first semester students (n=66) at the Ross University of Veterinary Medicine since fall 2005. Briefly, PowerPoint presentations of select case studies were distributed to students via email, and the next week, scheduled interactive in-class presentations and discussions were led by the respective clinicians. Data included within the case studies were signalment, owner complaint(s), history, and results of physical examination, and laboratory results. All case material was supported by visuals. To assess 1st year student perspectives and opinions about the mini-rounds, 4 questions were developed to collect data: 1) on usefulness of mini-rounds, 2) review and research work load per case, 3) study resources used, and 4) suggestions on how to improve the case study design. Participation in the survey was voluntary and anonymous. Seventy percent of students completed the survey during class. Sixty-five percent of students prepared for the case studies in under an hour, 35% took 1-2 hours. Primary study/research tool used by students for acquiring the relevant information needed to solve the case study was the Internet (42%). Personal experience (28%) ranked second followed by veterinary colleagues (17%), library (7%), and personal textbooks (5%). Student commentaries (n=67) regarding the usefulness of mini-rounds and suggestions on how to improve them were categorized into the following themes: clinical relevance and applied science approach, planning and organization, and case study improvements. Our small dataset provides useful information which will be used to adjust the use of case studies to demonstrate clinical relevance and illustrate key-topics in histology for our 1st semester veterinary medicine students. For the coming semester, in addition to the monthly clinician-led case presentation, we will provide each week several short written case studies (i.e. veterinary medicine abstracts) with basic science questions. We hypothesize that using abstracts in the suggested form leads to the development of critical reading skills, familiarity with veterinary medical terminology and disease entities, and they will provide a suitable format to review basic micro-anatomical science underlying veterinary medicine for 1st semester students.

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**FOURTH YEAR MEDICAL STUDENTS AS DISCUSSION LEADERS**

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Two medical schools use fourth year medical students as discussion leaders in the second year microbiology course to prepare them for their roles as medical educators and to serve as role models. At University of Louisville, 30 volunteer MS4s were provided with a skeleton of 5 medical cases, related to subject matter being taught at that time. They amplified these cases, based on their clinical knowledge and experience, and melded them into a final presentation. Each senior presented cases for 1 hour to 6 sections of 24 students. Since 2003, 80 MS4s at New Jersey Medical School have participated in Fellowship in Medical Education, a non-credit elective where they develop 3 cases to be discussed in three 2-hour sessions in 17 groups of 10 MS2s. The fellows create a list of questions for MS2s to answer prior to sessions, an answer key distributed at the end of these sessions, and a facilitator guide. Both schools train the seniors in methods of mentoring and teaching. These programs were highly successful for both MS4s and MS2s in integration of clinical and basic science information. MS4s reported that they greatly enjoyed the role of teacher/mentor and benefited from the experience.

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**USING CASE PRESENTATIONS TO INTEGRATE BASIC AND CLINICAL SCIENCES IN A LARGE GROUP SETTING**

*Hettie Till, M.Sc., M.Med.Ed., D.Ed., and Oryst Swyszcz, B.Sc., D.C.\* Undergraduate Education, Canadian Memorial Chiropractic College, Toronto, Ontario M2H 3J1 Canada*

One of the more serious challenges facing health professional education is the issue of how to integrate basic and clinical sciences in such a manner that students understand the relevance of taught material in the basic sciences. It has been shown that clinical cases can help students to associate course material with real patient situations leading to an increased interest in the material, as well as an improvement in deep learning and retention. It may also increase their ability to “draw upon” that material at a later stage when they need it in practice. This poster describes the development of integrated, case-based multidisciplinary forum presentations, or “Grand Rounds”, where students can observe an experienced clinician work up a patient in a large group setting. In these presentations the three classical steps of History taking, Physical Examination, and Report of findings/ Plan of Management/ Patient consent, are interspersed with educational experiences, such as question and answer sessions and focused reviews of relevant material. This approach helps the students understand the integration and relevance of basic sciences normally taught in isolation. Student feedback on these sessions is positive. From our experience over the last few years, these presentations appear to be effective, flexible to the year of study, and an inexpensive alternative for “real” patient observation.

