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Welcome to the research proceeding from the 2008 IAMSE Annual Meeting in Salt Lake City, Utah. IAMSE promotes the teaching and educational scholarship of the sciences basic to medicine, and it's over 600 members work throughout the year to further this aim via webcast seminars, the association journal (JIAMSE), colleague-to-colleague mentorship, and the annual meeting. A key part of the annual meeting is the presentation of research posters from all areas of medical education, including technology, faculty development, assessment, innovative methods, and curriculum. This special issue of JIAMSE is devoted to presenting the abstracts of the posters presented at this meeting.

The Salt Lake City meeting provided it's over 250 attendees an outstanding opportunity for faculty development and networking in an intimate and casual setting. It was enriched by the participation of the Team Based Learning Collaborative and by the technology organization Slice of Life, which created a dynamic partnership with IAMSE to add further diversity and energy to the meeting. The meeting featured plenary talks, technology demonstrations, poster sessions, and the well-loved IAMSE focus sessions, in which attendees gathered in small groups to discuss and explore educational issues in depth. To give you a taste of the scope of this meeting, we note below the plenary topics, which included:

- Simulation in a Clinical Context - The Next Big Challenge
- Copyright and the TEACH Act for Medical Educators
- Changes to the USMLE Exam - What is the Gateway Exam?
- Web-Based Virtual Reality: Second Life in the Classroom
- IAMSE Debate: Selling Out or Win-Win: The Benefit of Industry Involvement on Training of Healthcare Providers Outweighs the Harm

In this special issue of JIAMSE we present to you 99 poster abstracts. This includes 20 Electronic Demonstrations, an exciting new format brought to the IAMSE meeting by the Slice of Life community. In an E-demo the presenter not only presents a paper poster at the wall, but also shows the audience a live demonstration of the computer application presented. This type of posters has been highly appreciated by the meeting participants.

Posters and demos were presented in 8 main categories. In the category *Assessment* several nice examples of testing were presented ranging from basic sciences to competencies. The number of computer based testing applications was striking. *Clinical Skills* focused on clinical reasoning and problem solving. The topic *Integrating the medical sciences into our Curriculum* turned out to be the largest poster session of the meeting, reflecting the international focus on this topic and the efforts of IAMSE members to lead these efforts. *TBL (Team Based Learning) & PBL (Problem Based Learning)* featured research on both curriculum models and some cultural aspects were addressed as well. *Instructional Methods* and *Technology* addressed the core strengths of our association: how can I tech better, and how can technology facilitate this. The *Technology* sessions contained many E-demos on applications to teach science, including the expanding field of (serious) gaming. Finally, the category *Student Factors* showed excellent examples of

involving students in the teaching activities, such as the introduction of peer-teaching. Students are of great importance to the association and therefore IMASE is delighted that so many contributions on this topic were presented at the meeting.

We hope that the following abstracts will give you a taste of the enriching thought and diversity of our annual meeting, and that you will choose to join us at one of our summer meetings soon.

Frazier Stevenson, M.D.
President, IAMSE 2008-2009

Peter de Jong, PhD
Vice President IAMSE 2008-2009

Electronic Demo

COMPETENCIES TRAINING AND ASSESSMENT IN PATHOLOGY AND LABORATORY MEDICINE USING PATIENT SIMULATIONS

Fred Dee*, Clarence Kreiter, Christopher Goerdt, Timothy Leaven and Thomas Haugen. University of Iowa, Iowa City IA, 52242 U.S.A.*

PURPOSE

A novel web-based computer-assisted patient simulation (*LabCAPS*) has been designed to foster evidence-based use of laboratory resources and reduction in unnecessary costs. The simulation's ability to generate valid and reliable scoring of performance is crucial to its educational and assessment role.

METHODS

LabCAPS is created in a MySQL database. Perl-CGI scripting dynamically generates the simulations, and serves them over the web. When a new case is entered, a web-based editor allows entry of history and physical findings. Default normal results of 431 tests, procedures, and images can then be changed for each individual case to abnormal by the case editor. When cases are engaged the *LabCAPS* web interface allows the trainee to sequential order and interpret tests and procedures through several encounters, and arrive at a diagnosis, all from check-box menus. To develop a scoring key for comparison with trainee's responses, experts engage the simulations. The resultant electronically generated scoring key is based on the proportion of experts selecting responses, with disagreements adjudicated around evidence-based guidelines.

RESULTS

There are currently forty cases. Medical students in our Pathology Course rated three *LabCAPS* prototype units as the first, second, and fourth best units among 17 more traditional units. Formative evaluations and reliability and validity studies of *LabCAPS* are underway in our Laboratory Medicine Course.

CONCLUSION/FUTURE DIRECTIONS

Computer assisted simulations are expensive to develop and score. This project, supported by a grant from the National Library of Medicine, investigates methodologies designed to significantly reduce the cost of both case development and scoring.

Notes:

Electronic Demo

MAPPING & DISTRIBUTING COMPTENCY-BASED CURICULA: TOOLS AND TECHNIQUES

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PURPOSE: Design a theory based curriculum design tool that meets the needs of medical and nursing educators.

METHODS: Designing a competency-based curriculum for graduate medical or nursing education is a challenge. We have defined a conceptual model that translates competency language into generalizable professional abilities for physicians and nurses. We built a module using the open source Moodle Learning Management System that educators can use to collect, organize and present resources for single or multidisiplinary groups of learners. Our application contains both a competency mapping (CMI) and a curriculum building interface (CBI). The CMI permits users to take high level competencies, divide them into logical subunits and attach specific learning objectives, activities and assessments such that individual learning activities and assessments can support teaching multiple competencies. The CBI presents educators with keyword coded and searchable collections of learning activities and assessments organized by competency. Educators can collect and download educational resources stored in Moodle to build custom curricula for use at their institutions as well as a report card that allows educators to track learner progress towards competency achievement. This open source Moodle module is suitable for use for any graduate or undergraduate health or other professional education program.

RESULTS: The Achieving Competency Today web site, based upon the tools described above, is scheduled to release in late March, 2008.

CONCLUSION/FUTURE DIRECTIONS: If additional grant funding is awarded, these tools will be expanded to automatically generate web-based courses based upon curriculum maps.

Notes:

A CHANGE TO PASS/FAIL GRADING IN THE FIRST TWO YEARS OF MEDICAL SCHOOL RESULTS IN IMPROVED PSYCHOLOGICAL WELL-BEING WITH NO DECLINE IN ACADEMIC PERFORMANCE, ATTENDANCE, USMLE SCORES, OR SUCCESS IN THE RESIDENCY MATCH.

Robert A. Bloodgood[1*]*, Jerry Short*[2]*, John M. Jackson*[2]*, and James R. Martindale*[2]*. Department of Cell Biology*[1] *and the Office of Medical Education*[2] *University of Virginia School of Medicine, Charlottesville, Virginia 22908 U.S.A.*

PURPOSE

This study measured the impact of a change in grading system in the 1st two years of medical school, from graded (A, B, C, D, F) to pass/fail (P/F), on medical students' academic performance, attendance, residency match, satisfaction and psychological well-being.

METHODS

The last graded class (2006) was compared with the first P/F class (2007). Objective data were collected on academic performance in the 1st and 2nd year courses, the clerkships, USMLE Steps 1 and 2CK, and residency placement. Self-report data were collected using a web survey (which included The General Well-being Schedule of Dupuy) administered each of the 1st four semesters of medical school.

RESULTS

The P/F class exhibited a significant increase in well-being during each of the first 3 semesters of medical school relative to the graded class, greater satisfaction with the quality of their medical education during the 1st four semesters of medical school and greater satisfaction with their personal life during the 1st three semesters of medical school. The graded and pass/fail classes showed no significant differences in performance in 1st and 2nd year courses, grades in clerkships, scores on USMLE Steps I and 2CK, success in residency placement and attendance at scheduled academic activities.

CONCLUSION

A change in grading from letter grades (A, B, C, D, F) to pass/fail in the first two years of medical school conferred distinct advantages to medical students, in terms of improved psychological well-being and satisfaction, without any reduction in performance in courses or clerkships, USMLE test scores, success in residency placement, or attendance.

Notes:

RELIABILITY OF COMPUTER BASED TESTING COMPARED TO PAPER-BASED TESTING

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PURPOSE

The 'Klinische Lijn (KL)' exam is the final exam students have to pass before they can start their internship. Organising the KL exam is a complex logistical process, since all students have to take the test and almost all medical specialities are involved. To simplify this process a pilot was started to digitalize the KL test. However, before doing so, further research is needed on the effect of a computer-based test (CBT) compared to the original paper test.

METHODS

The pilot started with a small group of students who had to take the KL test. The students were divided into two groups. To the first group the first half of the test was presented on the computer and the second half on paper. To the second group it was presented the other way around. The layout of the CBT and paper-version were the same, no additional media were used.

RESULTS

We compared the results of the two groups and the two different ways of testing. No significant differences were found between testing on paper or computer based testing.

FUTURE DIRECTIONS

Our next study will be on the affect of introducing testing with long lists and with multimedia, on the student results.

Notes:

A HISTORY OF CLASS PERFORMANCE WITH COMPUTER-BASED TESTING IN HISTOLOGY

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PURPOSE

Computer-based testing (CBT) is used to assess competence in histology. This study reviews performance and compares the results to classes tested in two earlier years by other means.

METHOD

The average and % passing were examined for two modules and two years of video- or print-based testing. Only data from tests covering similar content were considered. The number of students meeting and not meeting the standard for passing a second test after not meeting the standard on the first and the number of students not meeting the standard for passing the second test after meeting the standard on the first were counted. The class average was compared to criteria used in admissions.

RESULTS

Performance in the inaugural years of CBT was lower than the last five and the previous two years of video- and print-based testing. With the addition of a practice quiz, sample questions and a second test, performance returned to pre-CTB levels and years with high passing rates alternated with lower rates. Unsuccessful students did not always succeed on the second test, and some that did succeed on the first, did not always succeed on the second test. There was no correlation with admissions data.

CONCLUSION

The interventions improved the performance on CBT. A second test warns of a weakness but may not result in improved performance. Despite trying to prepare students and identify weaknesses some students fall short. Scores may be influenced by elusive factors beyond the control of an instructor, e.g., student behaviors.

Notes:

IMPROVING MEDICAL STUDENT FEEDBACK WITH A DETAILED ITEM ANALYSIS REPORT AND SUGGESTIONS ACCORDING INDIVIDUAL LEARNING STYLE

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PURPOSE: The importance of providing good feedback about performance is a recognized principle in pedagogy. Internal and external multiple choice examinations are part of the assessment tools used in medical education. For several years, high percentage of students has suggested improving feedback about performance in this type of evaluations. We designed a structured feedback strategy directed to improve feedback quality and academic results. This abstract illustrate the project and its outcomes.

METHODS: The method has been piloted in some exams and fully implemented in the immunology course. The strategy use the testblueprint, providing a report of performance according type and complexity of questions, course's objectives, statistical analysis, correlation with other evaluations and suggestions to improve according individual learning style. After each test, students discuss the report with the course director. Recommendations include techniques for studying and answering exams and tutorial programs. Students satisfaction surveys and academic results analysis are been used to assess the strategy.

RESULTS: 180 students have received feedback using this technique. Satisfaction with the technique is highly significant and has grown each year. Students recognize the value of received information and valuate specific recommendations. Also they manifest increased self confidence about course mastery. Academic results have shown improvement in subsequent tests, except for those students confronting extreme academic risk, probably requiring additional interventions. Faculty report a notorious change in student's attitudes towards the course.

CONCLUSIONS: Structured strategies to provide feedback constitute a valuable tool that may be implemented through the entire curriculum taking advantage of technology resources.

Poster Award Finalist

Notes:

DO EXTRA CREDIT POP QUIZZES IMPROVE GROSS ANATOMY EXAM PERFORMANCE?

Carol A. Nichols, Ph.D.*, *Medical College of Georgia, Augusta, GA 30912 U.S.A.*

PURPOSE: Quizzes between exams are used in a variety of ways to encourage student preparation and discourage study procrastination. In an eight week Systemic Gross Anatomy course taught each year, varying numbers of unannounced extra credit pop quizzes have been given. Effect of these quizzes on actual exam performance is evaluated.

METHODS: Extra credit quizzes were given at random intervals between three major exams. Questions tested recall and/or application of material that would be on an upcoming exam. Each quiz was worth a maximum of two points on a student's subsequent exam grade. Some years six pop quizzes were given; other years fewer or even none were given. To determine effectiveness of quizzes on actual exam performance, exam grades and overall course grades were averaged before and after the addition of quiz points and then compared across years.

RESULTS: As expected, quizzes improved exam grades and overall course grades because extra points were added to each actual exam score. However, they did not significantly improve actual exam performance. There was no statistical difference in actual exam performance or overall course performance across years regardless of the number of pop quizzes given.

CONCLUSIONS: Students like extra credit quizzes because they provide formative feedback and boost grades. However, actual exam performance does not appear to improve when quizzes are given. This finding may be explained by the low-stakes nature of the quizzes or a quiz format that differs from the computerized multiple choice didactic and lab practical format of actual exams.

Notes:

A CREATIVE FINAL EVALUATION FOR A FIRST YEAR PATIENT CENTERED MEDICINE COURSE

Carol A. Terregino and ***Norma S. Saks*,*** *Robert Wood Johnson Medical School, Piscataway, NJ 08854 U.S.A.*

PURPOSE: The goals of the Patient Centered Medicine course include developing effective patient-doctor communication skills, learning to work as members of multi-disciplinary health care teams, and demonstrating knowledge of ethics, cultural competency, and medical economics. We wished to develop an appropriate final course evaluation that would be creative and enjoyable.

METHODS: Students collaborated in small groups (10 students) to select a health care system problem and potential solution, and to develop a creative presentation (skit, song, poem, or dance.) Ten minutes were allotted for presentations; 5 minutes for audience questions/discussion. Topics/themes included improving the quality and safety of health care, complementary/alternative/integrative medicine, culturally competent care, ethical challenges in health care, and interfacing spirituality, religion, faith, and medicine.

RESULTS: Presentations reflected a good level of knowledge acquisition, collaborative effort, and creativity; all groups earned a top score of “2”. Evaluations were overwhelmingly positive. Student comments mentioned issues of individual responsibility and collaboration, feelings of engagement and enjoyment, and the satisfaction of having produced a good quality final presentation. Negative comments related to the project taking more time than expected, difficulty in getting everyone in the group together to plan, and one student thought it “degrading” for students in a professional school to put on a skit.

CONCLUSION: These group projects requiring collaboration and creativity were an enjoyable and effective way for students to demonstrate proficiency in the Patient Centered Medicine course. This activity has remained part of the course.

Notes:

COMPARISON OF MEDICAL STUDENT GRADING SYSTEMS – FROM IOWA CITY, IOWA TO IRBID, JORDAN

Thomas J. Schmidt [1*], *Yousef Khader*[2], *Zeyad El-Akawi*[2], *and AbdelFattah Al-Hader*[2], [1]*Carver College of Medicine, The University of Iowa, Iowa City, Iowa 52242 U.S.A., and* [2]*Jordan University of Science and Technology, Irbid, JORDAN.*

PURPOSE: The purpose of this study was to compare and contrast the grading systems used to evaluate medical student at the University of Iowa and the Jordan University of Science and Technology.

METHODS: Specific details concerning course grading systems and graduation requirements were obtained during invited presentations in Jordan and by comparing the appropriate grading policy documents prepared by both medical schools.

RESULTS: At the University of Iowa, students are graded in all courses, including electives, using the following scale: Honors (90% or above), Near Honors, Pass, and Fail. A final course grade of 70% or above guarantees a Pass grade. To prevent potential grade inflation, no more than 30% of the class should fall into the combined Honors/Near Honors category. Students do not receive a grade point average and are not ranked. Students must achieve a passing grade in all required courses and electives to graduate after four years. In contrast, Jordanian medical students are graded on the following scale: Excellent (90-100%), Very Good (80-89%), Good (70-79%), Acceptable (60-69%), Weak (50-59%), and Fail (<50%). Students must thus achieve a score of 50% to pass each course. Elective courses are graded on a Pass or Fail basis. In order to graduate, students are required to achieve a minimum grade point average of 60% based on their performance in all six years of study. The cumulative grade point average at graduation determines the class rank for each student.

CONCLUSION: Although the medical schools in Iowa City and Irbid have very similar educational missions, the grading systems utilized at these two institutions vary significantly.

Notes:

STUDENTS APPRECIATE ADAPTIVE HINTS IN FORMATIVE ONLINE QUIZZES

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PURPOSE: We sought to enhance the tutorial effectiveness of formative online quizzes in our Year-1 Cell Biology & Physiology course by adding adaptive hints and concept recaps.

METHODS: Our vehicle for online quizzes is LON-CAPA ("Learning Online Network with Computer-assisted Personalized Approach"), a powerful web-based interface developed at Michigan State University and used nationwide. LON-CAPA permits a wide variety of question types, accommodates both text and images, and allows randomization of questions and answers. For each question type, we developed XML templates for including adaptive hints – i.e., different hints for different wrong answers, or a sequence of progressively stronger hints after one, two, or three wrong answers. Using these templates, we added hints to our Basic Science Pretest on LON-CAPA. The Pretest guides incoming students through a review of prerequisite concepts not taught during our Year 1 courses. We also concluded each Pretest question with a short recap of basic concepts and a statement of medical relevance.

RESULTS: Students appreciated the adaptive hints and summary statements. Hints promoted engagement and minimized frustration by guiding students' thinking about challenging questions. Summary statements increased students' sense of mastery and closure on each question. By contrast, other online quizzes (without adaptive hints) led to frustration and anxiety, increasing the students' tendency to make wild guesses (or copy from a classmate) after a wrong answer.

CONCLUSION/FUTURE DIRECTIONS: Adaptive hints enhance tutorial effectiveness of online quizzes, promote student engagement, and likely facilitate mastery. We will pursue this pedagogical strategy and carefully evaluate its effectiveness.

Notes:

CUMULATIVE ACHIEVEMENT TESTING IN MEDICAL SCIENCE EDUCATION

David Swanson[1]*, Kathy Holtzman*[1]*, Aggie Butler*[1] *and the Case Western Reserve University School of Medicine Cumulative Achievement Testing Study Group*[1,] *National Board of Medical Examiners (NBME), Philadelphia, PA 19104 U.S.A.*

PURPOSE: This project explores use of cumulative achievement tests in basic science education. These tests encourage students to retain previously covered material and attend to relationships among topics by systematically retesting previously covered topics on end-of-unit tests.

METHODS: The systems-based curriculum at Case Western Reserve University (CWRU) is divided into six units. Using web-based test construction software developed by the NBME, CWRU faculty members and NBME staff developed six end-of-unit subtests customized to unit content from NBME item pools. Six test forms were assembled from these subtests by combining items across units. Each form consisted of 100 items on the unit just covered (primary focus) and blocks of 20 items from units covered earlier (secondary focus). To build secondary subtests, items from each primary subtest were assigned to five 20-item blocks, students were randomly assigned to five groups, and, across administrations, student groups were rotated across secondary subtests such that 1) all 100 items from each primary subtest were seen by 20% of students and 2) no student saw the same 20-item block more than once.

RESULTS: Following each (web-based) test administration, students received score reports depicting areas of strength and weakness for the unit just covered and for each 20-item block drawn from earlier units. Because all items were used for each test administration, items served as their own controls, and performance trends on individual items and topics were studied by analyzing shifts in mean scores.

