Clinical Laboratory Educators Conference 2006 Abstracts

POSTER PRESENTATIONS

Presenters are listed in bold face type.

A Comparison of Learning Styles of Allied Health Students

Cynthia Adams Ed D MT(ASCP), Lillian Mundt MS MT(ASCP), ***Janet Vanik MS MT(ASCP),*** *Rosalind Franklin, University of Medicine and Science, North Chicago IL.*

This study assesses the learning style preferences of 236 allied health students in the following disciplines: Physical Therapy, Clinical Laboratory Sciences, Nutrition/Dietetics and Pathologists' Assistants. In order to develop innovative teaching strategies and create a learning environment that will enhance student learning, educators must be able to determine how their students are able to learn so as to retain and apply information with long term results. The instrument selected, the Learning Type Measure (LTM), was developed by Dr. Bernice McCarthy in 1980. It is composed of fifteen questions designed to reflect the individuals' degree of preference for each of four modes of learning.

The results show that students in Nutrition, Clinical Laboratory Sciences, and Pathologists' Assistants favor quadrant three as a preferred learning type, whereas, the Physical Therapy students favor quadrant one. These findings indicate very similar learning styles among most student groups surveyed. With this information, healthcare educators can positively impact their students, particularly when teaching interdisciplinary courses, by modifying their teaching methods and stimuli to specifically target students' preferred learning quadrants. For example, the prominent quadrant three learners perceive information abstractly and process it actively. Therefore, the educator should start by designing learning experiences for these learners that integrate theory with practice.

The peer-reviewed Clinical Practice Section seeks to publish case studies, reports, and articles that are immediately useful, are of a practical nature, or contain information that could lead to improvement in the quality of the clinical laboratory's contribution to patient care, including brief reviews of books, computer programs, audiovisual materials, or other materials of interest to readers. Direct all inquiries to Bernadette Rodak MS CLS(NCA), Clin Lab Sci Clinical Practice Editor, Clinical Laboratory Science Program, Indiana University, Fesler 409, 1120 South Avenue, Indianapolis IN 46202-5113. brodak@iupui.edu.

Career Advancement for the Working Professional

Robert Porter MT(ASCP), Ruth Paur MS CLS(NCA), *University of North Dakota, Grand Forks ND;* ***Sue Lehman MA MT(ASCP) SM(ASCP),*** *Mayo Clinic, Rochester MN.*

Mayo Clinic recognizes the need for employees with clinical laboratory science certification in their laboratories and has developed a partnership with the Clinical Laboratory Science (CLS) Program at the University of North Dakota (UND) to meet this need. Through this partnership, employees are able to advance from two year technical degrees or four year science degrees to become fully certified clinical laboratory scientists while maintaining full-time work schedules. Individualized programs of study are developed for each student. The curriculum plan consists of online and local college classes needed to fulfill general science and education requirements. Upon completion of the pre-requisites, the students enter the final phase of the cohort education model. The cohort model includes three semesters of class work and one semester of review. Each semester of class work is comprised of three unique experiences which include: CLS online courses available asynchronously, two weeks of intensive laboratory sessions, and bench training in the corresponding clinical laboratory. The final semester includes study guides and additional exams to review the entire curriculum. Presently, over 100 working professionals are participating in the program. The success of the CLS cohort educational model can be attributed to the flexible schedule for education developed by UND to meet the demands of the working professional, and the commitment by Mayo Clinic to allow laboratory professionals the opportunity to meet their individual educational goals.