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**\*\* Award Finalist**

**TEAM-BASED LEARNING: AN EFFECTIVE METHOD FOR TEACHING PHARMACOLOGY?**

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We sought to determine if the introduction of team-based learning (TBL) into the Fundamentals of Therapeutic Agents curriculum at Case School of Medicine would promote knowledge acquisition, improve retention and increase student satisfaction with regard to their learning experience. First year medical students (n=115) participated in a study to compare TBL and traditional small group learning approaches. Half were randomly assigned to study pharmacodynamic principles by means of a traditional small group approach while the other half were assigned to a TBL approach. Students perceptions were measured utilizing a survey while short-term retention was assessed utilizing an 11 question multiple choice exam. More than half of the study participants (n=74) completed the exam again 12 months later assessing long-term retention. There were no significant differences among students' perceptions of team-based vs. traditional small group learning. Results on the 11-item exam showed that team-based (tb) vs. small group (sg) learning were not statistically different with regard to short- and long-term retention of knowledge (short-term: mean(sd)=tb9.9(1.05) vs. sg10.16(0.70), F=1.58, p=0.21; long-term: mean(sd)=tb7.4(2.8) vs. sg6.8(2.7), F=1.06, p=0.31). In conclusion, there were no apparent deficits to utilizing the TBL approach with regard to knowledge acquisition, retention and student satisfaction. Benefits that were not specifically quantified may include degree to which students actively participate in class and instructor satisfaction.

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**INTERNATIONAL FACULTY DEVELOPMENT EXPERIENCES IN SERBIA AND MONTENEGRO**

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Upon invitation from the Dean of the University of Kragujevac School of Medicine (UKSM) in Serbia and Montenegro, we have assembled a team of five medical educators from UCSF to organize and conduct a faculty development course for 70 educators at UKSM. UKSM faculty, in preparation for a reformation of their traditional lecture- and lab-based curriculum, requested an introduction to interactive teaching modalities. We have designed a 5 day-course organized around three teaching settings: large group presentations, small group discussions and Problem Based Learning. Each main topic includes knowledge, attitudes, and skills components where participants are introduced to pedagogical principles, experience the modality from the learner’s perspective, and practice specific skills. To provide additional educational context, learning styles, feedback, evaluation and assessment, early clinical skills training, and the UCSF School of Medicine experience with institutional and curricular change, are also addressed. Each day concludes with a debriefing session in which the participants reflect on the day’s activities and discuss potential application of strategies. This daily feedback also allows for immediate adjustments to our approach. We will discuss our experience with this program including challenges faced and lessons learned. Participant expectations as well as the impact and outcomes of the program will be addressed.

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**SUCCESSFUL IMPLEMENTATION OF CINEMA-EDUCATION IN THE PSYCHIATRY COURSE**

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The curricular renewal process requires changing passive teaching and learning methods to active ones. Staff was stimulated to revamp the entire course. The themes, characters and issues portrayed in commercial movies are employed as simulators or virtual patients as a teaching strategy; cinema-psych-education.

The objective is to provide the students the opportunity to observe the “patient” in a “natural” environment (family, work, relations, diverse treatment settings, issues and responses through time), to develop the skills to analyze and use what they see and hear to identify signs, symptoms and gather the history to arrive at diagnostic conclusions and make treatment recommendations (critical thinking).

The movies used in this educational activity were: Girl interrupted, Prozac Nation, What the Bleep do we Know, One Flew over the Cuckoo's Nest and As Good as it Gets. The viewing and discussion emphasizes: a) The use of the DSM IV-TR (all axes); b) Evolution of Psychiatric treatments (institutional to pharmacological); c) Psychological aspects of medical illness, the Interview and primary care issues.

The students assessed the strategy using a structured survey that explores: understanding of the objectives; knowledge gained; and usefulness of the experience. The results were surprisingly good. A structured written report using a competence-based model will be used to evaluate medical knowledge, communication skills and information literacy. All outcomes will be discussed during the meeting.

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