CONCLUSION: Cumulative achievement tests appear promising for curriculum evaluation and study of student retention.

Poster Award Finalist

Notes:

UTILIZATION OF TEST MANAGEMENT SOFTWARE TO FACILITATE STUDENT ASSESSMENT AND AMALGAMATE LEARNING OBJECTIVES WITH OUTCOME DATA

Donna Weber* *and Allison Walters, University of Kentucky, Lexington, Kentucky 40536 U.S.A.*

PURPOSE: This project was initiated to implement and evaluate a commercial test management software system (LXR-Test®) for three required Pharmacology courses at the University of Kentucky (Medicine and Dentistry). Fundamental to this effort was to document learners' acquisition of key knowledge as defined by course objectives.

METHODS: Secure (not part of the public domain) exam items were entered into LXR-Test®, a searchable database. The first of multiple levels of classification was defined by course content areas. In-house processing and statistical analysis of exams permitted comparison with the LXR Test® methods. The second phase of this project - elaboration of an expanded standardized classification scheme, is under development.

RESULTS: Ten written MCQ exams have been administered using LXR-Test®. Advantages of this software include: a dramatic reduction of exam preparation time (accurate without redundant proofing), creation of multiple exam versions, and rapid receipt of student scores and statistical analysis. LXR reports have been utilized to summarize and review exam content and analysis. Most importantly, the first level of item categorization has been refined and standardized to permit selection of exam content to better reflect course objectives. The software has consistently produced identical data for student scores and exam reliability compared to the in-house method.

CONCLUSION: The initial implementation of LXR-Test® has met or exceeded expectations. The creation of test item linkage to a set of standard learning objectives has been initiated. This categorization incorporates both the content outline defined by USMLE Step1 and cognitive learning levels as defined by Bloom's taxonomy.

Notes:

DIAGNOSTIC PROBLEM SOLVING, COGNITIVE LOAD THEORY, AND COGNITIVE TOOLS – TEN YEARS OF USING THE DIAGNOSTIC PATHFINDER TO TEACH CLINICAL PATHOLOGY

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PURPOSE: Medical educators have long studied diagnostic problem solving in hopes of helping learners become better problem solvers. The Diagnostic Pathfinder is a software tool that has been used for ten years to teach this skill. This abstract reviews lessons learned from Pathfinder-based research, and ties them to current theory.

METHODS: Several studies exploring the Pathfinder's effect on problem solving performance and student/faculty satisfaction were reviewed, as well as studies and theoretical writing involving medical diagnostic problem solving, cognitive load theory, and cognitive tools. Pathfinder characteristics are explained in light of this review.

RESULTS: The Diagnostic Pathfinder's approach seems most likely to be effective against diagnostic errors caused by data integration problems. Studies suggest that Pathfinder use improves students' performance on case-based problems by providing real life cases, creating a safe practice environment, providing immediate and specific feedback, enforcing sequence and completeness, and facilitating problem manipulation. The Pathfinder can be seen as a cognitive tool, and as a tool that reduces cognitive load. Cognitive tools provide processes that the mind leverages to accomplish cognitive tasks, and, over time, can be adopted by the mind as its own. Cognitive load theory suggests that effective instruction respects intrinsic cognitive load, encourages germane cognitive load, and avoids extraneous cognitive load.

CONCLUSION/FUTURE DIRECTIONS: The Pathfinder's gating and feedback features appear to support germane cognitive load while reducing extraneous cognitive load. The Pathfinder also appears to function as a cognitive tool, leveraging processes that are used by the mind even after the tool is withdrawn.

Poster Award Finalist

Notes:

HOW TO GET INTO CLINICAL REASONING IN EIGHT STEPS

Nancy E. Fernández-Garza* and Diana Patricia Montemayor-Flores. Medicine School, Universidad Autónoma de Nuevo León, Monterrey Nuevo León, MEXICO.

PURPOSE: Clinical Reasoning is the key competency of medical practice. Through this complex intellectual ability, patient's information is integrated with physician's knowledge and experience in order to get a diagnosis, treatment, rehabilitation, prognosis and prevention of patients. The question is: What is the better way to develop this competency in preclinical students?

METHODS: We looked out for the intellectual abilities that lead to Clinical Reasoning and the shortest path to reach it.

RESULTS: What we found is that if clinical information is studied using the basic intellectual abilities: identification, description, comparison, definition and classification, and with the result of this starts a continues and repetitive intellectual play that goes from analysis to synthesis and evaluation we are learning Clinical Reasoning. Based on this, we wrote a booklet in which we describe how by applying this intellectual path to solve clinical problems students start to learn Clinical Reasoning.

CONCLUSION: The systematic use of this intellectual path allows students start learning Clinical Reasoning in the right way, avoiding learning the hard way what is expensive in time and effort.

Notes:

MR. VETRO: A COLLECTIVE SIMULATION APPLICATION FOR PHYSIOLOGY EDUCATION

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PURPOSE: Technology has become prevalent in K-12 science education without fundamentally improving test scores or student attitudes. We claim the core of the problem is *how* technology is being used in schools. The standard computer lab hides students behind large monitors and ignores social aspects of learning, while promising technologies such as simulations are not used to their full potential. For instance, physiology simulations often follow textbooks by sequentially exposing individual systems, leaving out essential comprehension of interdependent complex systems. Our main objective is to create engaging discovery-oriented science learning modules that uniquely combine *social learning pedagogies* with *distributed simulation technology*.

METHODS: We have begun creating a new kind of infrastructure, called *Collective Simulations*, which creates immersive learning experiences based on wirelessly connected handheld computers. This enables radically different classroom learning experiences that engage students and teachers simultaneously. As part of Mr. Vetro collective simulation prototype, students learn about physiology through technology-enhanced role-play. Each group controls physiological variables of a single organ on their handheld computer. A central simulation gathers all the data and projects them. In an example activity, the heart and lungs teams collaborate and engage in a teacher-facilitated discourse to adjust parameters and reach homeostasis.

RESULTS: Preliminary results from feasibility studies are encouraging in that students using Mr. Vetro to learn about physiology show higher learning gains than students taught the same material with traditional means.

FUTURE DIRECTIONS: We will implement a blood-centric view and add systems such as the renal and digestive system to Mr. Vetro.

Notes:

APPLYING ADULT LEARNING PRINCIPLES TO TEACH BASIC SCIENCE: USING STANDARDIZED PATIENTS AND SIMULATION IN PHYSIOLOGY

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PURPOSE: Adult learning theory emphasizes the importance of teaching knowledge to medical students in a manner that emphasizes experiential and applied learning. An innovative approach to utilizing these principles as part of a first year medical student physiology course using standardized patients (SPs), a high-fidelity cardiovascular simulator, and applied technology with electrocardiograms (EKGs) is described.

METHODS: During the cardiac physiology and electrophysiology portion of their first-year physiology course, all Tulane medical students were divided into one of 4 rotating small groups as part of a half-day symposium that consisted of: a review of the normal EKG, a demonstration of the application of the EKG using SPs, training on the normal cardiac examination by SP teaching assistants and training on a high-fidelity cardiovascular simulator (Harvey®) demonstrating the cardiac cycle in relationship to the normal cardiovascular examination. All sessions were highly interactive and required student participation and application of their classroom knowledge. Student feedback regarding sessions was obtained by having students complete an open-ended questionnaire as to what they liked best or least.

RESULTS: Student feedback was very positive. The groups provided a safe environment for students to learn the cardiovascular examination while emphasizing an understanding of cardiac physiology and electrophysiology. Students immediately appreciated the value of applying key physiologic principles to clinical medicine.

CONCLUSION: Adult learning principles can be effectively applied by using SPs, simulation, and EKGs to teach important and fundamental basic science concepts and knowledge to first year medical students.

Notes:

SYLLABUS STRUCTURE BASED ON CLINICAL REASONING AS THE KEY COMPETENCIE

Diana Patricia Montemayor-Flores* *and Nancy E. Fernández-Garza. Medicine School, Universidad Autónoma de Nuevo León, Monterrey Nuevo León, MEXICO.*

PURPOSE: The design of courses based on competencies is at present increasingly frequent. But when we look for the structure of a syllabus based on competencies, what we find is a mixture of objectives and competencies. Because of this we decided to develop a structure for a syllabus based on competencies.

METHODS: In our school the **CLINICAL REASONING** is the key feature of the curriculum. Every one of the subjects has a clinical orientation, even those in the preclinical years. We focus our efforts in the design of a syllabus based on CLINICAL REASONING as the key competencie. We also looked for a clearly orientation of the course content to the competencies of the physicians every day activities, what is the reach of a diagnosis, the determination of treatment, prevention, prognosis and rehabilitation.

RESULTS: The structure of the syllabus based on CLINICAL REASONING as a key competencie includes: 1.- Final competencie. It is the competencie that must be reached at the end of the course. 2- Midterm competencies. These are the competencies that are reached at the end of every course unit. 3- Performance criterio. These represents the course content that must be learned to reach the competencies in every unit. 4- Portafolios. Here are the learning evidencies from every student.

CONCLUSION: This syllabus structure is very useful for the design of a course based on competencies, avoid the use of objectives and the confusion that this generates.

Notes:

A FIRST-YEAR COURSE TO INTEGRATE BASIC SCIENCE CONCEPTS AND CLINICAL PROBLEM SOLVING USING TEAM-BASED LEARNING

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PURPOSE: To facilitate the integration of traditional discipline-based basic science courses with the concepts and skills taught in Introduction to Clinical Medicine (ICM), a clinical scenario, problem-based course was developed to enable students to appreciate the interdisciplinary concepts of concurrent courses and to establish connections between concepts presented in successive semesters.

METHODS: Seven 90-minute team-based learning (TBL) sessions were developed to present scenarios of patient problems. Each session integrated content from three or more of the nine first-year courses. The first-year class was divided into 40 teams of six students. The students' mastery of pre-reading and didactic lecture material was assessed using individual and group readiness assurance tests (IRAT/GRAT). The application exercises consisted of clinical scenarios with problem sets to be solved as a team. The students were assessed based on their IRAT, GRAT and team written justifications as well as a final team "take-home" examination. Students were given the opportunity to evaluate the course after each semester. This course concept was piloted for three years as part of the ICM course prior to being established as a stand-alone course.

RESULTS: Responses from student evaluations indicated that an overwhelming majority felt the sessions helped them better apply their basic science knowledge to clinical manifestations of disease. Most rated the GRAT as a useful learning activity, but did not rate the IRAT as highly.

CONCLUSION/FUTURE DIRECTIONS: The results suggest that these TBL clinical problem solving exercises are an effective method for integrating basic science concepts taught in a traditional discipline-based curriculum.

Poster Award Finalist

Notes:

Electronic Demo

IMPLEMENTING CLINICAL WEB BASED E-LEARNING MODULES

Mathijs Doets*, *Erasmus University Medical Center, Rotterdam, THE NETHERLANDS*

PURPOSE: An important part of the Erasmus University medical curriculum consists of individual assignments for self-directed learning. About 20% of these assignments are case based e-learning modules. These modules make extensive use of multimedia and interactive questions. They used to be available on CD-ROM, but from 2007, they were made available online, to allow for easier updating, more flexible delivery and usage logging.

METHODS: In 2007, 20 interactive e-learning were converted from CD-ROM based programs to web-based (Adobe Flash) modules, while 5 new modules were developed. All of them were made accessible through the electronic learning environment. The modules were developed in a specially designed template, which allowed for quick development of new modules.
Usage was logged and selected modules were evaluated online.

RESULTS: 95% of the students (year 1-3, n=1150) examined at least one module, 60% of the students examined all of the modules. Evaluation results (n=112) showed that students thought the modules were instructive (90%) and motivating for further study (60%), because of the multimedia. Modules with more text and less interaction and images were valued less. Although most students had access to broadband internet and used the modules online, 60% would appreciate it if the modules were also available on CD-ROM. Reasons given were less technical difficulties and faster access.

CONCLUSION/FUTURE DIRECTION: The e-learning modules are well received, so we will continue to develop more modules and convert existing ones to web-based versions. However, we will continue delivering them on CD-ROM as well as online.

Notes:

CLINICAL INTEGRATION OF BASIC SCIENCE COURSES THROUGH PROBLEM BASED LEARNING

Jeffrey Sosnowski* M.D., Ph.D*. Department of Pathology, University of South Alabama, Mobile, AL 36688-0002 U.S.A*.

PURPOSE: Faculties of basic sciences are under pressure to add clinical problem based learning to courses. Clinically integrating basic science courses can be accomplished in a step fashion; clinical correlations, small group problem based, mixed case lectures, and split lectures. This abstract describes these various problem based learning methods, benefits and problems.

METHODS: Clinician guest lectures serve as an initial and often only attempt of clinically integrating the basic sciences. Small groups are powerful problem based learning tools focused on few concepts with increased student teacher interaction. Mixed case lecture format are lectures divided into concepts preceded by clinical cases. Split lectures are paired clinician and basic scientist teaching clinical cases integrating science concepts.

RESULTS: The right clinician gives captivating clinical correlations highlighting relevant basic science. Whereas the wrong clinician may not be prepared, provide contradictory material, or have PowerPoint stage fright. Successful small groups require standardization of the educational experience which can be difficult due to variations in teaching abilities of faculty. Mixed case lectures are dynamic platforms which allow students to identify with the patients within cases and their intellectual struggle working through cases drive them to focus on lecture material. Split lectures could replace clinical correlations but require time to format and a team of clinicians and scientists dedicated to developing successful lectures.

CONCLUSION: Medical students appreciate clinical integration in the basic science courses because problem based cases fuse with basic science concepts allowing for better retention of the basic sciences which form their educational foundation.

Notes:

BASIC SCIENCE MEETS CLINICAL PROBLEMS – INTEGRATED INTERPROFESSIONAL LEARNING REALLY WORKS.

Birgitta Björck, Coordinator*, *Agneta Månsson-Broberg MD, and Hans Gyllenhammar, MD, Ph.D.*. Karolinska Institutet, Institution for Medicine, Karolinska University Hospital Huddinge. S-14186 Stockholm, SWEDEN*.

PURPOSE: We studied interprofessional education (IPL) with medical- and nursing students using supercases. We asked if basic science aspects could be equally stressed in this interprofessional environment as they traditionally are when only medical students are present.

METHODS: Groups composed of 1-3 nursing students and 2-3 medical students were introduced to their supercases (current patients). They were asked to interview the patient and focus on the problems that were most important at that moment for the patient. These were seldom the main disease of the patient but rather problems like pain, gastrointestinal problems or nutritional problems. The students were instructed to find solutions together to the problems and evidence for their solutions in the literature. All conclusions should be evidence-based. In a concluding seminar they together presented their results. Both nursing and the medical teachers were present. The supercase-cycle was 1 or 2 weeks and the study period were 3 years.

RESULTS: The students worked well together with minimum need for teacher interaction. The teachers found that both groups of students equally well covered basic science. Nursing students often read chapters in medical student textbooks prior to reading original publications. Medical students received their first introduction to nursing as a scientific subject. Both groups of students evaluated the module positively with nursing students slightly more positive tan medical students.

CONCLUSION: The students often asked – why do we not do this more often? IPL is essential for clinical education but works equally well for selected basic science subjects.

Notes:

COMPETENCY DEVELOPMENT AT AN INSTITUTIONAL LEVEL: UTILIZING STAKEHOLDER INVOLVEMENT

*Majka Woods, **Brad Clarke*,** and Leslie Anderson: University of Minnesota Medical School, Minneapolis, MN 55455 U.S.A.*

PURPOSE: Through its Medical Education Development 2010 project (MED 2010), the University of Minnesota Medical School is evolving toward a system focused on learner-centered education for patient-centered care. Clearly defined competencies both support and allow for assessment of personal and professional growth. This poster focuses on the methodologies employed at the University of Minnesota to articulate the competencies for undergraduate medical students and the use of multiple stakeholders in the development process.

METHODS: While many local, national and international groups have developed competencies that serve as useful benchmarks, no single model aligned completely with our vision. We have adapted existing competencies as well as drafted new ones in order to explicitly reflect the U of MN institutional mission. The use of multiple stakeholders in an iterative development process has been a vital component of the development sequence.

RESULTS: Our resulting competency development model incorporates multiple steps and stakeholders:

1. Create cross-discipline partnerships to draft the competencies for each subject area. Draw from:
   - Basic Scientists
   - Physicians
   - Educators
   - Students
2. Allow each partnership to define its own process/starting point
3. Provide centralized Oversight Committee to clarify direction and process, remove hurdles, ensure progression
4. Arrange for multi-layered review teams
   a. Internal and external reviewers
   b. Reviewers from a range of health care professions

CONCLUSION/FUTURE DIRECTIONS: The project is intended to be iterative and longitudinal. Challenges, lessons learned and future steps are to be shared.

Notes:

DEVELOPMENT OF A CORE COMPETENCY UNDERGRADUATE CLINICAL CURRICULUM

Richard Currie*, *Joann Hayes, and Elizabeth Young, Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Rootstown, OH 44272 U.S.A.*

PURPOSE: A continuum of clinical education skill set development from student to resident to practitioner is emerging nationally. With ACGME's implementation of six core competencies, it is intuitive to develop an undergraduate clinical curriculum around the same set of core competencies and learning objectives. This curricular revision for the third-year core clinical clerkships is one piece of an Integrated Steps Curriculum.

METHODS: The existing curriculum was critically assessed, with recommendations regarding addition, modification, consolidation, relocation, and elimination of curricular content. Goals and objectives were developed for each core competency, with a common competency-based Final Grade Report Form and establishment of acceptable levels of performance.

RESULTS: A comprehensive, integrated core competency-based clinical curriculum with:

- Common goals and objectives;
- Established levels of competency
  - 'Progressing Appropriately' determined to be the skill set expectation
  - Levels of performance descriptors for 'Needs Development' and 'Exceptionally Advanced' were established
- Common Final Grade Report Form

CONCLUSION/FUTURE DIRECTIONS: Challenges of this implementation include faculty development, avoidance of old patterns in a new format, and implementation of a curriculum management oversight team. Future considerations include development and implementation of common instructional initiatives, assessment of outcome measures, and further development and expansion into the fourth-year elective rotations.

Notes:

FACULTY PERCEPTIONS TO CURRICULAR INTEGRATIONS IN THE FIRST AND SECOND YEAR UNDERGRADUATE MEDICAL CURRICULUM.

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PURPOSE: The effects of curricular changes are often studied from the students' perspective and little is known of the faculty's perceptions to these implementations. The purpose of this study was to evaluate the perceptions of faculty towards the recently implemented horizontal and vertical curricular integration of pathology teachings in the first and second year of the undergraduate medical curriculum.

METHODS: Purposive sampling of four experienced medical faculty educators (2 males and 2 females) as voluntary participants for this study was undertaken. Data were collected from a one page semi-structured questionnaire and an in-depth focused one hour personal interview.

RESULTS: All faculty members agreed that this integrated curriculum promoted increased student engagement and student learning with better holistic understanding of the human body processes that was well suited to the students' long term goals of becoming a physician. However, faculty also identified increased faculty interactions with increased workload as a downside to this process. Faculty also felt threatened by the 'loss of discipline' and 'loss of power' contributing to increased faculty stress. This was compounded with faculty disagreements on content management and time allocation. The notion of respect, team-build, power and competition within such integrative environments arose as interesting facets of the faculty discussions. Last but not the least, it was recognized that to prevent chaos and disintegration, all curricular integrative environments needed vigilant monitoring with accountability to maintain sustainability of the implemented changes.