Career Advancement through Distance Education Technology

Janice Tompkins MPH MT(ASCP), *University of Nebraska Medical Center, Omaha NE.*

The Career Advancement through Distance Education Technology (CADET) project provides opportunity and access for clinical laboratory technicians (CLT) to earn a Bachelor of Science degree in Clinical Laboratory Science (CLS) and advanced certification through distance education technology. This innovative approach utilizes online access

to the University of Nebraska Medical Center (UNMC) Blackboard platform for the delivery of the coursework. These non-traditional students are able to continue employment in their home communities where shortages of allied health professionals remain critical. Prior to acceptance, they must complete the same prerequisites as the UNMC CLS traditional students and be CLT/MLT registry certified or eligible. During this Degree Completion Option (DCO), they take the same CLS courses as the traditional students. The clinical component of their course of study lies in continued demonstration of technical competence at their place of employment. UNMC CLS faculty provide academic advising and work with the practitioner to develop an individual plan of study that tailors the student's educational process with career advancement and professional goals. All student services are provided online to meet the needs of the working practitioners. An approved local preceptor acts as a mentor and examination proctor. Students are allowed the flexibility to complete their degree in two to five years. Six students are currently enrolled in the program. Graduates of the program will enhance their opportunities for professional advancement and provide new levels of expertise to their institutions and communities.

Evaluation of an On-campus Blood Bank Clinical Practicum Course

Faye E Coleman MS CLS MT(ASCP), *Old Dominion University, Norfolk VA.*

In an attempt to address the decreasing opportunities for clinical practicum sites, the 2+2 Medical Technology/Clinical Laboratory Science Program at Old Dominion University modified an existing blood bank clinical practicum course with the goal of providing some of the clinical education on campus. The course was initiated in the fall of 2000 and has been repeated during the summer of each succeeding year. The on-campus clinical course offers six weekends of simulated clinical experience followed by a two-week rotation at clinical sites, reducing the traditional blood bank clinical practicum course by two weeks. This study was a retrospective comparison of the scores of the modified and traditional Blood Bank clinical practicum course students on the blood bank subject area of the American Society of Clinical Pathology (ASCP) national certification examination. Preliminary results indicate that there is no difference in the performance of the two groups, indicating that the modified format is effective. The shortened clinical practicum course time has resulted in an increase of clinical practicum sites willing to take program students for the blood bank clinical practicum course because of the reduced time commitment. This modified blood bank clinical practicum course serves as a model for other Medical Technology/Clinical Laboratory Science Programs facing a decline in clinical practicum sites offering clinical practicum courses in blood bank and other disciplines.

Future Challenges for Clinical Laboratory Science Education

Anne Ranne MS MT(ASCP), *Medical College of Georgia, Augusta GA.*

It is critical that present and future challenges of clinical laboratory science education be identified. Ongoing assessments of laboratory practices will play a pivotal role in the ability of laboratory educators to keep up with the present curriculum and forecast future educational needs. To identify the trends in laboratory medicine, the presenter sent a survey to ASCLS members who actively participate in a lab administration internet discussion forum. With a response rate of ten percent, the members indicated advances in three areas: technology, electronic connectivity, and management. The first area, technological advances, is in the fields of genetic testing, protein markers, automation, nanotechnology, and point-of-care. The second area of study is the development of connectivity including national electronic medical records, direct access testing, and web-based resource centers. The last area, laboratory management, includes the interfacing of clinical laboratory scientists within interdisciplinary health care teams, developing quality management systems, and creating customer/patient advocacy programs. The implications for CLS educators will be to provide exposure to these new subject areas. Career development for the CLS student should include the integration of current and
future clinical testing arenas. Creation of new educational opportunities within the healthcare environment will meet these requirements.

Growth and Evolution of a Distance Education Clinical Laboratory Science Program: One University's Perspective

Janna Schill MS MT(ASCP), Robert Porter CLS(NCA), Karen Peterson MS MT(ASCP), *University of North Dakota, Grand Forks ND.*

To aid in service to the region's rural population, the Clinical Laboratory Science (CLS) Program at the University of North Dakota (UND) developed and implemented a distance education program. Beginning as a Master of Science degree in medical technology, the distance education component of the

program was designed for laboratory professionals looking for advanced laboratory-based coursework. Originally, the program delivered classroom instruction via audiocassettes and telephone conferencing. It has evolved into its current format utilizing the Internet and related computer software programs such as RealPlayer, Blackboard, and Macromedia Breeze. For students with limited internet access due to geographic location, all course material may be packaged in a CD-ROM format using either Toolbook or Authorware software. Due to the growth of online learning, enrollment in the Master of Science in Clinical Laboratory Science Program has grown significantly from ten students per semester to 60 per semester. The distance component of UND's CLS Program has evolved into many aspects of laboratory education including undergraduate, graduate, post-baccalaureate certificates, and categorical opportunities to students both regionally and nationally. Future program growth will continue to supply highly trained laboratory professionals both regionally and nationally for a profession in high demand due to critical shortage.