CONCLUSIONS: Awareness of such faculty perceptions is important information for consideration in the implementation strategies designed for all future curricular innovations.

Notes:

THE CONTENT OF THE UNDERGRADUATE SURGICAL COURSE: NEEDS ASSESSMENT

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[1] Department of Surgery, Faculty of Medicine, Cairo University, Cairo 264, Egypt and [2] Department of Surgery, College of Medicine, King Khalid University, Abha 641, KINGDOM OF SAUDI ARABIA.

PURPOSE: The College of Medicine, at King Khalid University (KKU), Abha, Kingdom of Saudi Arabia (KSA) has been trying to update its curriculum. The aim of this study was to determine the contents of the undergraduate surgical course.

METHODS: We adopted a questionnaire developed by the Association of Surgical Education (ASE), where responders graded the importance of 84 areas of knowledge and 46 skills. We sent the questionnaire to faculty members at KKU, consultants at Aseer Central Hospital (ACH), a group of students, house officers and residents in training at ACH. Knowledge & skills were ranked based on a mean value score (0-3) that determined the priority list. Stratification of results into three levels for knowledge; indepth - knowledge, moderate & familiarity. Skills levels were categories in three groups; proficiency, performed & observed. We compared our results to the finding of ASE published priority list.

RESULTS: Our results showed that 25/29 of knowledge ranked as indepth-knowledge matched with ASE findings, whereas 4 topics received a lower score. Our responders added 8 topics that they found essential. Regarding skills priority score, our results matched in 22/24 of skills scored as proficiency essential by ASE.

CONCLUSION: We concluded that the determination of surgery content for surgery course is essential to be done by the group of faculty members in the environment and region of the world were these courses will be implemented. Matching with international standards is important. We recommend that similar studies should be done prior to adopting international course since.

Notes:

RESPONDING TO THE PROPOSED USMLE "GATEWAY" INITIATIVE: ONE MEDICAL SCHOOL'S STORY

Ruth Greenberg* *and David Wiegman, University of Louisville School of Medicine, Louisville, KY, 40202, U.S.A.*

PURPOSE: For the past year, medical schools have been discussing the curricular and assessment implications associated with a possible change in the current USMLE licensure system that would eliminate Step 1 and Step 2 CK and replace them with a new "gateway" examination at the end of third year. Although no formal proposal has yet been presented by USMLE, medical educators have begun to consider its curricular impact. This abstract describes the steps one medical school has taken to promote student success in a potential end-of-third-year examination.

METHODS: As a medical school with a relatively "traditional" curricular structure, we were concerned about the possible elimination of Step 1. The Educational Policy Committee (EPC) encouraged the Dean to initiate curriculum review. The Dean charged the EPC to make recommendations that would respond to the proposed Gateway system. The EPC hosted a Curriculum Retreat to solicit feedback about a core set of curricular revisions. The Retreat was well attended by stakeholders (students, department chairs, faculty). Work groups were used to develop recommendations, including a "funding" work group.

RESULTS: The Curriculum Retreat was well received by attendees. Post-retreat communications with attendees and other medical school stakeholders created a positive attitude toward curricular change. Recommendations and a proposed budget were forwarded to the Dean. Recommendations included starting clinical clerkships earlier, creating an integrated lecture series in clinical years for all students, and restructuring some basic science courses.

CONCLUSION: Even the possibility of change in a high-stakes licensure examination may become an effective tool for promoting curricular review and reform.

Notes:

IMPLEMENTING A HUMANITIES IN MEDICINE REQUIREMENT: CHALLENGES AND OPPORTUNITIES

Ruth Greenberg* *and Edward C. Halperin, University of Louisville School of Medicine, Louisville, KY, 40202, U.S.A.*

PURPOSE: Many medical schools have developed electives and selectives that focus on the humanities in medicine. These courses create opportunities to explore and learn about the human qualities that physicians must display when they care for patients. In an effort to ensure that all students have opportunities to explore their own humanistic attitudes and behaviors, we developed a Humanities in Medicine requirement for all medical students. This abstract describes the challenges we faced and the strategies we employed to respond to those challenges.

METHODS: We faced three major challenges: 1) securing "buy-in" from stakeholders: students, faculty, course/clerkship directors, and department chairs; 2) identifying space in an already over-crowded curriculum for the new courses; and 3) identifying a way to deliver the courses to students at a regional campus. We addressed these challenges by: 1) sharing information broadly; 2) providing multiple opportunities for open discussions; 3) considering the needs of the learners; 4) exploring ways to use technology to support learning; and 5) emphasizing a collaborative, multi-stakeholder decision process.

RESULTS: The strategies we used resulted in a successful acceptance and approval process. The total number of hours in the curriculum remained unchanged. Stakeholders felt like partners in this process.

CONCLUSION: Communication, collaboration, and conciliation facilitate the introduction of curricular enhancements.

Notes:

CURRICULUM EVALUATION OF EXTRA-DEPARTMENTAL LEARNING PROGRAMS: PROCESS AND DOCUMENTATION

James Grogan*[1*]*, Mary T. Coleman [2], Scott A. Ippolito [3], Janice Johnson [4], Harriet H. Myers [5], Michael Robinson [6], Mukarram Uddin [7], Kal Winston [8], Michael M. Yakubovskyy [9]. [1]Department of Biochemistry, Ross University School of Medicine (RUSOM), Dominica, [2]Dean, RUSOM, [3] Associate Dean, Clinical Sciences, Edison, NJ, [4]Department of Pathology, RUSOM, [5] Associate Dean of Student Affairs and Department of Behavioral Science, RUSOM, [6] Assistant Dean of Curriculum and Department of Microbiology, RUSOM [7]Department of Anatomy, RUSOM, [8] Academic Success and Problem Based Learning Programs, RUSOM, [9] Department of Pathology, RUSOM.

PURPOSE: Evaluation of special extra-departmental curriculum programs requires effective participation of faculty stake-holders with different views on their educational value. We developed and implemented an effective method of program evaluation which may be applied to diverse extra-departmental programs.

METHODS: A uniform process timeline and unique evaluation forms were employed to address special features of each program. The three programs evaluated were Problem-based Learning (PBL), Academic Success (AS) and Progressive Academic Education (PAcE). Evaluation team members independently consulted with Program Leaders to complete evaluation documents. Communication was facilitated utilizing a system of icons representing the six ACGME competencies. The evaluation forms served as platforms for associating unique data pertaining to each program, and also served as focal points for group discussions of the Curriculum Committee.

RESULTS: Committee meeting discussions followed this schedule: (1) Program Evaluators presented their summary recommendations with any commentary on special issues which arose during the evaluation process, (2) Program Leaders were asked to comment on the recommendations and (3) questions and comments on the recommendations were invited from the full committee membership. A survey of the participants regarding the evaluation process and aspects of communication suggest future modifications for improved outcomes.

CONCLUSION/FUTURE DIRECTIONS: Effective evaluations depend on effective facilitation of dialogue between curriculum committee members and course directors to result in positive change. Extra-Departmental curriculum program evaluations are most effective when documentation facilitates focused discussions.

Notes:

Electronic Demo

TEACHING RESOURCE CENTRE (TRC): PERSONALIZED E-TEACHING OF PHARMACOLOGY AND PHARMACOTHERAPY THROUGHOUT A MEDICAL SCHOOL CURRICULUM

Eline Dubois*[1] *and Kari Franson[1,2], [1]Leiden University Medical Center, Leiden, the NETHERLANDS, [2]Centre for Human Drug Research, Leiden, the NETHERLANDS.*

PURPOSE: Due to curriculuar changes at our medical school, pharmacology and pharmacotherapy teaching had to be integrated into courses throughout the curriculum. For this purpose one integrated learning strategy (Teaching Resource Centre: TRC) has been developed to provide a consistent presentation across the curriculum and optimal personalized student self-learning possibilities.

METHODS: The TRC program contains basic pharmacological information and mechanisms of drug action integrated with respect to physiology and pathophysiology using graphics or animations in the TRC icon language, explanation texts and formative feedback questions. Another part of the TRC teaches the student therapeutic decision making for a specific patient following the Dutch 6step format. The student is guided through the therapeutic decision process and can practice writing therapeutic plans in interactive, step-by-step assignments. Furthermore, the TRC is personalized for each user. This means that anybody can log onto the TRC program using a personal account and easily identify previously studied, newly added or changed topics. Finally, usability is enhanced by adding improved search options and a new interface.

RESULTS: Increasing numbers of medical students from all Dutch medical schools use TRC. Over 80% of the Leiden medical students use TRC; they enjoy studying with the program and increasingly rely on it.

CONCLUSION: The TRC program helps students to obtain pharmacological knowledge and to practice with therapeutic plans throughout the curriculum in a consistent, structured and stimulating manner. Curriculum-wide e-learning programs should specifically address usability issues like personalization, user friendliness and recognizability for optimal student learning efficiency.

Poster Award Finalist

Notes:

BEDSIDE BASIC SCIENCE – SUPERCASES FACILITATES INTEGRATION OF BASIC AND CLINICAL SCIENCES.

Hans Gyllenhammar, M.D., Ph.D.*, *Karouk Said M.D. and Birgitta Björck, Coordinator. Karolinska Institutet, Institution for Medicine, Karolinska University Hospital Huddinge. S-14186 Stockholm, SWEDEN.*

PURPOSE: To test the concept of continuous and transparent integration of basic- and clinical sciences in a new course within the Karolinska institute (KI) medical curriculum.

METHODS: In the new, integrated curriculum of the KI we designed a 5 week elective course “Inflammation in Clinical Medicine”. The course was designed to include two modules: One traditional with lectures and demonstrations. In this module basic and clinical science were presented mostly as separate entities. The second part was based on supercases (see e.g. B. Björck et al., IAMSE 2005) where basic and clinical sciences were completely integrated. The students were introduced to their supercases – patients currently in the hospital. They extract all that is of importance for inflammation from the case. They are instructed to find evidence for their conclusions in original publications, meta-analysis or review articles. All conclusions should be evidence-based.

RESULTS: On a scale from 1 to 10 (best) the students evaluation of the conventional module at 7.4 whereas the integrated module was evaluated at 8.1. The evaluation of the integrated module was reduced by a small number of students who were rather negative whereas 85% rated it at 9 or 10. However, teacher evaluation strongly favoured the integrated module stressing high student activity and excellent learning outcome.

CONCLUSION: More study is needed to find the best way to integrate basic and clinical science but we find the results for supercase-based integrated learning to be most promising and we are currently planning a new study.

Poster Award Finalist

Notes:

INTEGRATION OF ALLIED DISCIPLINES WITH GROSS ANATOMY CLASS NOTES

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PURPOSE: Most biomedical science learning resources presented in a PBL program are discipline-based, so that students are required to integrate and synthesise much of the information presented during a single week, based on a clinical problem. More explicit reference to histology, physiology, radiology and pathology was included in the gross anatomy practical notes, and student reactions to these changes were determined.

METHODS: Paper based questionnaires were used to survey second year students about their attitudes to the discipline of anatomy and its presentation. The results were used to edit the existing notes. Focus groups involving final year medical students then discussed the differences between first year anatomy notes presented three years apart. Most recently, on-line questionnaires of one-quarter of the first year cohort were used to determine student attitudes to various aspects of the first system module presented in this PBL-based hybrid curriculum.

RESULTS: In the first survey of second year students, practical notes were identified as a weakness in the teaching of anatomy. In a subsequent focus group, fourth year students were very positive in their reactions to the change in format of the notes, including the integration of allied disciplines. Early in 2008, the response to anatomy teaching was better than that of other biomedical science disciplines.

CONCLUSION/FUTURE DIRECTIONS: There is general satisfaction with the teaching of anatomy in the course, but the effects of modelling the processes of integration and synthesis by making specific references to allied disciplines needs to be tracked throughout the year with qualitative comments from students.

Notes:

BLENDED LEARNING STRATEGIES FOR FIRST YEAR MEDICAL STUDENT BASIC SCIENCE COURSES

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PURPOSE: At Michigan State University, the allopathic (College of Human Medicine) and osteopathic (College of Osteopathic Medicine) medical schools teach the first year basic science courses jointly, with 356 students currently enrolled. Both colleges are planning expansions to include preclinical students located at multiple sites. This abstract describes the planning process for curricular delivery and progress in producing online materials in selected courses.

METHODS: A coordinated effort began in spring 2007 with involvement of multiple campus units, including administrators in both medical schools, MSU Global, Virtual University Design and Technology, Health Information Technology, MSU Libraries, and teaching faculty. Regular planning sessions were held. Input was obtained from Year 1 students about the most effective use of online options. Besides lecture delivery, strategies have been determined for development of interactive digital materials that can be shared. These would include multimedia objects for use without copyright fees (e.g. from Health Education Assets Library). Requirements for faculty support and features needed in a local searchable repository of re-usable learning objects were discussed

RESULTS: Development of online interactive modules has been planned and partially implemented for disciplines of biochemistry, physiology, histology, bacteriology, immunology, and neuroscience, with attention given to effective modalities for specific course objectives, focusing initially on difficult concepts.

CONCLUSION/FUTURE DIRECTIONS: Goals include development of online materials that (1) enhance learning, (2) can be implemented as part of blended learning strategies for students in multiple sites, and (3) can be adapted for integration in the curriculum in Year 2 courses and in clerkships.

Notes:

INCORPORATING NEJM "CLINICAL PROBLEM-SOLVING" INTO A MEDICAL SCHOOL PATHOLOGY COURSE

*Scott J. Schoenleber, **David M. Kurtz***, Jennifer L. Kruse, Joseph P. Grande, MD, Ph.D. Mayo Medical School, Mayo Clinic College of Medicine, 200 1ST Street SW, Rochester, MN 55905 U.S.A.*

PURPOSE: Integration of the basic and clinical sciences has become a priority in medical education. An introductory pathology course emphasizing morphologic changes and mechanisms of disease in lecture- and case-based formats would be an optimal environment in which to combine these.

METHODS: We developed a clinical problem-solving journal club to provide students with a framework for formulating a differential diagnosis and considering diagnostic tests. Upon course completion, students were given a survey to report their thoughts regarding the benefits and shortcomings of journal club.

RESULTS: Forty-one of 42 first-year students completed the survey, which contained questions scored from 0 (strongly disagree) to 10 (strongly agree). Students were split regarding journal club's value (24% rated it as "very valuable;" 44% rated it as "least valuable"). The greatest benefits of journal club appear to be correlating clinical cases with pathologic findings (mean score 7.0/10), formulating a working differential diagnosis (6.6/10), and becoming more excited for upcoming clinical experiences (6.5/10). Students who found case-based learning useful also reported journal club to be a useful way of making clinicopathologic correlations ($p=0.05$). Those who said journal club was a most useful part of class reported large improvements in differential diagnosis formulation ($p=0.007$), a greater desire to read medical journals ($p=0.002$), and more excitement for upcoming clinical experiences ($p=0.003$).

CONCLUSIONS/FUTURE DIRECTIONS: A journal club emphasizing clinical problem-solving may be a useful tool in a case-based and basic science curriculum. Focus on differential diagnosis formulation and clinicopathologic correlations appears to be most enjoyable and beneficial.

Notes:

CAN YOU SAVE LUCY BROWNING? ENCOURAGING CHILDREN TO PURSUE A CAREER IN MEDICINE USING MULTIMEDIA CASE SCENARIOS

*Jo Cross and **Paul Scott*.** Hull York Medical School. University of York, Heslington, York. YO10 5DD. U.K.*

CONTEXT: The Higher Education Funding Council for England (HEFCE) have made Widening access and improving participation in higher education one of their key strategic aims in recent years. At Hull York Medical School (HYMS) the overarching aim of the widening participation agenda is to encourage and support applications to Medicine and other health related Higher Education courses by young people from under-represented groups in society.

METHODS: The Lucy Project is part of HYMS' Widening Participation programme and is designed to stimulate children's interest in Science using a range of media focusing around a medical case study. Children are split into groups, and with the support of HYMS students work through the 'real time' scenario of managing the treatment of Lucy, who has been involved in a serious car accident. Using multimedia resources the children have to decide which investigations are appropriate and then based on these results develop and discuss a treatment plan for their patient.

RESULTS: Although the project is still in the early phase of development the initial evaluations received from the participating schools have been very positive. This feedback has also generated significant interest from other schools for further sessions to be made available.

FUTURE DIRECTIONS: Planned future developments are to create a web application to support the project which can be accessed both before and after the event. This would facilitate further classroom based activities extending the scope of the project and would be a valuable asset for building lasting relationships with schools in the region.

Notes:

THE MEDICAL LITERATURE CURRICULUM

*Karen C. Kelly and **Paul F. Shanley***, *SUNY Upstate Medical University, Syracuse NY, 13210 U.S.A.*

PURPOSE: Our goal was to help students integrate the basic and clinical sciences throughout medical school through formal study of the medical literature.

METHODS: The Medical Literature Curriculum (MLC) consists of three required yearlong courses running in parallel with the standard curriculum. In the two pre-clinical years, the courses feature independent study of case reports and perspective pieces followed by class discussion with faculty experts. After clerkships, study of clinical and translational research reports returns students' focus to the scientific basis of medicine. Participation in the process is assured by quizzes prior to class discussion and by written assignments, such as "pathophysiologic case analyses" and "lay summaries" of research suitable for counseling patients.

RESULTS: Due largely to student advocacy, the MLC has progressively expanded into a multidisciplinary enterprise over the past 6 years. Surveys show that published cases provide an accessible entry into the literature for beginning students and that reading them achieves the same motivational benefits as other case methods. Reading papers reporting medical research during the fourth year represents a substantive response to the challenges issued by the AAMC to return to basic science and the new LCME standard necessitating student exposure to the basic principles of research.

CONCLUSION: The MLC applies basic science knowledge concretely and demonstrates its relevance first in case analysis and later in assessing scientific progress toward solutions of problems in medicine. Formal reading of the medical literature under the guidance of faculty can be a foundational educational experience, initiating students into the authentic conversation of medicine.

Notes:

CLINICAL MEDICINE CORRELATION EXERCISES USING A HIGH FIDELITY SIMULATOR TO ENHANCE BASIC SCIENCE TEACHING

*David A. Wald, **Gerald Sterling***, *Jane Cripe, James Heckman, Jeffrey Barrett, Thomas Costantino, Michael DeAngelis, Nina Gentile, Joseph Lex, James Ryan, Ronald Tuma*
Temple University School of Medicine, Philadelphia, PA 19140 U.S.A.

PURPOSE: Use of high fidelity patient simulators is an important teaching modality to integrate basic science concepts with clinical medicine. We describe the implementation of educational exercises in the first two curricular years to bridge the gap between the classroom and the patient care setting.

METHODS: Faculty from the departments of emergency medicine, pharmacology, and physiology developed three basic science – clinical correlation exercises, which were implemented during the 2007 – 2008 academic year (complete heart block – MS I students, tachyarrhythmias – MS II, acute exacerbation of asthma, and opioid overdose – MS II). Each case emphasized the basic science principles (physiology and / or pharmacology) as applied to the management of selected clinical conditions. The exercises were taught in small groups with a basic science and clinical faculty member using a high fidelity simulator (SimMan®).

RESULTS: The basic science – clinical medicine correlation exercises were highly rated by all MS I and MS II students and were felt to be of substantial educational value in enhancing their knowledge of basic science, and integrating the knowledge in a clinical setting. In addition, all faculty felt that this approach promoted collegiality between the basic science and clinical faculty.

CONCLUSION: High fidelity simulators can be used in a multidisciplinary fashion to bridge the gap between basic science and clinical medicine. Because of the positive response in its first year, we are planning on expanding the program to include six basic science – clinical medicine correlation exercises (three MS I, three MS II) during the 2008 – 2009 academic year.

Notes:

RETENTION OF BASIC SCIENCE INFORMATION BY SENIOR MEDICAL STUDENTS

David Swanson*[1], *Yu Ling*[1], *Kathy Holtzman*[1] *and S. Deniz Bucak*[1]
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PURPOSE: Over the past 30 years, NBME studies of the retention of basic science information have consistently shown performance declines as students progress through medical education. This study investigated whether the changes occurring in basic science education and assessment over the past decade have altered patterns of basic science retention.

METHODS: 502 content and statistically representative basic science items from 2004-05 forms of USMLE Step 1 were included in unscored sections of 2004-05 USMLE Step 2 Clinical Knowledge (CK) test forms, and the performance of 15,000+ first-time examinees from US and Canadian schools was analyzed to identify item characteristics affecting retention.

RESULTS: Across all 502 items, the mean item difficulty on Step 1 was 76.1%; on Step 2 CK, this value declined 6.4% to 69.7%. Performance improvement was only observed for Behavioral Sciences items (8.7%); performance declined in all other disciplines, with the largest declines in Biochemistry (17.5%), Microbiology (12.6%) and Pharmacology (10.1%). Performance on items presented in the context of patient vignettes declined relatively little (3.1%), with larger declines observed for experimental vignettes (12.0%) and non-vignettes (14.2%).

CONCLUSION: Shifts in examinee performance were similar to those observed in four previous NBME studies, although the magnitude of the overall decline was somewhat larger. These results were somewhat disappointing: one might anticipate that use of integrated basic science curricula would improve retention of basic science information, particularly when assessed in a clinical context. Clearly, additional research on teaching, learning and testing students' understanding of basic science is desirable.

Notes:

INTEGRATED PBL CURRICULUM AND BASIC SCIENCES – MISSION (IM)POSSIBLE?

Ute Tautenhan*[1], *Dagmar Rolle[2], Jörg Pelz[2], (1) Klinik am Park, (2) Charité Universitätsmedizin Berlin, 10117 Berlin, GERMANY.*

PURPOSE: Basic science concepts are thought to receive not enough attention in integrated PBL curricula. Nevertheless they are implicitly present and may be notably hidden in an 'organ and periods of life' structured PBL based curriculum. We analysed which basic concepts were covered by the learning targets of the students during the first 5 semester of a PBL curriculum.

METHODS: The learning targets of all PBL groups (9 per semester) of the first 5 semester of the reformed curriculum at the Charité (Berlin) – resulting in more than 600 sessions - were analysed for their content. The analysis was done independently by two physicians (one in addition a basic scientist).

RESULTS: About 40% of the learning targets formulated by the students addressed basic science concepts or issues. The targets were formulated in different quality and variable depth. They comprised a sufficient high amount of knowledge necessary to analyse clinical problems.

CONCLUSION: The rationale to teach content through patient cases is to provide students with a context so that they can see the clinical relevance of the basic science concepts at once and so that they can instantaneously use them for solving the cases. This aim is sufficiently achieved in the Berlin reformed curriculum.

Notes:

FUNDNAMENTALS OF MOLECULAR MEDICINE, LEARNING BASIC SCIENCE CONCEPTS IN A STUDENT-CENTERED ENVIRONMENT: MEDICAL STUDENTS' PERCEPTIONS

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PURPOSE: The Fundamentals of Molecular Medicine (FMM) course is a first year course where medical students learn fundamental concepts in cellular and molecular biology and biochemistry in small group, faculty facilitated sessions. The primary objectives for FMM are two-fold: 1) Students understand and apply their knowledge of cell and molecular biology and biochemistry to solve clinically relevant questions; 2) Students develop skills in small group, interactive student-centered learning. To determine if the course accomplished these two major objectives, we surveyed three separate medical student classes.

METHODS: An end-of-course electronic survey of undergraduate medical students in classes matriculating in 2005-2007 was administered to all students. The percent of responses were calculated on a three or four point scale.

RESULTS: The vast majority of students agreed or strongly agreed that FMM contributed to their learning of basic science concepts (88 %), helped link clinical symptoms to underlying basic science concepts (86%), and helped students develop skills working in small groups (93%). Similar numbers were obtained when asked other specific questions that addressed these two major objectives.

CONCLUSION/FUTURE DIRECTIONS: The majority of students confirmed that the two major objectives of the FMM course are being met. The faculty facilitator writes mid-term and end-of-course assessments regarding medical knowledge, professionalism and communication competencies for each student. As a next step, these assessments will be examined to determine if the facility assessments match the overall students' perceptions.

Notes:

WR2 IQ+: A RECIPE FOR INTEGRATING A BASIC SCIENCE CURRICULUM INTO CORE CLERKSHIPS

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PURPOSE: To weave the scientific foundations of medicine and health with clinical experiences throughout the four-year Western Reserve2 (WR2) medical education curriculum.

METHODS: Experience dictated that a successful integration of basic science into the third year clerkships would require a curriculum that was highly engaging and relevant to clinical care situations. Faculty and students collaborated to develop guiding principles, key features and a sample template for "pull-out" sessions that would take place at the medical school on Friday afternoons during the core clerkships.

RESULTS: A curriculum was developed based on guiding principles that focus on 1) basic science and emerging basic science knowledge in the practice of clinical medicine, 2) reflection, feedback, and team interaction in professional growth and development and 3) advanced skills in communication, physical examination, clinical reasoning, and critical appraisal/evidence based medicine. The curriculum emphasizes interactive, self-directed learning in small-groups building on the Case Inquiry (IQ) groups that are a central feature of the WR2 curriculum. Four-hour sessions were designed to be entirely self-contained with integrated time for reflection, clinical problem solving, research, expert consultation and didactics, and related simulation exercises. Facilitation by faculty and senior students was incorporated to provide guidance and perspective.

CONCLUSION: A curriculum development process that utilized balanced input from faculty and students along with clear guiding principles has facilitated the creation of a session template that allows for reflection, integration of clinical and basic sciences, acquisition of new emerging basic science knowledge and clinical skills development.

Notes:

"NATURAL HISTORY" OF VIRTUAL MICROSCOPY ADOPTION IN A MULTI-DISCIPLINARY PRE-CLINICAL MEDICAL CURRICULUM

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PURPOSE: Virtual microscopy (VM) will likely replace standard microscopy for teaching of histology and histopathology in medical schools. Our multi-disciplinary pre-clinical curriculum offers the opportunity to study the spread of VM through the program, and the evolution of faculty approaches to its utilization.

METHODS: At UTMB, VM has been implemented between 2002 and 2008 under the impetus of individual course directors, rather than by curriculum committee mandate. We classified VM applications according to the degree to which they enhanced existing teaching modalities, ranging from Level I (e.g. replacing glass slides in lab exercises with virtual slides), to Level III (e.g. annotated tutorials with self-assessment exercises).

RESULTS: VM was first introduced in two first year, basic science core courses in level II/ III applications from the outset. In subsequent organ system courses, two patterns of implementation were observed. In one pattern, the technology was gradually introduced, beginning with low level applications. In other courses, LIII applications were used first. Early adopters tended to start with higher level applications. Late adopters typically started with level I applications. Late adopters were as likely to be pathologists as not. Overall, there has been an exponential growth in the use of VM across the curriculum.

CONCLUSION/FUTURE DIRECTIONS: The patterns of adoption of VM reflect variations in rates of faculty acceptance of the technology but an overall appreciation for its educational value. We believe that allowing faculty to "buy-in" at their own pace will foster further creative integration of VM into the pre-clinical curriculum and beyond.

Notes:

STIMULATING COLLABORATIVE LEARNING USING A WIKI

*Mary Dankbaar, **Mathijs Doets*** and Emely Spierenburg, Erasmus University Medical Center, Rotterdam, THE NEHTERLANDS.*

PURPOSE: To stimulate collaborative learning in the Erasmus University medical curriculum, we introduced a new group assignment. Challenges were the large number of students (350 in the third year), assessment and selecting a suitable tool to support the collaborative learning process.

METHODS: The group assignment (12 students) was to write a fictional clinical case in a wiki, a website which facilitates collaborative writing. Each group was coached by a clinical teacher, who met with the group and provided feedback. Students also had to give feedback on the cases of other groups. The teacher assessed both the quality of the clinical case and the collaborative learning process.

RESULTS: Evaluation showed that students were satisfied with the ease of use of the wiki software (spontaneously, students applied wikis in other settings) and the feedback from the teacher. However, they were critical on the assignment itself. The cases were too familiar and they found the group size too large. The teachers found the quality of the cases varying, sometimes large pieces were copied from other sources. There was limited collaboration within groups. A small subgroup constructed the case, other students contributed only comments.

FUTURE DIRECTIONS: For this year, the assignment will be used again, but it will be more extensive and structured, with different subtasks laid out. Also, students will have to assess each other's contribution, putting more emphasis on the collaboration process. By introducing group assignments in other parts of the curriculum, we hope the students will get used to collaborating electronically.

Notes:

Electronic Demo

USING WEB 2.0 FOR FACULTY DEVELOPMENT

Deirdre Bonnycastle*, *College of Medicine, University of Saskatchewan, B103 Health Sciences Building-107 Wiggins Road, Saskatoon, Saskatchewan, S7N 5E5 CANADA.*

PURPOSE: Bringing faculty development opportunities to the College of Medicine's 300+ community-based physician/faculty scattered over 588,276.09 square kilometers is a mind boggling task if you try to provide training face to face. Educational Support and Development needed to find innovative ways to meet their mandate with this group.

METHODS: Web 2.0 is the popular term for online tools that allow readers to interact with the online content. This electronic demo will show how tools such as Blogs, Wikis and Elluminate have been used at the University of Saskatchewan to increase the availability of training opportunities to individual physicians at distant locations.

RESULTS: The Medical Education Blog http://blogs.usask.ca/medical_education/ averages 150 downloads a month, there are 2 provincial committees using wikis regularly, the information wiki http://wiki.usask.ca/db/index.php/Main_Page has been accessed 3,293 times. 60 people have participated in three Elluminate sessions. Awareness of the resources is the biggest obstacle to overcome. The second obstacle is engaging faculty to actively participate rather than passively reading.

CONCLUSION/FUTURE DIRECTIONS: Web2.0 tools are a useful method of providing faculty development opportunities to people at a distance because they are relatively inexpensive and easy to create, maintain and access. Engaging people into actively participate with these tools is a more onerous task.

Notes:

STUDENT LEARNING IS ENHANCED BY CONDENSING OBJECTIVES AND PROVIDING EXPLICIT READINGS LINKED TO LEARNING OBJECTIVES

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PURPOSE: At our institution, first year medical students have had more than 70 learning objectives per week for a cardiovascular course. There were many indications that this number of objectives was unmanageable and detracted from student learning. We decided to broaden and reduce the number of objectives to fewer than 15 per week, and to provide explicit textbook readings to define the scope of their learning. The goals were to 1) enhance student learning, 2) increase reading of textbooks, and 3) discourage the use of a student "objective exchange."

METHODS: Three weeks after the course ended, students were asked to complete a brief, anonymous online survey regarding their experience with this new objective format.

RESULTS: Student reaction to this change in faculty-directed learning was mixed during the course and immediately after the course, in large part, because of concerns that they might not be as prepared for the final exam. The reflective survey results taken 3 weeks after the course, however, showed that 80% or more of the class felt that having broader and fewer objectives with explicit readings enhanced their learning, and caused them to dig deeper into important concepts; 98% of the class admitted to reading more than for other courses.

CONCLUSION: Fewer learning objectives per week (<15) with explicit reading resources enhanced student learning compared to having 5-times that number of detailed objectives without explicit readings. Furthermore, students were more motivated to read textbooks instead of relying on student-generated objective exchanges.

Notes:

USE OF AN ONLINE IMAGE-LINKED GLOSSARY IN A GENERAL PATHOLOGY COURSE

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PURPOSE: A computer-based, image-linked Glossary of General Pathology (GP) terms was designed to provide first-year medical students easy access to definitions of terms introduced in the course, supplemented by integration of related images. A Pathology elective was created for second-year students to contribute content.

METHODS: Glossary terms from the GP course content were selected by the Course Director. Second-year students on elective provided definitions and identified images from a variety of sources. The edited content was loaded into the WebCT Glossary tool as an alphabetical listing accessed though an icon on the GP website. Glossary terms appearing within course material (course objectives, vocabulary, lecture and laboratory syllabi) posted on the website were also highlighted and linked to the Glossary for direct access. GP student feedback was reviewed in required end-of-course evaluations, and elective students' responses were solicited.

RESULTS: Over three years (2005-2007), an increasing percentage of students utilized the Glossary (52%→>75%). Students rated as 4/5 on a Likert scale: "The Glossary helped reinforce my understanding of the concepts covered." Free-text comments included: "The glossary was fantastic;" and "I thought the glossary was such a great learning tool." Students on elective reported an improved understanding of Pathology and praised its utility for Board preparation.

CONCLUSION/FUTURE DIRECTIONS: The Glossary, enriched by images, is a well-received teaching tool for GP students. The Glossary elective enhances acquisition of Pathology knowledge base. Continued development of the GP Glossary and expansion to other courses are planned.

Notes:

INTERNET-BASED CURRICULUM SUPPLEMENTATION (IBCS): A STUDY FOR GENETICS EDUCATION

Mary P Metcalf*[1] *and T. Bradley Tanner*[1]*,MD,* [1] *Clinical Tools, Inc, Chapel Hill, NC 27514 U.S.A.*

PURPOSE: Supplementation of existing curricula using structured online education has the potential to save time, teach a medical science topic that the institution could not do otherwise, and provide a consistent and reproducible experience that is easily available. We developed and implemented an "Internet Based Curriculum Supplement" (IBCS) program on the topic of the ethical, legal and social issues of genetics for use in medical schools.

METHODS: Our program provided live metrics (student and group based), integrated assessments and interactive question/responses. Instructional design, peer review and usability studies occurred during development. The final program included refresher medical science content, 6 case study modules, additional genetics modules, an image gallery, and resource information. Our implementation focused on how medical schools could most easily integrate the supplementary materials into their curriculum.

RESULTS: In 2006-2007, 897 students from 14 different medical schools utilized over 1700 modules. Implementation varied by school, ranging from 1 to 18 modules; (average 5). Some instructors made the courses "required activities;" others used them as supplements or "extra credit". Modules were incorporated into all years of undergraduate medical education. All schools wanted some level of data analysis, varying from complete analysis of metrics (knowledge, attitude, self-efficacy) to simple done/not done.

CONCLUSION: Online curriculum must be prepared for a wide variety of customization if it is to work outside the home institution. Modules and resources must be creatively designed to allow faculty to "pick" and choose which will work best within their curriculum. One size does not fit all.

Poster Award Finalist

Notes:

Improving Critical Thinking Skills in the Gross Anatomy Classroom

David A. Morton, Ph.D.*, Department of Neurobiology and Anatomy, University of Utah School of Medicine, SLC, UT; John D. Bell, Ph.D. - Department of Physiology and Developmental Biology, Brigham Young University, Provo, UT; William S. Bradshaw, Ph.D. - Department of Microbiology and Molecular Biology, Brigham Young University, Provo, UT, U.S.A.*

PURPOSE: Overemphasizing rote memorization of factual minutia is a criticism of medical gross anatomy (GA) courses. Experienced physicians indicate the need to improve critical thinking skills as opposed to memorizing volumes of information. To address this need at the University of Utah School of Medicine (UofUSOM) we sought to improve the GA course by implementing active learning exercises in the classroom and increasing the rigor of our exams.

METHODS: During one unit of the GA course medical students were encouraged to learn the basic facts outlined for each lecture prior to class. Class sessions involved a variety of short lectures with application exercises where students worked cooperatively solving clinical problems by integrating the lecture material. The didactic principle was to engage each student in active learning exercises such as Socratic dialogue or small group discussions. In addition, the exam questions focused on integrating the required material through problem solving.

RESULTS: Students enjoyed being actively engaged during lecture as opposed to passive listening. Students indicated how much they enjoyed being challenged on the exam because they were being stretched to think about the data as opposed to simply regurgitating it.

CONCLUSION/FUTURE DIRECTIONS: To help students focus their studying, specific objectives will be included for each of the 42 lectures detailing student expectations. Practice problems will also be provided for each lecture in order for students to practice synthesizing new information. We will continue to increase the rigor of exam questions in order to help students improve their critical thinking skills.

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Notes:

ONLINE TEACHING AND LEARNING: FACULTY PERCEPTIONS ON EFFECTIVE INSTRUCTIONAL FEATURES AND INSTITUTIONAL SUPPORT

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PURPOSE: To investigate faculty development efforts and faculty perceptions of what instructional design features are effective in the implementation of online lectures and online instructional materials.

METHODS: An online questionnaire was developed with four parts: (1) instructional experience, (2) experience with online courses and materials, (3) features important for successful online instruction and (4) resources important in developing online instruction. E-mail solicitation through several listservs was used to solicit respondents. Faculty who had no experience developing online materials were also asked to share their perceptions about online teaching and learning.

RESULTS: Faculty (N=234) from 83 domestic and international educational institutions responded to an online questionnaire. Sixty-eight percent of respondents taught medical or professional students. The majority of respondents (85%) felt that online instruction or materials enhanced teaching effectiveness. About 75% said that implementing online materials and instruction takes more time than traditional instruction. Of those who had some prior training in developing online materials (47%), 26% received it from individual consultations and the rest from classes at their institution. Faculty indicated that the key resources needed to assist and support their development efforts are: faculty release time (84%), technical consultation (88%), and on-going technical support (91%). Features of online learning materials considered very important included ease of navigation, interactive exercises, online quizzes and relevant images and video. A majority of faculty (70%) felt they were successful implementing online lectures or course materials.

CONCLUSION/FUTURE DIRECTIONS: These results will be used to provide support and training opportunities for faculty.

Notes:

LESSONS IN TEACHING HISTOLOGY: COLORFUL INSIGHTS FROM COLOR DEFICIENT STUDENTS

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PURPOSE: Routine histology relies on color staining techniques such as hematoxylin and eosin (H&E) to differentiate tissue components. It has been assumed that success in histology depends upon the ability to distinguish between various stain colors. If that were true, however, why are color deficient (color blind) histologists and histopathologists often exceptionally proficient in their fields? Given its prevalence, color deficiency likely poses a significant obstacle for a handful of medical students in each entering class.

METHODS: Previously, we have tested the effectiveness of color overlays and tinted contact lenses to filter out problematic colors for our color deficient students. Recently, we have used black and white computer monitors along with grey-scale prints to emphasize contrast and texture over color in histological sections.

RESULTS: Using these approaches, color deficient students have quickly learned to compensate for their deficiency by focusing on cellular morphology instead of color staining characteristics. Additionally, grey-scale prints may prove instructional for students with normal (trichromatic) vision, by encouraging them to consider subtle cell characteristics that may otherwise be overshadowed by stain color.

CONCLUSION: Transforming color histological sections to grey-scale was an effective teaching tool for our color deficient students. Additionally, because beginning students tend to rely too heavily upon color consistency between sections, all students may gain valuable insight by comparing color and grey-scale images, thus experiencing histology through the eyes of a color deficient student.