Implementation of an Integrated, Case-based Course in Cell and Molecular Biology for Pre-clinical Laboratory Science and Pre-cytotechnology Students

Karen A Golemboski PhD MT(ASCP), *Bellarmine University, Louisville KY.*

Educators in Clinical Laboratory Science (CLS) are often challenged to include all the prerequisite and professional classes necessary to meet both professional needs and the requirements of the degree-granting institution in a four year program. Prerequisite courses taught by other departments may not address the needs of the future healthcare professional, and course sequences designed for other majors may not fit into pre-professional timelines. In our 2+2 University-based CLS program, the Biology Department changed their sequence of courses, making it impossible for pre-CLS and pre-Cytotechnology students to take Molecular Biology as previously required. Students were instead expected to take Cell Biology and Genetics, but these courses included considerable overlap of content, as well as material not relevant to a clinical program. As an alternative, an integrated course, Cell and Molecular Biology for Health Sciences, was developed specifically for pre-CLS and pre-cytotechnology students. This course is taught by CLS faculty during the second semester of the sophomore year, using a modified case-based model which presents each topic in the context of a disease or pathological process. The accompanying laboratory is designed to provide a solid foundation of transferable skills, from basic procedures to a variety of molecular techniques. Teaching molecular theory and procedures at the pre-professional level allows courses in the professional portion of both curricula to concentrate on clinical applications of specific methods. In addition, post-baccalaureate and transfer students who are entering the program without experience in molecular biology will be able to fulfill the prerequisite with one clinically-oriented class.

The Incorporation of Student Support in Distance Learning Course Structure

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The CLS Program at the University of Cincinnati introduced an AS to BS degree completion distance learning track (CLS DL) in June 2004. Individuals enter this program from a variety of professional and educational backgrounds. Many are returning to school after being out of the classroom for many years. Since this is typical of the type of student who is attracted to distance learning, the proper support for these students must be considered during the course development process. In our course model, several resources (UC Helpdesk, Blackboard support, Group Facilitators, etc.) are available to address concerns and provide guidance to students by developing and maintaining a very interactive relationship with them. In addition, the course model also encourages interaction within the student peer group. As a result, a class and small community learning environment is established. To understand how nontraditional students integrate into their new educational environment, a survey was developed and administered to 225 CLS DL students. The survey investigates the students' perception of their growth both academically and professionally. Preliminary data indicates that the students are gratified by their newfound knowledge and by their changing roles in the laboratory in spite of the rigorous nature of the coursework. The data also indicates that the support provided by the use of an instructional team concept and by the program manager and coordinator has contributed to student academic success and retention. Additional data will be presented that provides a better understanding of which types of support are most beneficial to various student demographic groups. Outcomes will be used to emphasize best practices in making decisions for future courses.

Industry and Education: The Categorical Model of Learning

Robert Porter MT(ASCP), Ruth Paur MS CLS(NCA), *University of North Dakota, Grand Forks ND;* ***Sue Lehman MA MT(ASCP) SM(ASCP),*** *Mayo Clinic, Rochester MN.*