Notes:

FACULTY LEARNING STYLE AND STUDENT SATISFACTION

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BACKGROUND: We make sense of the world by the use of specific mental qualities that affect the way we perceive and order the world around us, i.e. the way we learn. According to Dr. Anthony F. Gregorc, these mental qualities can be divided into four groups of concrete sequential, abstract sequential, abstract random, and concrete random. All people have the ability to learn by each of these four methods, but tend to favor one or two. The method a teacher prefers to learn by can heavily influence their teaching methods. When the teaching method best matches a student's learning style, those students will tend to be better satisfied with that teacher. We will be testing the hypothesis that teachers with a learning style similar to that of medical students, concrete sequential, have higher student satisfaction scores.

METHODS: All faculty at the Joan C. Edwards School of Medicine at Marshall University were requested to complete a survey to determine their learning style. Linear regression analysis was performed to determine the degree of correlation and analysis of variance was used to determine significance of correlation of each learning style to overall student satisfaction as determined by teaching evaluations by the student population.

RESULTS: The survey for the faculty as a whole represents each learning style for each individual with a score. Higher scores in each category represent stronger preference. There is a favoring of sequential learning styles of both the abstract and concrete varieties in the faculty of our medical school. None of the learning styles showed a significant correlation with student evaluations. However, concrete sequential did show the best correlation with teaching evaluation using multiple linear regression analysis.

CONCLUSION: We were unable to offer statically significant results to support our hypothesis. However, it still represents the best-fit model when comparing teacher learning styles with student satisfaction. A larger sample size may be able to offer stronger support of our hypothesis.

Notes:

CASE DISCUSSIONS IN THE INTERNAL MEDICINE CLERKSHIP ENHANCED BY NOVEL 3-D VIRTUAL RECONSTRUCTIONS OF NORMAL AND PATHOLOGICAL ANATOMY

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PURPOSE: To increase the students' exposure to radiological imaging during the Internal Medicine clerkship and help them gain a thorough understanding of in situ three-dimensional relations within the human body.

METHODS: As part of our innovative approach to incorporate the use of the Eclipse Treatment Planning System (Varian Medical Systems) into various educational settings and venues, we added a novel instructional component to one of the sessions conducted with third-year medical students during their internal medicine core clerkship at the University of Massachusetts Medical School in the academic year 2006-2007. This pilot activity consisted of interactive case presentations and discussions enhanced by sectional images correlated with 3-D virtual reconstructions of anatomical structures based on real patients.

RESULTS: This creative methodology was used to review the regional anatomy and facilitate the integration of key concepts related to the pathological processes, principles of physical examination, radiological imaging, and certain medical procedures. It also stimulated the students' interest and active participation in the session. At the end of the session the participating students had the opportunity to voluntarily and anonymously complete a short questionnaire regarding the usefulness of this methodology. The method was considered useful for the learning of anatomy, for reviewing the anatomy beyond the first-year, and for discussing clinical applications during the clerkships.

CONCLUSION: New activities derived from our 3-D instructional methodology offer additional opportunities to discuss normal and pathological anatomy, seamlessly correlated with radiological imaging and applied to the clinical practice.

Notes:

THE REALTIONSHIP BETWEEN TIME SPENT BY STUDENTS ON AN HISTOLOGY ONLINE COURSE MANAGEMENT SYSTEM AND COURSE NUMERICAL GRADES

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PURPOSE: Increasingly, basic science courses in medical school are being supplemented with an online Course Management System (CMS). In the Spring of 2006, our Histology course was expanded to a CMS where students were able to access most components of the course such as: lectures, images, lab manuals, and self tests. This study examines the relationship between the amount of time students took advantage of the additional tool of learning and their final numeric course grade.

METHODS: Data was extracted from the CMS which showed the amount of time, the date, and the number of times each student accessed the CMS. Data was merged into an SPSS database containing students' block and final numeric course grades. (N= 99). Bivariate correlation procedures were performed to examine if a linear relationship exists between the total amount of time and/or number of sessions students' spent on the CMS and students' numeric grade.

RESULTS: The students perceived the newly introduced online instructional component as useful. Results reveal an extremely small, if any, inverse linear relationship between total time (r = -.145) and total number of sessions (r = -.168) and students' final course grade. Block results indicated similar findings. All of the correlations were not statistically significant. Additional findings will be reported.

CONCLUSIONS: Many aspects influence grades. The results could suggest that it may not be the quantity of time a student spends on a CMS, but the quality of the experience that impacts the final grade. Analysis of additional factors appears necessary.

Notes:

ASSESSING THE POTENTIAL VALUE OF REMOTE STANDARDIZED PATIENTS TIED TO ONLINE LEARNING

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PURPOSE: For medical students in the pre-clinical years, Standardized Patients (SPs) can help the learner integrate medical science knowledge into a clinical framework. While online learning has been shown to be effective, a similar demonstration of the utility and viability a "remote" SP has not yet been established. We seek to assess the pedagogical strengths and weakness of a "remote" SP encounter, where the encounter occurs via the Internet in comparison to "face-to-face" SP encounters.

METHODS: We are creating a suite of online educational modules incorporating vignettes, longer cases, standard interactivity and user controlled learning, to be paired with integrated SP interviews. During 2008-2009 we will compare 3 different types of SP experiences: text-based chat, video-enabled Internet phone conversation, or standard face-to-face interaction using a 3 group case-control evaluations with assessments pre and post intervention. Evaluation instruments include knowledge, attitude, and behavior measures as well as SP specific instruments.

RESULTS: Potential benefits of include the ability to deliver effective training curricula at institutions lacking in topic expertise, or appropriately trained SPs. Potential problems include insuring SPs are available, and maintaining a high quality SP experience when the SPs are not located onsite or are only using chat.

CONCLUSION: One can design an online learning experience that incorporates SPs in both the assessment and training components. Such a study can address questions about the means of delivering the SP experience to determine if there is additional value for live versus remote SPs, or video enabled conversation versus chat.

Notes:

MULTI-FACETED E-LEARNING: COMPARISON OF METHODS STUDY #2

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PURPOSE: Case-based learning (CBL) can be an effective web-based instructional method. However, specifically what effect a CBL component of multi-faceted instructional programs has on learning when compared to similar programs without a CBL component remains unknown. Thus, this study compared two web-based instructional methods and also compared the effects of time-massed versus time-spaced study on long-term knowledge retention.

METHODS: Using an entirely web-based program, 119 Internal Medicine housestaff were surveyed about their perceived bioterrorism preparedness and pre-tested on bioterrorism concepts. Subjects were then randomly assigned to one of four different online study groups, based upon study type (didactics plus cases versus didactics plus reading) and study schedule (time-massed versus 6-week time-spaced study), and then post-tested with online multiple-choice testing and targeted case simulations.

RESULTS: Upon survey, of eight medical specialties, subjects felt least prepared in bioterrorism, although 83% agreed that it's their responsibility to respond medically to a local bioterrorism event. Subjects studying with cases were better than reading group subjects in several target case performance metrics, such as diagnostic accuracy ($p=0.04$) and therapeutic efficiency ($p<0.05$). There were trends toward faster case solution time and better pre-test to post-test improvement in the case groups versus the reading groups. However, there were no reliable interactions between the study type and study schedule.

CONCLUSION/FUTURE DIRECTIONS: There is discrepancy between perceived bioterrorism readiness and responsibility among physicians-in-training. The case-based component improved the overall pedagogical efficacy of this multi-faceted web-based instructional approach. Additional and more diverse CBL environments should be studied for similar effects.

Poster Award Finalist

Notes:

Teaching Histology with interactive technology: Virtual Microscopy and audience Response System

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PURPOSE: Our collection of microscope slides was deteriorating, class size was growing, faculty, and course support staff were less available. School administrators were urging student self-directed and collaborative study. Faculty were expected to provide more small group interaction and less contact time.

METHODS: By introducing virtual microscopy (VM; Bacus) and an Audience Response System (ARS; Turning Point), we completely changed our traditional approach to histology laboratories. Students worked with a partner in preparation for each 75-minute discussion session, which began promptly with a 3-question quiz using Audience Response System (ARS; Turning Point), and images from the assigned VM slides. The quizzes contributed 10% to the final course grade.

RESULTS: Students quickly learned to complete the exercises before their assigned discussion session. The ARS quiz assured that the students keep up with the laboratory assignments. The ARS quiz results identified under-performing students within the first three laboratory sessions, rather than after the first practical exam. Our first VM practical exam replicated the first exam of the previous fall. Performance on this exam was nearly 16 percentage-points higher than the mean of any first exam we have given with slides and microscopes.

CONCLUSIONS: The students' responses to both the VM and to the ARS were universally positive and enthusiastic. We have now also successfully incorporated ARS into the lectures of the histology course.

Notes:

PEER TEACHING AS A LEARNING TOOL IN THE GROSS ANATOMY COURSE

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PURPOSE: Peer teaching is an important tool in the Gross Anatomy course. This study evaluates the opinion of medical students in relation to peer teaching strategies including: understanding of the material; collaboration/cooperation within groups; adequacy of the group size; active participation of peers in the groups; case presentations and the role of peers; academic integrity and honor code as observed by peers; and if this strategy should continue in the Institution.

METHODS: A paper and pencil questionnaire was used to survey 60 first year medical students about peer teaching strategies in the Gross Anatomy course. Overall satisfaction was measured using a 4-1 scale, and narrative opinions were gathered**.**

RESULTS: According to the questionnaire results; 86% of the students agreed that peer teaching helped them better understand the material; 92.6% recognized that collaboration/cooperation among peers was positively promoted; only 52.9% agreed that 8-9 students per group was adequate; 54.4% agreed that peers participated actively. In case presentations 96.5% recognized that peer interaction was important; 85.2% admitted to observing academic integrity and adherence to the honor code among peers, and 95.5% of the students recommended the continuation of peer teaching strategy at the Institution.

CONCLUSIONS: It can be concluded that the peer teaching strategy positively affected the performance of the medical students; it helped them to better understand the material. The strategy needs fine tuning with regard to the optimal number of students per group, so that they can participate actively in the process. The students recommend that the strategy continue at the Medical School.

Notes:

A SUCCESSFUL RECIPROCAL PEER TEACHING PROGRAM FOR MEDICAL GROSS ANATOMY AND HISTOLOGY LABS

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PURPOSE: Many medical schools have been faced with the challenges of increasing class size while at the same time facing static laboratory size and, in some cases, reduced number of teaching faculty. In our institution, we implemented a Reciprocal Peer Teaching Program in the Histology and Medical Gross Anatomy labs to alleviate some potential concerns associated with these challenges, and at the same time to facilitate the interaction among students. In addition, it was hypothesized that the students would learn the material better when they were responsible for teaching their fellow students.

METHODS: For the Medical Gross Anatomy lab, a group of 6 students was assigned to each tank (cadaver) and they were further divided into 3 groups of 2 students (A, B, and C). However, only 2 groups of students at a time would be in the lab performing the dissection and the third group of 2 students had independent study time. This practice significantly reduced the number of cadavers needed for the course, while at the same time reducing the number of faculty needed in the lab and still maintaining optimal student to faculty ratios. One group of students who performed the dissection was then responsible for teaching the structures they had dissected to the one group of 2 students who were not scheduled to be in the lab for that specific dissection. In order to assure the effort and quality of the student instruction, the group that was not present at the dissection were then given a quiz based on photographic images of the class dissections and the 6 students from the same tank received the grade of the group taking the quiz. Groups of students from the same tank were rotated so they performed 2 out of every 3 dissections.

For the Histology lab, a rotating group of 8 students received detailed instruction over the slides for the up-coming lab with a faculty member at least one day prior to the scheduled lab. These students then acted as "Peer Teachers" for the class during the scheduled lab time, answering questions and helping their fellow students locate and identify microscopic structures and cells. Faculty members were also available in the lab to confirm or answer difficult questions.

RESULTS/CONCLUSIONS: Overall, the Reciprocal Peer Teaching Program in both courses was a huge success. The large majority of students felt that the group rotation worked well for the Medical Gross Anatomy labs and should be continued in the future. For the Histology course, 93% of students rated their experience as being positive with no students reporting a negative experience. The same percentage agreed that acting as a Peer Teacher significantly helped them better understand the material, proving the adage "those who teach, learn." Student comments reflected their support for expansion of the Reciprocal Peer Teaching Program.

Poster Award Finalist

Notes:

UTILIZING LEARNING PRINCIPLES: TEACHING MEDICAL STUDENTS HOW TO LEARN IN A FIRST YEAR MICROSCOPIC ANATOMY COURSE

***Richard Feinberg*[1]** *and Norma S. Saks*[2]*,* [1]*New Jersey Medical School, Newark, NJ07103* [2]*Robert Wood Johnson Medical School, Piscataway, NJ 08854 U.S.A.*

PURPOSE: Most medical students develop effective study methods through trial and error, sometimes a slow and frustrating process. The goal was to develop a specific lecture for first year students to focus on strategies to learn Microscopic Anatomy.

METHODS: Learning principles and study strategies as described in the book, *How to Excel in Medical School*, were used to develop a lecture in a first year Microscopic Anatomy course on how to learn the course material to achieve durable learning. Topics included: understanding the relationship between structural and functional qualities in tissues, integrating sources of visual and written material, learning the fundamentals (to get the big picture), using verbal cues (to note size, shape, pattern, density, etc.), and utilizing compare and contrast strategies, i.e. to pay attention to "look-alikes."

RESULTS: The study strategies lecture was well integrated with content material and contained reference to popular culture; the lecturer was satisfied with it. Informal student feedback indicated that the "how to learn" information was important, but they had difficulty remembering specifics from the introductory lecture. The relationship of how learning about effective study strategies impacted course performance is not known.

CONCLUSION/FUTURE DIRECTIONS: Teaching students how to learn specific content material as an integral part of a Microscopic Anatomy course may have the potential to increase student achievement and to serve as an adjunct to academic support for medical students. The most effective placement and format of the instruction (lecture or lab? presentation or written materials?) needs to be explored.

Notes:

THE INTERN LECTURE SERIES: HOW TO SURVIVE, THRIVE, LEARN, AND TEACH AS A PEDIATRIC INTERN

Gregory Harlan M.D. M.P.H.*, *Deirdre Caplin Ph.D., James Bale M.D.* University of Utah, Department of Pediatrics Residency Program, Salt Lake City, UT 84113, U.S.A.

PURPOSE: We developed a semi-structured curriculum (Intern Lecture Series (ILS)) in July 2005, to prepare pediatric interns for their simultaneous roles as learners, teachers, and practitioners.

METHODS: Intern needs were assessed via survey in May 2005. Interns identified fears (errors, helplessness, lack of knowledge, relationships) and goals (knowledge, communication, efficiency, research, balance) for their intern year. ILS' four segments ("Survive, Thrive, Learn, and Teach") were arranged to help address these fears and to facilitate achievement of goals. The curriculum reinforces professionalism and communication, while providing a longitudinal program that meets weekly for one hour. ILS was evaluated at the conclusion of the intern and second year of residency.

RESULTS: Interns from two successive years have identified improvements in intern cohesion (91%), communication skills (93%), and knowledge of pediatric topics (86%) as a result of ILS. "Survive" gave interns concrete skills and covered basic topics. "Thrive" delved into psychosocial and emotional aspects of medicine. "Learn" allowed interns to become more comfortable with preparing and delivering medical presentations, while "Teach" improved their comfort with teaching overall. The transition from medical student to intern was difficult for all. Support from the residency program as a whole and from individuals was helpful. Supervising residents still have fears regarding the need for increased medical knowledge, leadership skills, and teaching skills.

CONCLUSION: ILS is a plausible way to incorporate communication, knowledge, and professionalism themes. Identifying and addressing interns' goals and fears may improve their experience and performance, while easing the transition to senior residency roles.

Poster Award Finalist

Notes:

WILL STUDENTS AVAIL OF A PEER FEEDBACK SYSTEM TO TELL EACH OTHER IF THEY HAVE CONCERNS ABOUT PROFESSIONALISM?

Niamh Kelly, Ph.D.* *UBC, Vancouver, B.C. V6T 2B5, CANADA.*

PURPOSE: Having introduced a web based peer feedback step into our PBL curriculum we asked whether students would use the system to let a peer know if they had concerns about their professionalism?

METHODS: Using a web based system, peers assessed each other as 'have some concerns' 'have no concerns' or 'good role model' for five areas of professionalism, using a simple tick box system. In addition they were invited to add comments under the headings: 'a real strength' and 'something to improve upon'. Peer feedback was performed at the end of each of 7 PBL blocks for 7 peers with the option of remaining anonymous or identifying oneself when giving feedback. At the end of the academic year 31 students donated their e-portfolios to this study consisting of 1471 peer assessments.

RESULTS: Nine of the 31 students (29%) were identified by their peers as 'have some concerns' in one or more of the professional skill areas. The areas most frequently cited for concerns were communication, work habits and team work, with self assessment and motivation being less frequently cited. Most of the 'have some concerns' ratings were accompanied by comments under the 'something to improve upon' category which explained why a peer had concerns. Examples of these comments will be shared in the poster presentation.

CONCLUSION: The study demonstrates that students will avail of a web based peer feedback system to let each other know if they have concerns about areas of professionalism.

Notes:

TURNING THE TABLES ON OSCA'S: OUR STUDENTS CREATE THE ASSESSMENTS.

Mary F. Kritzer* *and Elza Mylona, Stony Brook University School of Medicine, Stony Brook, New York, 11794 U.S.A.*

PURPOSE: Beginning medical students are exposed to learning experiences tapping curricular competencies beyond medical knowledge. Because these can be unfamiliar to students, our Neuroscience course incorporated content-specific learning objectives into an assignment that tasked students with creating cases, patient and student scripts and grading rubrics for an Objective Standardized Clinical Assessment (OSCA) based on stroke. The challenging area of nervous system blood supply was a natural focus for medical knowledge objectives while other components of the exercise were designed to enhance students' abilities to self-monitor learning and increase their understanding of additional educational/competency objectives associated with OSCAs.

METHODS: Year 1 students worked in groups with each member assigned an artery and responsibility for anatomically mapping a stroke; for identifying brain structures and functions affected by it; for translating clinical consequences into patient scripts; for generating question sets for doctor/patient encounters; for developing grading rubrics for the ten competencies adopted by SB's curriculum; and for reviewing/approving each individual's contributions.

RESULTS: Completion of the exercise required teamwork, shared learning of nervous system blood supply, demonstrations of logic and the use of multiple styles of audience-appropriate communications.

CONCLUSIONS/FUTURE DIRECTIONS: In addition to enabling evaluation of medical knowledge, communications and problem solving, the grading rubrics that students generated provided unique insights into what were self-identified as salient features of successful OSCA performance for SB's ten core curricular competencies.

Notes:

STUDENTS TEACHING STUDENTS: FACILITATING A CULTURE OF PEER TEACHING IN MEDICAL SCHOOL

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PURPOSE: Peer teaching is an important skill for physicians. The aim of this study is to evaluate the outcome of a pathology course that sought to facilitate an environment in which medical students are inspired to become both learners and teachers.

METHODS: An introductory pathology course included biweekly small group sessions developed and executed by third year medical students. Upon course completion, first year medical students completed a survey which contained questions scored from 0 to 10, to evaluate the small group sessions, including comfort level with learning from other medical students, and student interest in teaching.

RESULTS: Ninety-eight percent (41/42) of students completed the survey. The majority (78%) ranked the student-led small group sessions as either the most valuable or second most valuable component of the course, out of five components. Those who ranked small groups highly were significantly more likely to have increased interest in teaching as a result of the pathology course ($p=0.01$). The majority of students (90%) were comfortable to very comfortable learning from third year medical students. The majority (88%) of students reported moderate to strong interest in teaching. The majority of students (80%) reported an increased interest in teaching as a result of the pathology course.

CONCLUSIONS/FUTURE DIRECTIONS: A course in which medical students were instructed by other medical students resulted in increased interest in teaching among learners. If practiced widely, this approach to medical education may encourage a culture of peer teaching that would benefit medical students and their peers throughout their careers.

Notes:

PROMOTING PROFESSIONALISM THROUGH BASIC SCIENCE COURSES AND PEER-FEEDBACK

Kirsten A. Larson*, Janet D. Smith and Dennis M. DePace. Departments of Microbiology and Immunology, Neurobiology and Anatomy Drexel University College of Medicine, Philadelphia, PA 19129, U.S.A.

RATIONALE AND PURPOSE: The discussion of professionalism is often limited to clinical courses. When looking at the standard first year curriculum, only a fraction of the total student contact hours address this key principle. Our goal was to incorporate the basic sciences into our professionalism curriculum and develop a tool that would complement existing teaching and evaluative components. We used basic science laboratory and small group activities because successful participation required students to demonstrate many characteristics of medical professionalism including respect, responsibility and accountability, excellence and scholarship, and leadership[1].

METHODOLOGY: Students evaluated each group member on 1) participation, accountability, and responsibility, 2) respect for others, 3) leadership and excellence. Narrative feedback was optional. Using a threshold-based criteria, faculty members identified students who demonstrated either exemplary or unsatisfactory behavior, and individual action plans were developed.

RESULTS: Over the past two years, the peer evaluation has allowed the identification of students who demonstrated exemplary behavior (9%), commendable behavior (24%), satisfactory behavior (46%), behavior of some concern (15%), unprofessional behavior (4%), and unprofessional administrative behavior (3%). It also provided written comments to virtually every member of the first year class. Student feedback of the process has been positive.

CONCLUSION: Our evolving peer-evaluation process has 1) increased the discussion of professionalism in the first year, 2) provided an effective tool to promote professionalism, and 3) provided a tool to assess professional behavior, identify commendable behavior and allow for the early identification and remediation of deficiencies.

[1]Embedding Professionalism in Medical Education
http://www.nbme.org/PDF/NBME_AAMC_ProfessReport.pdf

Notes:

CAN THE HEART BE A PREDICTOR OF SPECIALTY CHOICE? VICARIOUS EMPATHY VS. SPECIALTY CHOICE.

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PURPOSE: Some students interviewing for medical school say they desire primary care to curry favor with the admissions committee. Many students change their minds by graduation. How many students honor their initial commitment and does their vicarious empathy change?

METHODS: The Balanced Emotional Empathy Scale (BEES) was given to UAMS classes of 2001-2004 (n = 421). Specialty choice was obtained. Specialties were divided into “core” (i.e., primary care) and “non-core”. Core specialties have continuity of patient care. The BEES score, obtained during freshmen (M1) orientation, was compared to M1 specialty choice and senior BEES score and residency acceptance.

RESULTS: 124/273 M1 men (45.4%) indicated a core specialty; 87/124 (70.2%) entered a core residency and 47/87 (37.9%) honored the same M1 choice. 37/124 M1 men (29.8%) switched and entered non-core residencies. 106/148 M1 women (71.6%) indicted a core specialty; 79/106 (74.5%) entered a core residency and 30/79 (38%) honored the same M1 choice. 27/106 M1 women (25.5%) switched and entered non-core residencies. Men entering core residencies dropped BEES scores by 21.1%. Men switching from an M1 core choice to enter non-core residencies dropped 41.9%. Women entering core residencies dropped BEES scores by 15.4%. Women switching from an M1 core choice to enter non-core residencies dropped 31.6%.

CONCLUSIONS: Approximately 3/4 of entering freshmen who said would enter a core residency did so. The drop in BEES scores is twice as great for those that switched to non-core residencies. Graduates entering core residencies maintain vicarious empathy better than those entering non-core residencies.
tion http://www.nbme.org/PDF/NBME_AAMC_ProfessReport.pdf

Notes:

OSTEOPATHIC MEDICAL STUDENT ACCEPTANCE OF EVOLUTION AND EXPOSURE TO CONCEPTS OF EVOLUTIONARY BIOLOGY

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PURPOSE: The incorporation of evolutionary medicine into medical curricula presupposes an acceptance of evolution among medical students. Since few studies exist that specifically address medical student opinions regarding human origins or their exposure to evolutionary biology, this study was undertaken.

METHODS: An online questionnaire was used to survey three classes of Osteopathic medical students regarding their acceptance of Darwinian evolution, their exposure to evolutionary biology prior to and during medical school, and their opinion about the relevance of evolutionary biology to medicine.

RESULTS: Of the 222 students completing the survey, 62.3% accept Darwinian evolution, 27.8% believe an intelligent force guided human evolution; and 9.9% believe that humans were directly created in their present form. The primary reasons given by students for rejecting evolution were contradictions in evolutionary theory, literal acceptance of a religious creation account, and/or the presence of alternative explanations for biological diversity. 68.2% of students indicated significant exposure to evolutionary biology concepts prior to medical school, primarily within botany, biology, ecology, or other similar courses. 36.5% of students recognized evolutionary concepts within their medical curriculum, primarily as evolutionary explanations for human structure and function within anatomy, physiology, and biochemistry courses. 41% of students thought evolutionary biology was highly relevant to medicine, whereas 25.3% felt evolutionary biology had little relevance to medicine.

CONCLUSIONS: Acceptance of Darwinian evolution is not universal among medical students. Students indicated greater exposure to evolutionary biology prior to medical school than during medical school. Not all students felt that evolutionary biology was relevant to medicine.

Notes:

A STUDENT-DESIGNED COLLABORATIVE SYSTEM FOR MANAGING EDUCATIONAL MATERIALS IN MEDICAL SCHOOL

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PURPOSE: With the increasing amount of information presented to medical students, efficiently distributing and maintaining up-to-date information by traditional methods limits potential productivity. We have implemented a novel model using proven technologies that allow for an instant, collaborative knowledgebase.

METHODS: The management of complex information can be simplified through the use of enabling technologies. These include centralized storage, collaborative editing, structured data management, and integration of rich media within the context of natural, non-technical user interfaces. Successful implementation depended upon the development of a student-run website consisting of several software applications including the use of MediaWiki for collaborative note-taking and media distribution, a custom pathology image quiz, and access to live and recorded lecture videos.

RESULTS: The software was first made available in early July to all faculty, staff, and students involved with the medical school or taking medical school courses. From July 15, 2007 to March 15, 2008, usage statistics show 781 people have made use of the MediaWiki software, resulting in 266,255 page views, over 3,000 page creations, and 19,795 page edits. From Feburary 25, 2008 to March 14, 2008, the image quiz software had 63 users viewing 15,741 images.

CONCLUSION: The response to this project has overwhelmingly met our expectations based on usage data. Information has been submitted to the system by many users with varying degrees of technical expertise. The collaborative nature and future potential of the system addresses the challenge of managing educational resources.

Notes:

PROBLEM-BASED LEARNING: MORE OF A HINDRANCE TO RATHER THAN AN ENHANCEMENT OF LEARNING FOR ASIAN MEDICAL STUDENTS?

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PURPOSE: Problem-based learning (PBL) is a learning system design aimed at optimizing student-centred, self-directed, collaborative and integrated learning. PBL has spread widely across the globe, including much of Asia. PBL tutorials require students to be engaged in interactive peer teaching-learning in open discussion, which may conflict with the Asian communication style often dominated by cultural reticence. Will the PBL strategy therefore be more of a hindrance to learning for Asian medical students?

METHODS: Evidence for the study was obtained from the literature, personal PBL tutoring experience in a multi-cultural setting (with medical students and tutors from several countries), and also from personal observations of PBL tutorials in some Asian medical schools.

RESULTS: Documented literature suggests that cultural reticence is still prevalent in Asia which can pose a potential barrier to learning in PBL. However, there is also strong evidence, especially from the multi-cultural PBL tutoring experience, that creating a conducive learning environment for students can overcome such an apparent cultural barrier to learning. Moreover some Asian attributes have been well documented to be consistent with some of the basic tenets of PBL.

CONCLUSION: Asian cultural reticence can pose a potential barrier to learning in PBL. However, Asian medical students will participate actively in and benefit from PBL tutorials if a conducive environment of mutual trust, respect and support is created.

Notes:

PROBLEM BASED LEARNING AT THE FELLOWSHIP LEVEL: NEW CHALLENGES

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PURPOSE: Problem Based Learning (PBL) is widely used at the undergraduate medical education level. However, due to time constraints and competing clinical responsibilities, traditional PBL has had limited application at the graduate medical education level.

METHODS: In 2001 a PBL-based core curriculum was implemented in the fellowship training program in infectious diseases at the Cleveland Clinic, replacing a traditional lecture-based curriculum (LBC). The PBL group consists of 6-7 fellows and one preceptor, four one-hour sessions per week. Cases are presented as diagnostic unknowns including radiographs, photographs, and pathologic material. Fellows initially analyze the case independently, completing a standardized form which is later scored. Subsequent PBL sessions are open-ended discussions.

RESULTS: Fifteen fellows have completed the PBL curriculum to date. Each year, approximately 60 clinical cases are presented, with 70% derived from preceptors' own patients, 20% abstracted from the literature, and 10% miscellaneous. Several modifications in PBL format were required after the initial pilot program: open-ended discussions were limited to one hour per case, "homework" assignments were discontinued due to competing clinical demands; allotted time increased from 50 to 200 hours/year; supplementary problem vignettes were required emphasizing basic science, epidemiologic investigations (e.g. simulation of a hospital infection outbreak), antibiotic development, and professionalism .

CONCLUSION/FUTURE DIRECTIONS: PBL curriculum can be implemented for fellowship training, but requires significant time-commitment and modifications.

Notes:

PROGRESS IN ENCOURAGING PRE-LAB PREPARATION USING ON-LINE EXERCISES AND INDIVIDUAL READINESS QUIZZES

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PURPOSE: Previously, to encourage student preparation for histology laboratory, a series of on-line exercises, with points awarded, was instituted. We discovered, however, that students were concentrating on gaining points rather than on learning the laboratory material. In an effort to refocus the students' efforts, we instituted in-lab individual readiness quizzes (IRQ's) using an audience response system.

METHODS: LON-CAPA (Learning Online Network with Computer-assisted Personalized Approach, developed at Michigan State University) was used to deliver prelaboratory preparatory exercises to students. These exercises, each of which had a small point reward, directed students to use course material, particularly their textbook, to answer questions pertaining to upcoming laboratory objectives. Then, at the beginning of their assigned laboratory section, students were given a short IRQ based upon material covered in the LON-CAPA exercises. Individual student answers were captured using the audience response system (i>clicker^{TM}). Correct answers earned a small point reward. The IRQ was geared for student success, provided students had done their pre-lab preparation thoughtfully.

RESULTS: There was a dramatic increase in laboratory attendance during the semester in which IRQ's were given. It was the faculty's perception that students used their in-lab time and resources more efficiently, and engaged with faculty in higher level learning.

CONCLUSION/FUTURE DIRECTIONS: The in-lab IRQ was an effective inducement for students' pre-laboratory preparation. We will conduct a student survey to evaluate their attitudes and suggestions for improvement of the LON-CAPA and IRQ exercises.

Notes:

PEER EVALUATION IN CLERKSHIP TEAM BASED LEARNING SMALL GROUPS: THE INFLUENCE OF EXPERIENCE AND FORMATIVE EVALUATION

Ruth E. Levine* [1], *Gayle Olson*[2], *Paul Haidet*[3], *and Britta Thompson*[3]
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PURPOSE: To see if peer evaluation experience influences students' ability to discriminate among peers and to evaluate the influence of a midpoint "formative" peer evaluation.

METHODS: Three years of peer evaluation (PE) scores were compared in two clerkships (Psychiatry and Ob/Gyn) depending on whether or not the student had experience with PE. A midpoint PE was instituted in Psychiatry in AY07/08, but not in Ob/Gyn, and scores were compared to determine potential impact on the quantitative and qualititative evaluation components.

RESULTS: The percentage of students giving different scores to different teammates is referred to as the "mean discrimination scores" or MDS. MDSs prior to the introduction of the midpoint PE ranged from 20-28% in Psychiatry and 23-33% in Ob/Gyn. PE Naïve (PEN) students in Psychiatry but not Ob/Gyn have significantly lower MDSs than PE Experienced (PEE) students. Post introduction of the midpoint PE, the midpoint MDS was 11.8%, and the endpoint MDS was 10.3%. End point discrimination was 0% among PEN students vs 20% among PEE students.
Psychiatry students provided significantly more qualitative feedback than Ob/gyn students. Both total comments and constructive criticism increased during midpoint PE, but decreased by the endpoint.

CONCLUSION: PE experience influenced Psychiatry but not Ob/Gyn students, for unknown reasons, but likely having to do with the way the PE is administered. The midpoint evaluation was associated with increased qualitative evaluation and lesser discrimination, suggesting that it achieved its purpose of providing the students a tool to help their peers become better teammates.

Notes:

USE OF TEAM-BASED LEARNING IN GRADUATE EDUCATION IN THE BIOMEDICAL SCIENCES

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PURPOSE: The focus of team-based learning (TBL) on problem-solving and integration of information has tremendous potential but has not been widely explored for improving biomedical science graduate education. This study assessed the TBL experience of biomedical science Ph.D. students and compared evaluations of courses taught with and without the TBL component.

METHODS: Online course evaluation results were compared for prior to and following the implementation of TBL for two graduate courses. TBL sessions replaced nine of forty-two lectures in an immunology course. In a responsible conduct of research (RCR) course, TBL sessions replaced six small group case study discussions.

RESULTS: After implementation of TBL, immunology students gave higher ratings for the course overall, general format (teaching methods used), fairness of test grading, appropriateness of test content, and overall rating of lectures. Student evaluations of the RCR course did not change significantly. A majority of students in both courses (62-75%) preferred TBL over other small group teaching methods. A majority of immunology students spent an hour or more preparing for class, agreed that they were better prepared and their classmates seemed better prepared for class, and over 80% agreed that TBL sessions helped them to be better prepared for exams. A majority of respondents from both courses agreed that TBL resulted in more interaction and that they could learn better in TBL compared to other small group settings in our curriculum.

CONCLUSION: Based on student feedback, TBL appears to improve course evaluations and to promote active learning in graduate-level courses.

Poster Award Finalist

Notes:

IMPROVED SCORES USING A MODIFIED TEAM BASED LEARNING INSTRUCTIONAL APPROACH IN A MCAT PREPARATION PROGRAM

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PURPOSE: This paper describes the introduction of an innovative instructional method in an existing MCAT preparation program. The objective was to introduce a modified team based learning (TBL) approach to enhance the skills necessary for optimal performance on the MCAT exam through a no lecture format. Previously, instruction involved lectures either live or via compressed video that resulted in poor attendance and no improvement in scores.

METHODS: The new MCAT prep program began in 2006 and is an intensive 13-week (Saturdays only) program developed for economically disadvantaged students interested in medical careers. Twenty students were accepted into the initial program in 2006. Each session begins with student presentations on session topics followed with work on passages from AAMC practice tests individually, in pairs, and then in fours. Medical students facilitate the discussion sessions in physical and biological sciences, and verbal reasoning. Each session concludes with timed CBT quizzes relevant to that day's topics**.** Participants complete a full- length computer based MCAT pretest at the beginning and a posttest at the end of the 13 week prep period.

RESULTS: In 2006 and 2007, total scores from pre to post-tests increased an average of 6.0 and 9.3 points respectively. Actual total scores increased 7.0 and 9.0 points from pre-test scores in 2006 and 2007 respectively. Eight students from the initial class and 10 students from the 2007 MCAT class were admitted to the UAMS College of Medicine in 2007.

CONCLUSION: The modified TBL format for MCAT prep appears to have significantly improved MCAT scores.

Notes:

A COMBINATION TBL/PBL APPROACH IN A MEDICAL PHYSIOLOGY COURSE

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PURPOSE: This study describes the use of combined team based learning (TBL) with problem based learning (PBL) in the Physiology section of an M1 integrated curriculum at UAMS. The aim was to encourage students to develop more effective clinical reasoning processes through teamwork.

METHODS: The 2007-2008 M1 curriculum was modified from a traditional discipline-oriented curriculum toward an integrated basic science curriculum. The new curriculum encouraged active learning and student participation instructional methods. Therefore, small group PBL sessions were modified by adding a TBL approach into the Medical Physiology course. In each room, students were divided in three teams of 5 -6 students each staffed by a basic scientist and a clinician. Pre-class preparation materials included a case to research with questions to answer. Faculty met before the TBL/PBL sessions to discuss format, questions and solutions. Following the iRAT and gRAT, discussions centered on the case questions. Faculty facilitated the sessions by fostering discussions on both the basic science and the clinical aspects of the case.

RESULTS:
The TBL aspect of the sessions encouraged students to effectively function as member of a team while enhancing their personal educational. This addition has enabled Physiology students to better understand the relevancy of basic science concepts to clinical medicine. Both students and faculty were enthusiastic about this process.

CONCLUSION/FUTURE DIRECTIONS: Team based learning in an integrated first year curriculum has the potential to encourage team building and effective clinical reasoning in the early stages of medical school.

Notes:

EVALUATING THE DYNAMICS OF INTELLECTUAL COLLABORATION IN A CASE-BASED ONLINE LEARNING ENVIRONMENT

*Maria Carlo[1,5], Wendy Ham[1,2,5], Chris Dede[3,5], David Broniatowski[4,5], Robert Leffert[1,5], **James Quattrochi**[*1,2,5]*
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PURPOSE: The dynamics of intellectual collaboration are not well understood. Collaboration among medical students during an online, case-based tutorial was studied using a quantitative intellectual convergence model. The Interactive Case-based Online Network (ICON) is a web-based instrument that allows students to see the consequences of their decisions and interact with each other, faculty consultants, and virtual patients as a means of enhancing case-method tutorials. Using ICON, discussions are recorded in a Brainstorm module, providing the opportunity to analyze decision-making and team cooperation that are otherwise difficult to track in the classroom. Here we describe a derivative of the three-phase model embedded in ICON: idea generating, idea linking, and intellectual convergence.

METHODS: Three teams of eight students (n=24) participated in ICON tutorials, consisting of seven cases during a two-month Neuroscience course. Each student contributed discussions of hypothesis and differential diagnosis. Transcripts were scored into one of three phase domains. Patterns of convergence were mapped for each case.

RESULTS: Data analysis of aggregate level metrics demonstrates that intellectual collaboration in case simulation can be quantitatively measured. Divergent profiles of convergence among teams consisted of entering the convergence phase later compared to reaching consensus early on before linking of ideas. The findings point to the predictive power of the model in reconstructing distributions of students' levels of team cooperation.

CONCLUSION: ICON offers a unique environment to profile quantitative measures of intellectual collaboration in case-based learning. By tracking the progression of team cooperation, educators can obtain real-time information to enhance the practice of decision-making and collaboration that will produce best possible outcomes.

Supported by CRICO/RMF and the Provost Award for Innovations in Instructional Technology.