National studies confirm that the number of Clinical Laboratory Professionals is critically low, prompting the need for innovative approaches to professional clinical laboratory education. The University of North Dakota (UND) Clinical Laboratory Science (CLS) Program, in conjunction with Mayo Clinic, developed a model of learning that blends online didactic material with onsite laboratory training. This course successfully provided the 36 semester credits required by the National Credentialing Agency (NCA) in didactic and laboratory education in a combined format of distance education and onsite training. A biology degree with 36 total semester hours of science (including categorical) is required for admission into the program. The didactic material is presented online by UND's CLS faculty and the clinical training is provided by Mayo Clinic's clinical laboratories. The training schedule is individualized for the student to fit an intensive 14 week period. Each day involves approximately four hours of didactic material and four hours of laboratory training. Assessment is provided for each lecture and laboratory skill. Throughout the program students are given quizzes and exams by UND to determine the effectiveness of the categorical model of learning. To date, 6 employees of Mayo Clinic have completed the categorical training program in Immunohematology, and four of the six have taken and passed the NCA categorical certification examination. The categorical model has been expanded to other areas of the laboratory including microbiology, hematology, chemistry, and histology; two Mayo Clinic employees are currently enrolled in a 16-week pilot categorical program in Clinical Microbiology; and Hematology and Histology categorical program pilots will be implemented in 2006. This unique model, integrating academic education and clinical facility training, provides new options for mediating the employer's need for appropriately trained personnel in the field of Clinical Laboratory Science.

LEAN: One Laboratory's Solution

Brendon Sato MLT(ASCP), *Darla Van Asselt MT(ASCP), Avera McKennan Hospital and University Health Center, Sioux Falls SD.*

Like many other laboratories throughout the country, cost of health care is rising, budgets are increasingly restrained, workspaces are cramped, and the demand to provide higher quality service and results for patients and physicians is unceasing. In April 2004, our institution tackled these issues by adopting the LEAN concept. LEAN, taken from the Toyota Production System, is a disciplined approach to reducing waste and improving processes. To begin, the processes technical staff (operators) followed in order to produce laboratory test results were filmed. The actions that were taken on tubes of blood (product) were also filmed to help document what happened to the actual product. All video was analyzed using LEAN methods and philosophies. Based on the results of the analysis, several changes were made to laboratory processes, design, and layout, and to staff functionality. These changes have resulted in the creation of standard work, a 50% decrease in testing turnaround times, improved space utilization, a decrease in inventory, and annual savings in excess of $300,000 per year. To keep track of improvements and productivity, graphs and bar charts are used on a daily basis. As new ideas and concepts are presented, even greater gains are anticipated as world-class production levels are approached. Implementation of LEAN by clinical laboratories is increasing around the country and educators will need to learn about and incorporate LEAN principles into their curriculum so that future laboratory professionals are prepared to practice the LEAN way.

Managing a Clinical Laboratory Science Program Prior to, during, and after a Disaster

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In August 2005, a major hurricane named Katrina impacted New Orleans and the Mississippi Gulf Coast. Two clinical laboratory science program directors located in these areas managed their programs prior to, during, and after the disaster. Disaster plans developed prior to the event and activities required during and after the event were analyzed by the two program directors by reflection on the disaster plans at the two institutions and reflection on the required activities. Similar disaster situations were reviewed. While planning was instrumental in addressing the disaster's impact on the programs, the magnitude of this specific event provided the program directors with new insights for future disaster preparation. Program areas affected by the disaster included university decisions, faculty and student safety, displacement of students,

communications, faculty availability, access to buildings, counseling activities, travel, faculty offices and resources, student laboratory equipment and supplies, clinical rotations, affiliation agreements, accreditation standards, educational equipment and resources, and computer/Internet access. Recommendations regarding planning for the impact of disasters on clinical laboratory science programs are discussed in view of the experiences with Katrina. While clinical laboratory science programs may be greatly impacted by unavoidable disasters, knowledge regarding the possible impact will allow the programs to plan for management of the events.

National Tuberculosis Curriculum Consortium

Sandra Latshaw MA, *University of Nebraska Medical Center, Omaha NE;* ***Kathleen Mugan M Ed,*** *University of Arkansas for Medical Sciences Little Rock, AR;* ***Maribeth Flaws PhD,*** *Rush University Medical Center, Chicago IL.*

Tuberculosis is currently on the decline in the USA; however, it is imperative that all medical disciplines remain alert to the detection, identification and treatment of this deadly disease. Therefore, the National Tuberculosis Curriculum Consortium (NTCC) was established in October 2003 under a contract from the National Heart, Lung, and Blood Institute of the National Institutes of Health (N01-HR-36157). The mission of the NTCC is to create test-bed environments for designing, implementing and evaluating tuberculosis (TB) curricula; to develop a network of organizations to impact TB education throughout the USA; and to create access to educational and training opportunities for post-graduates and the public. The NTCC is led by Dr. Antonino Catanzaro and the University of California San Diego School of Medicine and consists of faculty from around the country representing clinical laboratory science, medicine, nursing, pharmacy, public health, respiratory therapy, and physician assistants. This poster provides an introduction to the NTCC and its activities related to TB education in CLS/CLT programs. Projects completed to date include: suggested TB competencies, a student survey to assess comprehension of TB upon graduation, and preliminary work products including test questions, games, computer-based learning objects, and case studies. A sampling of all completed or preliminary work products will be presented. By determining current deficiencies in TB curricula for health professionals and developing active learning modules to correct deficiencies, it is the hope that we will prevent a resurgence of TB infections in the USA.

PCR Laboratory Exercises for Clinical Microbiology Students

Scott Wright MS CLS(M)(NCA), *Weber State University, Ogden UT.*

Developing PCR (polymerase chain reaction) protocols for use as student molecular biology laboratory exercises for the clinical microbiology educator is a daunting task. This poster illustrates three PCR protocols which were developed for students at Weber State University in the Clinical Laboratory Sciences program. The first two exercises involve detection of clinically significant infectious diseases and are 1) PCR amplification of *Neisseria gonorrhea* from vaginal swabs, and 2) Screening for MRSA (methicillin resistant *Staphylococcus aureus*) in student nasal cavities. The third project that is described is called "Who done it?", a forensic demonstration of human DNA fingerprinting using seven primers in two multiplex PCR reactions. The three exercises provide students with hands-on experience using protocols that have been shown to be reproducible over the course of three semesters of student laboratories. The poster will provide a brief summary of the protocols and results. In addition, a link to the faculty's web site is provided where there are detailed protocols for the three exercises, including: sample collection and preparation, DNA extraction, PCR components, amplification conditions, and gel electrophoresis techniques. The web site has been developed in hopes that other CLS educators will also share protocols that are being done in their student laboratories. The web site can either contain the actual protocols or a link to a professor's own web site.

Status of Molecular Diagnostics Incorporation into Clinical Laboratory Science Curricula: Results of a National Survey

Barbara Kraj MS CLS(NCA), *Medical College of Georgia, Augusta GA.*

Current NAACLS Accreditation Standards (v.2001) require that the CLS Educational Programs incorporate molecular diagnostics into the curriculum including performance of assays. This study was prompted by an article which reported a significant number of educators being dissatisfied with the molecular diagnostics instruction they provided (Miller and Abbate, 2002). In June 2005 a survey was designed to evaluate the progress that has been made in introducing this discipline and to find out what teaching materials were used by the participants. Forty (40) NAACLS accredited CLS/MT Program Directors or Faculty listed on the NAACLS website responded to an informal, e-mail survey containing six (6) questions. Results were expressed as row numbers or percentages, or were assigned casual frequency description.

All but one respondent stated that molecular diagnostics was taught in their programs although only in half of these as a separate subject. One-fourth of the programs included laboratory instruction. The inquiry about teaching materials has revealed frustration among the educators and only 40% recommended specific sources all of which are presented. No textbook was preferred by a statistically significant number of instructors. One school planned opening a Diagnostic Molecular Scientist (DMS) program in 2006. Only 16% reported familiarity with the "Human Genetics Curricula for the Health Professionals Project" in which the NAACLS has participated since 2000. These results indicate that CLS educators still need guidance with incorporating molecular diagnostics into their curricula in order to comply with NAACLS requirements.