Poster Award Finalist

Notes:

"PRODUCE AND PROMOTE THE NOVEL OPTIMAL TOOTHPASTE": A TEAM PROJECT FOR DENTISTRY STUDENTS EXTENDING FAR BEYOND COMPREHENSION OF AN ESSENTIAL BIOCHEMICAL LEARNING ISSUE

Ferhan G. Sagin*, *Ege University Faculty of Medicine, Dept of Biochemistry, 35100 Izmir, REPUBLIC OF TURKIYE.*

PURPOSE: The need for new educational strategies enabling effective learning in the context of real life challenges continues. Effective comprehension of the active agents in toothpastes in the biochemistry curriculum for the Faculty of Dentistry was my primary aim. I developed a team project for the deign of production and promotion of a novel product to meet the multifaceted requirements.

METHODS: The students had to role play the members of a research & development unit and the executive board of a toothpaste company. The challenge was to create an optimally formulated and cost-profitable brand new product. The teams worked for 3 weeks on conducting a needs assessment protocol; determining the target for promotion; learning the formulation (active agents) in toothpaste / its effects and the costs; formulating the desired content; developing concept, brand name and market strategy for the new product; and finally persuading the "Executive Board" who then critically appraised the presentation according to the predefined criteria including creativity, scientific content, etc.

RESULTS: Compiled analysis of the questionnaires (5 years & 300 students) indicate that the strategy is challenging / stimulating for effective learning; profoundly enjoyable; adds real life spirit / thrill to basic science; integrates knowledge and critical thinking skills; and draws attention to possible ethical issues.

CONCLUSION/FUTURE DIRECTIONS: This strategy facilitated comprehension of the specific learning issue and helped construct / adopt other desirable attitudes: creative thinking, communication & presentation skills, problem solving, and critical evaluation of literature. An in-depth correlation study of the data is foreseen.

Notes:

INTEGRATIVE PROBLEM BASED LEARNING

Electronic Demo

Edward C. Klatt M.D.* *and Andrew F. Payer Ph.D., Florida State University College of Medicine, Tallahassee FL 32306, U.S.A.*

PURPOSE: We describe a strategy utilizing nuances of problem based learning that reduces faculty time commitment and keeps students engaged with high-level clinical reasoning for mastery of more learning objectives.

METHODS: Six PBL modules were developed for a 2nd year pathology course. Each 4 hour module had a case with a family of 2 to 5 patients, whose different but often related medical conditions required students to work with expanded differential diagnosis sets and cover more course objectives. Each 4th hour of a module was a combined group wrap-up session conducted by one facilitator with all students present, and called upon randomly to discuss the case. Facilitator preparation session time was reduced by 1 hour. Each module began with a quiz covering objectives in that section of the course, scored individually.

RESULTS: Students kept track of multiple patients with multiple problems, like real medical practice, and determined how patient interactions affected outcomes, reinforcing clinical reasoning. 70% more objectives were covered than in single patient PBL cases. Wrap-ups kept students more engaged and confirmed key objectives. Overall faculty facilitator time was reduced by 33% compared to traditional PBL sessions of similar length because of reduced facilitator preparation and small group participation time. Quizzes promoted individual student preparation, with performance similar to quiz scores for the entire course.

CONCLUSION: Integrative PBL encouraged student preparation, engagement, achieving objectives, and clinical reasoning, while reducing overall faculty time.

Notes:

Electronic Demo

INTERACTIVE HISTOPATHOLOGY TUTORIALS USING WEBSLIDES

Judith F. Aronson* *and Annette Ayala, The University of Texas Medical Branch, Galveston, Texas, 77555, U.S.A.*

PURPOSE: We developed virtual microscopy-based self-study tutorials to complement small group pathology laboratory teaching of general pathology topics in a core course of our Integrated Medical Curriculum (Pathobiology and Host Defenses).

METHODS: Topics covered in three web-based tutorials included cell injury, inflammation, neoplasia, and hemodynamics. Development of tutorials was achieved by combining several technologies: Dreamweaver for web development, WebSlide Browser for slide annotation, ActiveX and Java to embed slides into web pages. The web-based format allowed explanatory text and the virtual slide to be viewed concurrently. Multiple choice style self-assessment questions probed students' ability to identify structures, and to correlate morphologic information with concepts in disease mechanisms. Data were collected from server logs to indicate frequency of WebSlide access during the course. Brief surveys were completed by students on a voluntary basis.

RESULTS: WebSlide tutorials were rated very good or excellent by nearly 70% of students. Students particularly liked the fact that the tutorials were self-paced, easily accessible from off campus sites, and offered opportunities for self-assessment. Students frequently commented on the ease of navigation and the "realistic" microscope-like action of the WebSlides. Students valued these exercises as supplements to, but not replacements of, small group laboratory sessions. Students suggested that tutorials could be improved by incorporating more clinical vignettes/correlations.

CONCLUSION/FUTURE DIRECTIONS: Virtual microscopy offer powerful opportunities to create self-study tutorials that engage students in the study of histopathology and provide opportunities for integrating morphology concepts with other information such as pathophysiology, pathogenesis, and clinical diagnosis.

Notes:

Electronic Demo

VIDEO DOCUMENTATION IN A CARDIAC SURGERY DEPARTMENT: INTEGRATION, DATA MANAGEMENT AND USE

*Thomas Breymann[1], **Marc M. Batschkus[2]*;[1]Department of Surgery for Congenital Heart Disease, Hannover Medical School, Carl-Neuberg-Str. 1, D-30625 Hannover, GERMANY, [2]Archiware GmbH, Sonnenstr.27, D-80331 Muenchen, GERMANY.*

PURPOSE: Heart surgery is difficult to teach, learn and document. Images only convey some of the information. Videos of operational procedures provide improved means for surgical training, documentation and research. Integration of video documentation results in one central question: How to balance cost and effort with the outcome?

METHODS: Routine video documentation was integrated in a cardiac OR. A restricted metadata set was defined. A workflow was developed to capture, edit and file videos. Platform independent archiving was chosen to allow for maximum flexibility in training and teaching. Scalability and usability of the data management software were considered important for the long-term outcome.

RESULTS: Restricting the effort for the surgeon and personnel is crucial. Recording, processing and editing need to be streamlined and options limited. Cross platform access including search options and visual browsing were key points in routine use. After only two years the generated data is unique in scope and comprehensiveness. Discussion about techniques and details was stimulated. Ideas for future uses and scientific perspectives were enhanced. Surgical training was improved tremendously through the use of video files and the archive.

CONCLUSION/FUTURE DIRECTIONS: Routine video documentation in the cardiac OR is more than justified by the resulting data and the multiple scenarios for their usage. The use of HD-video format increases the quality dramatically and is scheduled for this year. Experimental efforts were undertaken to work with 3D reconstruction of two HD-video sources. This remains a research scenario since resulting data sets are of tremendous size.

Notes:

Electronic Demo

IMPROVED LEARNING EFFICIENCY AND INCREASED STUDENT COOPRERATIVE LEARNING THROUGH THE USE OF VIRTUAL MICRSOSCOPY.

Mark Braun*, Indiana University School of Medicine, Bloomington, Indiana, 47405 U.S.A.*

PURPOSE: Wishing to improve efficiency of learning and promote student collaboration, the Medical Sciences Program in Bloomington, a regional division of the Indiana University School of Medicine, integrated the virtual microscope into the second-year (MS-II) pathology curriculum.

METHODS: The gradual and integrated approach of incorporating virtual microscopy (Bacus Laboratories. Lombard, IL) into the second-year medical school pathology class allowed the parallel assessment of student attitudes and histopathology content mastery with respect to the virtual and optical microscopes. After obtaining human subject's committee approval for this study, a survey was developed to measure student attitudes regarding use of the virtual microscope in comparison to the traditional optical microscope. Comparison of aggregate grades with previous classes permitted assessment of content mastery.

RESULTS: Student survey data indicated that the virtual imaging technology was enthusiastically received, and grade comparisons with the previous classes showed no decrease in content mastery. Survey questions assessing a variety of parameters revealed improved time and resource utilization with virtual microscopy. Questions assessing team learning indicated increased collaborative study. Instructor observations of spontaneous student interaction during laboratory periods confirmed the student survey data of enhanced cooperative study. Even so, 54% of students reported they appreciated having both the virtual and optical microscopes available for use.

CONCLUSIONS: Virtual microscopy is an effective and user-friendly tool for learning tissue pathology. Student grade comparison revealed equivalent content mastery when compared with use of the traditional optical microscope. Virtual microscopy in our pathology course improved resource utilization and student cooperative learning.

Poster Award Finalist

Notes:

Electronic Demo

COMPUTERIZED DOG LAB FOR TEACHING CARDIOVASCULAR PHYSIOLOGY TO FIRST YEAR MEDICAL STUDENTS.

Kurtis G. Cornish* *and Irving H. Zucker. Dept. of Integrative and Cellular Physiology, University of Nebraska College of Medicine, Omaha, Nebraska 68198-5850. U.S.A*

PURPOSE: This laboratory objective is to provide the students with an experience similar to that provided through animal labs but without using animals.

METHODS: Dogs were chronically instrumented to demonstrate cardiovascular function and reflexes. This included aortic, left atrial and left ventricular catheters (LV), aortic and coronary flow probes, inferior vena cava, coronary artery and aortic occluders and in some instances LV dimension crystals. The instrumentation allowed demonstration of the cardiac cycle and the direct and reflex responses to various interventions in conscious animals. The interventions included increasing and decreasing preload and afterload with drugs or vascular occluders, injecting an alpha or beta agonist, nitroglycerine or veratradine into the left atria. Reactive hyperemia was demonstrated with coronary occlusion. The data were recorded with the Power Lab system (ADInstruments).

RESULTS: Data were obtained over a period of years, negating the need for animals. Some additional animals were prepared to fill gaps. The data were organized in a html format allowing the playback of avi files or figures showing the response to the intervention. For more advanced analysis the Chart 5 program (ADI) was used.

CONCLUSION: This lab has repeatedly been very highly evaluated by the students. They appreciate observing the integration of the cardiovascular system without the necessity of using animals for their “educational use.” Such a demonstration can replace the experience previously obtained with live animal labs. However, it is the opinion of the authors that such educational tools will never completely duplicate the educational experience obtained in animal labs.

Poster Award Finalist

Notes:

INTEGRATING VIRTUAL MICROSCOPY WITH A COURSE MANAGEMENT SYSTEM

Haiyan He*, *John Jackson, University of Virginia School of Medicine, P.O. Box 800859, Charlottesville, VA 22908 U.S.A.*

PURPOSE: Virtual microscopy systems have very limited educational tools available. Most systems only offer collections of images and simple quizzes. We expanded the scope of virtual microscopy use by integrating Aperio's technologies into our course management system applications including: virtual patient cases, practice quizzes, on-line testing, virtual labs and multimedia database.

METHODS: Using the virtual microscopy application tools provided by Aperio, we modified the code in each of our applications to support virtual microscope images in the same way that they support JPEG, GIF, MOV, SWF and other common file types. When faculty include a virtual microscope image in any exercise our web applications automatically generate all the necessary code to display the image. Faculty can continue to use the tools that they already know with the expanded capabilities of virtual microscopy including annotations, pan, zoom and focus. Virtual microscopy images are displayed embedded within web pages or in pop-up windows, depending upon the application.

RESULTS: Faculty and student response has been very positive with our initial deployment. Faculty have been able to use the virtual microscopy images within an array of applications with very little training. Formal evaluation will begin Fall, 2008.

CONCLUSION/FUTURE DIRECTIONS: We are working with Aperio to define ways that multiple annotations may be stored for individual images. We are also participating in the AAMC task force that will define best methods for sharing virtual microscopy resources between institutions.

Notes:

Electronic Demo

PODCASTING- AROUSING THE ANATOMY ARCHIVES

Raymond Macharia*, Brian Cox, Kim Whittlestone, and Nick Short; Royal Veterinary College, University of London, NW1 0TU. U.K.*

Purpose: Many of the world universities have archives and museums full of useful specimens and rare collections but which are not readily available to students due to their delicate nature or lack of labelling to identify specific parts. We have utilised podcasting technologies to capture 3D images and transmitting them in all forms of mobile devices and computers without altering the nature or structure of specimens.

METHODS: Museum pots are selected and videoed with a voice-over and edited using adobe premiere software. The short podcasts have coloured areas added to identify the structures that are described on the audio. The podcast are then converted to WMV and MP4 and uploaded onto a streaming server from where one can download them onto a MP3/MP4 player, iPod or laptop. Students can walk into the museum with their mobile devices and study specific museum pots or even revise out of the campus.

RESULTS: There has been unprecedented and overwhelming interest in the use of podcast by veterinary students. The podcast has become a unique tool to recapture old teaching materials that have been preserved over the decades at a time when there is a deliberate scaling down of use of animal derived material or cadavers for research and teaching.

CONCLUSION: Podcast is an essential 21st century tool to enhance good teaching and learning in higher institutions. Podcast images reinforce and allow greater retention of information.

Notes:

Electronic Demo

USING POWERPOINT/KEYNOTE ANIMATION TO SIMULATE MICROSCOPY

John T. Woosley* *and Howard M. Reisner, Department of Pathology and Laboratory Medicine, University of North Carolina School of Medicine, Chapel Hill, NC 27514 U.S.A.*

PURPOSE: Histopathologic study of tissues is essential for the understanding of human diseases. Medical students can more easily appreciate and remember essential pathologic characteristics of diseases when presented as a series of vivid histopathologic images, rather than as descriptive text. Unfortunately, many students become confused when viewing multiple microscopic images of increasing magnification.

METHODS: The animation features (builds and transitions) of Microsoft PowerPoint and Apple Keynote can be used to simulate the microscopic examination of a pathologic slide. Multiple digital microscopic images can be sequentially stacked on a single slide revealing progressively higher magnifications of the image. Such animations can contain visual and spoken annotations. The presentations can be reviewed on computers and exported for viewing on portable media devices such as iPods. Hence, students can simulate microscopic examination of histopathologic processes without having to become proficient in microscopy and do it in a convenient setting of their choice.

RESULTS: Simulation of microscopy using PowerPoint animation has been incorporated into a GI/liver disease course at the University of North Carolina School of Medicine with excellent student acceptance.

CONCLUSION: Application of Keynote and PowerPoint animation techniques to the teaching of histopathology to medical students provides a method to enhance understanding of pathologic processes. This method actively engages student's attention and provides a vivid learning experience that will prepare them for subsequent clinical training.

Notes:

12 TIPS FOR CREATING AN EDUCATIONAL AUDIO TOUR

*Alien W. Riedstra, **Peter G.M. de Jong***, Leiden University Medical Center, Leiden, THE NETHERLANDS.*

PURPOSE: The Leiden University Medical Center possesses many pathological and anatomical specimens gathered together in an Anatomical Museum. With the rise of integrated and patient oriented education, the attention paid to basic sciences like anatomy and pathology is declining. In order to fill this gap, we tried to integrate the specimens in the Museum into the curriculum by developing an audio tour.

METHODS: While developing an audio tour we briefly followed this procedure: The course director selects specimens from the museum and records comments on the specimens with a voicerecorder. These audio files are edited and converted to MP3 format. Students download the files from Blackboard. They visit the museum in small groups and listen to the audio tour on their own MP3 device.

RESULTS: 4 audio tours have been developed and successfully integrated in four different courses of our (bio-) medical curriculum. Both students and teachers were very enthusiastic about this learning tool and requested more tours in other courses. Based on our experiences, we developed a list of educational, technical, organizational and practical do's and don'ts. In this presentation we offer you twelve tips to help you develop and integrate audio tours in your own curriculum.

CONCLUSION/FUTURE DIRECTIONS: Following our twelve tips, you can successfully develop a modern and innovative learning tool that matches closely with the 'digital' generation of students nowadays. It's a cheap and easy way to integrate an existing unique collection of specimens in the curriculum.

Notes:

CAMTASIA FANTASIA FOR CLERKSHIP CURRICULUM UNIFORMITY

Christina Dokter*, *Ph.D., Michigan State University, College of Osteopathic Medicine, East Lansing, Michigan 48824, U.S.A.*

PURPOSE: Our clerkship students rotate through 20 different base hospitals. Since we have very little control over how hospitals teach we need to find a way to deliver uniform curriculum to our students.
Using Camtasia to record Journal Clubs and other didactics sessions out in the hospitals proved to be a great way to create online learning modules.

METHODS: I go through the following steps in order to create a module:

- Find hospitals that deliver good educational programs.
- I have the presenter sign off a copy right release.
- I help set up the program and instruct the presenter on what to do.
- I ask the attending in charge if the presentation was a good one and what items should be expanded upon for students
- My administrative assistant goes through and finds all the graphics on the Internet and starts to gather the copyright permissions. When the permissions are granted, she compiles them in a folder in her email box.
- I edit the recording, breaking up into 10 minute sections with quizzes.
- I find video clips and basic definitions on the Internet to bring the information down to the student level.
- I add concept maps (for Rapid Learning), patient stories, and a “big ideas” page to complete the module

RESULTS: All of our core rotations are being converted into online courses using this methodology

CONCLUSION/FUTURE DIRECTIONS: We will continue to add to existing modules to match our learning objectives.

Poster Award Finalist

Notes:

PODCAST REVIEWS IN A MEDICAL SCHOOL PATHOLOGY COURSE

David M. Kurtz*, *Jennifer L. Kruse, Scott J. Schoenleber, Joseph P. Grande, MD, PhD. Mayo Medical School, Mayo Clinic College of Medicine, 200 1ST Street SW, Rochester, MN 55905 U.S.A.*

PURPOSE: Podcasts are a simple way to distribute audiovisual information to a wide audience. They have found utility in medicine in education of both medical professionals and the general population. This study examines the use of brief podcast reviews in basic science education.

METHODS: We developed concise (15 to 25 minute) review sessions covering key concepts and cases from our first year Pathology course. Audio reviews were recorded and distributed in coordination with topics covered in class sessions. Podcasts were released twice weekly and were available to students throughout the course. Upon completion of the course, students were given a survey evaluating the podcasts.

RESULTS: Forty-one of 42 students completed the survey, which contained questions scored from 0 (strongly disagree) to 10 (strongly agree). A majority (63%) of students used the reviews. Listeners found the podcast helpful in learning pathology (mean score 6.8/10); they also would find podcasts useful in future classes (mean 8.6/10). Students preferred a brief length, with 64% preferring less than 25 minutes per podcast and 93% preferring less than 45 minutes. Students who found the podcast most useful tended to prefer less time spent in lecture ($p=0.081$), although this failed to reach statistical significance. Students who preferred hands-on learning (kinesthetic learners) found the podcast very helpful ($p=0.005$).

CONCLUSION/FUTURE DIRECTIONS: Podcast reviews appear to be a useful tool for teaching basic science. They are most useful when brief, highlighting key concepts. They have notable benefit to hands-on or kinesthetic learners, who are often underserved by traditional formats.

Notes:

VIDEO PODCASTS AND COMPUTER QUIZZES IN TEACHING MEDICAL BIOCHEMISTRY: WHICH DO STUDENTS FIND MOST HELPFUL?

Janet E. Lindsley*, *University of Utah School of Medicine, Salt Lake City, UT 84112 U.S.A.* (IRB # 00024688)

PURPOSE: Our Medical Biochemistry course is an intensive, primarily lecture-based course. We wanted to study the effects of video and audiocasting the lectures on class attendance, participation and student usage. Additionally, in order to provide regular, low-stress assessment of student understanding, we instituted computer-based quizzes after most lectures. The quizzes were made available for 3 days following the lecture. Students were allowed two attempts to obtain a perfect score. The 41 quizzes, 317 total questions, were worth 10% of the grade.