Teaching Techniques to Increase First Year Success

Lynne Brodeur CLS(NCA), *Elizabeth Correiro CLS(NCA), University of Massachusetts – Dartmouth, North Dartmouth MA.*

The attrition rate of first year Medical Laboratory Science students is the highest in the College of Arts and Sciences at the University of Massachusetts Dartmouth. It is of great concern to the faculty to find ways to increase retention and success rate of students enrolled in our program. The faculty at the University of Massachusetts – Dartmouth has developed a collection of teaching strategies to help achieve first year student success. The goal of the program was to have faculty modify one of their courses to promote the retention and success of students in their first year of college. One MLS faculty member instituted the use of "entrance and exit" passes for the Introduction to Clinical Laboratory Science course. For the "entrance pass", students answer three questions pertaining to the experiment prior to participating in the laboratory exercise. The questions selected for the entrance pass were designed to facilitate student preparedness and check the level of understanding of key concepts. This encourages students to read the laboratory protocol and privately ask questions. The "exit" pass consists of three reflective questions that engage students in thinking about the purpose as well as the clinical significance of the experiments they have performed. These passes target the heterogeneous mix of learning styles in the classroom, as determined by a learning style survey. Based upon increased quiz and exam grades, it has been found that students have a better sense of what they are doing and why. The passes also help cut down on the expense of reagents and supplies being wasted due to non- preparation on the students' part. The student leaves the laboratory session feeling confident and the general laboratory experience is a positive one.

Twelve Month, Second Degree Track in Medical Technology

Cherry Childs MS MT(ASCP)SM, *Kathleen Mugan M Ed MT(ASCP)SH, University of Arkansas for Medical Sciences, Little Rock AR.*

Individuals with a Bachelor of Science degree are reluctant to enter a two-year allied health program and prefer programs that require one year of additional training. To attract students who already have a degree, the College of Health Related Professions of the University of Arkansas for Medical Sciences initiated a 12-month accelerated, second degree track in medical technology starting in the fall semester of 2004. The program includes two semesters of professional curriculum taken concurrently with traditional 2+2 students. The 16-week clinical experience includes approximately three weeks in both the fall and spring semesters and ten weeks in the summer. The accelerated student must meet the same clinical competencies as the 2+2 students. Admission requirements for the accelerated track include a bachelor's degree in biology, chemistry, microbiology or related science field, 3.0 math/science, and general education grade point average (4.0 scale), and fulfilled pre-professional math/science curriculum. Five accelerated track students have graduated and six students are currently enrolled. On exit interviews, all five graduates rated the program quality as very good or excellent. All of the accelerated track graduates are currently working as clinical laboratory scientists. The authors are evaluating the performance of the accelerated students (n = 5) and the traditional students (n = 12) as measured by graduate and employer surveys six months after graduation and national certification exam results. These results should provide data that will help other 2+2 programs that are considering a 12-month track.

Western College Alliance for Clinical Laboratory Science Education

Karen Peterson MS MT(ASCP), Ruth Paur MS CLS(NCA), Janna Schill MS MT(ASCP), *University of North Dakota, Grand Forks ND.*

The critical shortage of qualified people to fill vacancies in the clinical laboratory has prompted the formation of an alliance among students interested in clinical laboratory science, regional medical centers, regional colleges, and the Clinical Laboratory Science (CLS) Program at the University of North Dakota (UND). The Western College Alliance gives a student the opportunity to complete clinical training in a regional medical center, receive a BS degree from their local college, and be eligible to take a national certification

exam in clinical laboratory science with a minimum of time away from their home. The student is required to spend 12 weeks of intensive lecture/laboratory on the UND campus; the remainder of the coursework and laboratory experiences can be completed at the student's local medical center. One advantage for medical centers is an opportunity to train prospective employees without the expense of providing accreditation and faculty lectures. An advantage for the regional college is the ability to attract students into a cost effective program while furnishing the region with needed, skilled graduates. An advantage for UND's CLS Program is an income to assist in the expenses of providing intensive laboratory experiences for the students before the clinical affiliation. The Western College Alliance has proven to be an example of a partnership which can benefit all parties while fulfilling the critical need of providing Clinical Laboratory Scientists in the region.