METHODS: Anonymous paper and online questionnaires were used to survey the 103 students. Students were asked to evaluate the effects of these technologies on class attendance and learning effectiveness. Faculty noted the approximate attendance during lecture. Computer records of podcast downloads and quiz usage were studied.

RESULTS: This course concluded the same week that this abstract was due, and therefore only preliminary observations can be noted at this time. The major observations are that: 1) having all of the lectures available as video and audiocasts has not noticeably altered student lecture attendance, and 2) nearly all students are taking the lecture quizzes seriously (81% scored above 90%) and most reported that the quizzes were the most useful technology to help them learn course material.

CONCLUSION: Final conclusions will be presented at the meeting. However, two important conclusions are already clear. First, videocasting lectures has not significantly affected student attendance. Second, the quizzes have been popular among students and faculty alike.

Notes:

Electronic Demo

CLINICO-PATHOLOGIC CASE EXERCISES BASED UPON HIGH DEFINITION VIDEO RECORDINGS OF SURGICAL PATHOLOGY DISSECTIONS

John T. Woosley*, *Claudia Brady, and Kirsten Boland, Department of Pathology and Laboratory Medicine, University of North Carolina School of Medicine, Chapel Hill, NC 27514 U.S.A.*

PURPOSE: A medical student's ability to fully understand many diseases is limited, at least in part, by their failure to form a clear visual image of the disease process. They rely on still pathologic images of variable resolution and quality and on descriptive text to form their visual image. These internal visual images are often incomplete and may even be inaccurate.

METHODS: A high-definition (1920 X 1080 lines of resolution) video camera (Canon HV20) has been used to record short (1 to 3 minutes) video demonstrations of surgical pathology specimens immediately after their arrival in the laboratory. Since the pathologic specimens are fresh, these demonstrations reveal pathologic processes in realistic color and texture. In addition, the movement and manipulation of the specimens during recording adds a 3-dimensional understanding of the pathologic processes that cannot be achieved with still photography. These gross pathology videos can act as a core to which are attached short video presentations of: 1) clinical findings, 2) annotated radiographic images, 3) annotated histopathologic images, and 4) discussions of therapeutic options to create a concise, tightly integrated video presentation of each disease.

RESULTS: Over 100 gross pathology videos have been created. Several of these have been used to create short, but comprehensive video case exercises

CONCLUSION: Clinico-pathologic case exercise videos provide an engaging and memorable educational experience. They can be viewed in high detail on a computer screen or can be transferred to a portable media device (i.e., iPod) to add portability to the experience.

Notes:

UTILIZATION OF ON-LINE LECTURE VIDEOS IN A BASIC SCIENCE COURSE.

John A. McNulty, *Amy Hoyt, Ron Price Jr., Arcot Chandrasekhar, Greg Gruener, Bajune Espiritu, Ross Naheedy, Loyola University Stritch School of Medicine, Maywood, IL 60513 U.S.A.*

PURPOSE: Our school recently adopted a policy making videos of all lectures available to students through a secure network. Because lecture videos are becoming increasingly popular in medical schools, we undertook an analysis of the utilization of these resources using both server logs and student surveys.

METHODS: The subjects were MS1 students (n=143) taking their course in anatomy, which had 49 total lectures. Data were collected from server logs and surveys.

RESULTS: Server logs revealed the number of lectures viewed by individual students ranged from 0-32 (x=6.2 lectures/student). About half the students viewed between 2-10 lectures; 31% viewed 0-1 lectures; 22% viewed more than 10 lectures. The number of students viewing individual lectures ranged from 1-46 (x=15.2). Students tended to view the videos away from school (76%) with peaks of activity on the weekends. Of those students who viewed 1 or more videos, 28% viewed them throughout the full extent of the course. According to the survey (47% response), they used videos primarily to fill in notes and review for exams and they tended to view them alone. Only 4% used videos to replace going to more than 5 lectures. When utilization was plotted against grade, there was a tendency for inverse correlation (Pearson's; p=0.03) between the frequency with which videos were viewed and the final grade.

CONCLUSION: Our study shows considerable variability in the preference of students for these resources. These preliminary findings further suggest that videos are more widely used by students having difficulty with the subject matter.

Notes:

CHARACTERIZATION OF HIGH LEVEL AND LOW LEVEL USERS OF ONLINE LECTURES: PATTERNS OF USE AND LEARNING STYLES

Gary L. Nieder*, *John C. Pearson, Nicole J. Borges and Dean X. Parmelee, Wright State University Boonshoft School of Medicine, Dayton OH, 45435 U.S.A.*

PURPOSE: The use of online lectures, the exclusive mode for core content delivery in the gross anatomy course at WSUBSOM, varies markedly between students. This study characterizes high level users versus low level users in terms of usage patterns and learning style preference.

METHODS: Course content was presented in 52 online lectures comprised of html pages. A secure server logged individual student access permitting online viewing behaviors to be tracked. Students had previously completed the Grasha Reichmann Student Learning Style Scale (GRSLSS). Patterns of online use were correlated with course performance and learning style.

RESULTS: Students were grouped into quartiles by total page downloads. 'High users' averaged 4063 page views during the course while 'low users' averaged 1549. With both groups, hourly activity peaked during late morning-early afternoon and evening, and total activity was highest on Wednesdays and lowest on Fridays. High users accessed more lectures the day before major exams. High users were significantly more 'competitive' in their learning style than low users; 'high competitives' averaged 3124 pages compared to 2590 for 'low/medium competitives' and exhibited higher use before exams. However, exam grades were not correlated with any GRSLSS style preference.

CONCLUSION: High and low users show differences in online lecture use for test preparation. High users tend to fit the competitive GRSSLSS style; they use online lectures more and in a different pattern than do low/medium competitive students. Differences in online lecture usage are not correlated with exam performance.

Notes:

Electronic Demo

WEB-BASED DIGITAL MEDICAL MODULES AS A TEACHING TOOL IN RESIDENCY TRAINING

***James D'Agostino*, M.D.**, *Ann Barker-Grifffith, M.D., Paul Cunningham, M.D.**,* *Jannie Woo, Ph.D., SUNY Upstate Medical University, Syracuse, NY 13210, U.S.A.*

PURPOSE: At SUNY UMU a dynamic database-driven Website was introduced in 2002 as an adjunct to residency training in pathology (http://www.upstate.edu/pathology/residency), which has served successfully as a learning tool. To extend the advantage of Web-based learning to residents in pediatric and emergency medicine, ophthalmology and surgery, we developed multimedia Web-based modules in each discipline utilizing interactive case-based tutorials with national-board formatted quizzes. These modules allow residents assessment of their knowledge in pathophysiology & anatomy, and skills in procedures, diagnosis & management.

METHODS: Using an interactive case-quiz module built with FileMaker Pro (FileMaker Inc, Santa Clara, CA 95054) that allows search, storage, retrieval, with image, audio-video incorporation functions, a patient's history is introduced with audio-video followed by key physical findings (e.g. emergency medicine module). Patient diagnostic studies and management are then displayed through sequential interactive quizzes that simulate medical-board questions. Answer submissions are followed by detailed responses. Patient data interpretation facilitates succession of subsequent quizzes.
It concludes with a detailed description of the disease with references. HTML-driven FileMaker Pro Web-based templates are available for convenient input of data, images and audio-video.

RESULTS: Feedback has been favorable. Residents feel that in addition to complementing and enhancing regular lecture sessions, these modules enhance educational opportunities and preserve interesting and/or infrequently encountered cases which some learners might otherwise miss due to other commitments.

CONCLUSION: Web-based digital medical modules can successfully be used to educate medical and surgical residents utilizing a dynamic database driven website with audio-video enhancements and interactive patient case simulation.

Poster Award Finalist

Notes:

Electronic Demo

TECHNOLOGY ENHANCED LEARNING IN SURGERY IN SWANSEA NHS TRUST, WALES. DOES IT WORK?

*Simon Browning[1], **Peter Donnelly***, *Paul Kirk, and Joel Benson[2], [1] Swansea NHS Trust, U.K, [2] Cardiff University, Wales, U.K.*

PURPOSE: MMC and EWTD have changed the way in which medical trainees in the UK are trained and assessed. In Swansea NHS Trust an ENT surgeon (SB) set up a blended approach to training in this craft speciality. This study asked 2 questions; 1) can 'e' be used to support basic surgical training in this sub-speciality and 2) how do the learners view this experience?

METHODS: An education programme consisting of an 'SHO Survival Guide', 'ENT Core Curriculum', 'Curriculum for ENT Career SHOs' and 'Curriculum for GPs' was devised. An intuitive web-enhanced user interface, and 'Contribute Server' software provided an easy to use mechanism for updating the content without the need for specialist web skills. Blackboard VLE was used to deliver, assess, monitor and feedback to the users of the programmes. Education events in Blackboard were signposted by the Consultant Education supervisor and integrated into the experiential learning. Post -course evaluation of 3 rotations of trainees was completed (n=20). Learners were asked the extent to which they agreed or disagreed with key statements covering: access, relevance, usefulness, flexibility, IT skills, assessments, effect on practice and patient management.

RESULTS: All trainees rated the use of the VLE highly. The trainer felt that basic knowledge and skills could be initially assessed via the training package prior to the trainees being in the clinical setting thus improving patient safety.

CONCLUSION: TEL can be used in a hands-on clinical speciality such as ENT surgery. Trainer and trainees used the blended approach which will be rolled out to include all ENT trainees in Wales.

Notes:

Electronic Demo

Immersive 3-D Game Environments for Terrorism Response Training

Joseph V. Henderson M.D.*, *Interactive Media Laboratory, Dartmouth Medical School Hanover, NH 03755 U.S.A.*

PURPOSE: To create immersive, experiential training for emergency personnel working during the immediate response to a terrorist attack involving weapons of mass destruction.

METHODS: As part of a multi-modal learning environment, we created four virtual scenarios using the Quake 2 “first-person shooter” game engine, adapted to incorporate motion video and question/answer dialogues with a virtual mentor, played by an actual expert trainer. This adaptation also allows for use of virtual hazmat instruments, critical decision making, and conduct of reconnaissance and rescue operations. Scenarios are bracketed by briefings and debriefings segments during which the learner is given information, asked questions, and provided feedback on actions taken.

RESULTS: In testing with more than 200 first responders, the environment was found to be easy to use, realistic, and educationally valuable. As part of a larger educational environment (the Virtual Terrorism Response Training Academy – VTRA) more than 10,000 copies of the program have been distributed nationally for first responder training.

CONCLUSION/FUTURE DIRECTIONS: We find that a guided, 3-D game-based scenario, in which specific goals, decisions, and alternate outcomes are presented, is a valid training method. With proper preparation in the form of a simulation designed to teach how to use the game environment, it can be used – and actually enjoyed – by nearly all trainees among the target audience. We have already received funding from the Department of Homeland Security to develop two additional 3-D simulations for this learning environment. These will be developed over the next 6 months and added to the VTRA program.

Poster Award Finalist

Notes:

Electronic Demo

A COMPUTER-ASSISTED INSTRUCTIONAL TOOL FOR GROSS ANATOMY OF THE BRAIN

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PURPOSE: Computer-assisted instructional (CAI) tools are useful adjuncts for human neuroanatomy instruction. Unstained serial brain sections are a major teaching resource in the gross neuroanatomy lab. However, outside of the teaching laboratory, students typically rely on atlases that feature stained sections, drawings, MRIs, or CT scans. Therefore, to provide students with the most relevant study materials outside of lab, we developed a CAI tool featuring unstained serial brain sections.

METHODS: Five embalmed human brains were frozen and sectioned in either the frontal, sagittal or transverse planes. The sections were photographed, labeled using Macromedia Fireworks, and inserted in a web application developed using Macromedia Flash.

RESULTS: A formative evaluation of the CAI tool, utilizing neuroanatomy faculty and students, was performed during spring 2007. Participants judged it to be a useful, clear, and accurate adjunct instructional tool. In spring 2008, 69 physical and occupational therapy graduate students enrolled in a neuroanatomy course began using this tool for lab preparation and review. Verbal feedback from students has been positive.

CONCLUSION/FUTURE DIRECTIONS: The CAI tool provides a useful resource for studying the gross anatomy of the brain, and warrants further study and development. A questionnaire study will be performed with these 69 physical and occupational therapy students to evaluate this CAI tool and its benefits (expected completion May, 2008). The information gained from this study will be used to guide further development of this instructional tool.

Notes:

Electronic Demo

DUTCH E-LEARNING ACROSS THE BORDERS: SERIOUS GAMING AND BLENDED LEARNING FOR HEALTH CARE WORKERS *AND* PATIENTS

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PURPOSE: Since 2001 the UMCG facilitates e-learning for Dutch health care workers. Last year, the medical centre opened their online “learning portal”. Which resulted in the opportunity to study, game, develop or diagnose themselves, e.g. how to deal with safety or pain.

METHODS: Seven years ago, the hospital provided their first digital training of protocols and reserved procedures by the Intranet. The UMCG Skills Centre offers simulation facilities to assess skills of nurses in a patient environment. Since 2007 health care workers in the Netherlands find their way to e-learning by using www.wenckebachinstituut.nl as their online learning portal. Here they find training programmes embedded in the Blackboard electronic learning environment.

RESULTS: Nowadays UMCG provides some of their digital training as games and simulations to give employees a better understanding of their responsibilities in their everyday handling. The project is called "Gaming in Health Care". Several groups of students completed this gaming course successfully. In this game students found themselves in a simulated environment, resembling their work. By entering buildings, encountering unexpected situations and carrying out various assignments on the way, participants are interactively guided through the learning material. Further information, news, and screenshots at; www.edugidz.nl Also in 2007, UMCG developed e-learning for patients who suffer from chronic pains and blended learning “medication safety” for health care workers.

CONCLUSION: Research demonstrates that in comparison with conventional assessment of skills digital training and assessment saves time, reduces workload and increases patient comfort.

A ‘reserved procedure’ is a specific procedure in the Dutch individual health care which can only be performed by professionals. This because of that some procedures entail a considerable risk to the health of the patient if performed by people that are not qualified.

Poster Award Finalist

Notes:

Electronic Demo

MEDAGORIES – AN EDUCATIONAL GAME TO PROMOTE HIGHER ORDER THINKING

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PURPOSE: Higher order thinking involves analyzing, classifying or organizing perceived relationships. Comparing and contrasting information is at a higher level in Bloom's taxonomy and is used by educators to encourage students to sort into categories, differentiate between, and identify similarities as they learn new material.

METHODS: To integrate the advantages of both higher order thinking and games, Medagories, a web-based educational game was developed in partnership with computer science students of the Saskatchewan Institute of Applied Science and Technology. While the students developed the software as part of an experiential learning course project, the author (KP) provided the requirements of the game and the content.

RESULTS: The visual interface consists of 2-4 categories. The player is given a pile of cards, with each card carrying a description. The player's objective is to sort the pile of cards according to the category named on the cards on the visual interface. Points are given for every correct answer. The game can be played in different ways – with or without feedback for every answer. By changing the database, the game can be used by educators involved in the teaching of kindergarten to higher education.

CONCLUSION/FUTURE DIRECTIONS: In this electronic demonstration, the beta version of the game, as well as the process for changing categories and description will be demonstrated. In addition, lessons learnt, benefits of such collaborations to instructors and computer science students, proposed method of evaluation of the product and future applications of this software will be discussed.

Notes:

Electronic Demo

XO COMPUTER APPLICATION TO MEDICAL SCIENCE EDUCATION

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PURPOSE: We will demonstrate some of the hardware and software features of the current XO laptop computer and compatible open source software as a potential educational tool for health professionals.

METHODS: We received two XOs from The One Laptop Per Child (OLPC) Foundation in January 2008 and have explored in our laboratory the features and limitations which might be considered by educators in medical science in both developed and developing nations.

RESULTS: OLPC focused on designing, manufacturing, and distributing a laptop computer to be mass produced and sufficiently inexpensive to distribute to children in developing countries. The current model (XO1) weighs 1.45kg and measures 25x25x3cm when folded flat or turned in e-book form. The XO1 includes: built-in full motion camera and microphone for audio, still photography, and video recording; wireless communications capable of establishing a mesh network with other XOs and 802.11b/g wi-fi; dust and water resistant keyboard that is customized to national alphabets; lithium-iron-phosphate battery with 4-6 hour life and capable of 2000 charge cycles; liquid crystal display of 800x600 full color pixels which can be converted to an ultra-low power/high contrast black-and-white 1200x900 pixel display readable in bright sunlight. It contains 256MB of dynamic memory and 1GB of flash memory with an SD slot for substantial expansion. The XO is based on a 433MHz x86 central processor, Linux operating system, and a graphical user interface developed especially for XO.

CONCLUSION: Many of the included software applications are sufficiently versatile that they will be useful at any level of scientific education and many are uniquely suited to a laboratory or clinical setting.

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DIGITAL GAMING AS A TEACHING AND LEARNING TOOL IN POSTGRADUATE EDUCATION

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PURPOSE: For the emerging gaming generation, a weekly self-directed student-learning online digital gaming activity was constructed as part of the first year course design, to meet the course objective of analyzing the acquisition of the 'new' vocabulary of the language of pathology.

METHODS: The WORD SCRAMBLE game was designed specifically for this course as an additional educational tool. In this electronic game, letters appear in a scrambled fashion. The aim of the timed games (x5) was to decipher the given word. These words were related to the relevant module of study. Clues to solve the word puzzle included "hint" and "add a letter" options. Upon completion of the game, correct responses were collated to give an overall percentage score of achievement.

RESULTS: Student feedback on the midterm course evaluation questionnaire was favorable. 40% of the students marked "agree"/"strongly agree" when asked if they enjoyed WORD SCRAMBLE and 40% marked these same boxes when asked for the usefulness of WORD SCRAMBLE in building their vocabulary. The first-time score for students ranged from 51.64% (47.75% to 62.4%). This increased to 78.07% (76.14%-82.06%) on their second attempt. An overall percentage improvement of 26.43% (13.52%-34.31%) was seen, with 12.70% (0.9%-29.96%) in males and 23.48% (16.12%-35.04) in females.

CONCLUSION: Digital games can be used as an effective and relevant educational tool. It promotes student engagement amid a relaxed and fun setting in the extended learning environment. Higher level thinking/evaluating games are now being utilized as an additional resource for the teaching/learning environment in this course.

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IS STUDENT COLLOCATION A FACTOR IN SYNCHRONOUS DISTANCE EDUCATION?

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PURPOSE: Studies have shown that students like the convenience and flexibility of asynchronous distance learning, but prefer interacting in classrooms. Internet bandwidth has grown so that it is possible to offer classes at a distance with real time interaction by videoconference, usually to students meeting in groups. The advent of desktop and laptop videoconferencing tools and the growth of broadband to offices and homes make it increasingly feasible to provide distant learning classes by videoconferences in virtual venues where students are not physically collocated. This research investigated whether medical students learned differently and had different attitudes toward instruction and technology in conditions where they were collocated and where they were not.

METHODS: Students in the collocated condition met in a computer lab and communicated with the distant instructor by videoconference and each other face to face. Those in the dispersed condition were located in separate offices and interacted with the instructor and each other entirely by videoconference. In both conditions, students listened to a lecture on telemedicine, asked questions, and then completed exercises that they were asked to do collaboratively. Students were observed and subsequently tested on lecture content and asked to rate the instruction and technology.

RESULTS: There we no differences in outcome between the two groups, except for perceived interaction and the amount and pattern of interaction.

CONCLUSION: Students in the videoconferencing condition felt the learning experience was more interactive and they, indeed, experienced more and broader interaction because of the way the technology channeled communication.

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