TECHNOLOGY DEMONSTRATIONS

Blended Learning in the Practice, Wet Laboratory Learning Environment

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To make the most efficient use of instructor-teaching and student-learning time, The University of Nebraska Medical Center's Clinical Laboratory Science (CLS) Program has incorporated a blended-learning environment during its 11-week, introductory student laboratory phase. In the practice wet-laboratory environment, one Internet accessible computer is available at each two-student work station. As students complete independent laboratory exercises, they have on-line access to concise (i.e., fewer than five minutes) technical procedure videos (Real™) and graphics of test interpretations and staining results. At the click of a mouse, streaming media and graphics are available to the student on an on-demand or as needed basis. Examples of procedure videos include preparation of blood smears, immunohematology tube procedures, pipetting techniques, performing a serial dilution, setting up a urine culture, and rapid immunochemical tests. Color graphics are available for color-dependent interpretation results, such as microbiology biochemical tests. Digital graphics of microscopic results are available so students can compare unknown samples (e.g., Gram stains and slides for parasites) to known samples. Students are required to utilize this online resource center preparing them for using similar resources during clinical rotations. Students like the asynchronous availability of the laboratory material, allowing review of visuals previously available only during laboratory sessions. All such multimedia material is available to students for review during clinical rotations. This technology demonstration will provide an overview of the navigation and content of this student laboratory resource center, including the various types of multimedia used.

Bringing the Classroom Online: How to Set Up and Maintain the Discussion Board Tool in Online CLS Courses

William B Zundel MS, *Weber State University, Ogden UT.*

A common barrier to effective learning in online courses is a lack of interactivity, both social and instructional, for the teacher/student and student/student relationships. On campus these interactions occur routinely in the classroom, laboratory, and socially in the halls and elsewhere. This interaction promotes the learning process. Effective set-up and maintenance of an asynchronous discussion board can break down many of these barriers encountered by online students. For example, setting up a discussion board just for social interaction, beginning with an introduction during the first week of class, can create camaraderie and unity among student peers and the faculty before the course even starts. Having a Question and Answer (QA) discussion board every week to discuss new content is similar to asking questions on campus before each lecture. Also having students post assignments (e.g., case studies) in a discussion board and receiving feed back from peers can also be quite powerful as they encourage and support each other. The outcomes include helping detached (often by thousands of miles) online students feel close to each other and comfortable with their instructor. It enhances learning by providing increased access to the faculty and their expertise. A properly set up and maintained discussion board can be a very effective tool to keep track of student progress and well being. How to set up and maintain a discussion board using WebCT will be demonstrated. In addition, examples will show student interactivity from previous semesters demonstrating the interactive processes and their outcomes.

Classroom Clicking for Enhanced Student Learning

Susan Stalewski MBA MT(ASCP), *University of Wisconsin – Milwaukee, Milwaukee WI.*

Assessing student understanding and participation as well as maximizing active leaning are ongoing concerns for instructors regardless of the size and type of class. Student response systems, also known as "clickers", are a technological innovation

designed to increase student engagement in the classroom, while also enhancing the ability of the instructor to probe student attitudes and assess depth of understanding, data interpretation, and critical thinking. The interactive nature of student response systems provides real time feedback for all course participants, improving their awareness of learning (metacognition). Radio frequency student response systems (Turning Technologies, LLC) were integrated into a large lecture course, Introduction to Diagnostic Medicine. This is a course for Clinical Laboratory Science majors and non-majors. The student demographic spans all levels, with a concentration of freshmen and sophomores. Measurements of success of this project include student attendance and participation rates, test scores, final grades and pass rates, and faculty and student evaluations. This is a new innovation in the fall 2005 semester. Prior evidence indicates that use of student response systems increases student learning and engagement. Data collected from this project is expected to mirror that of similar studies. Evidence and experience gained from this large class project will be used to further integrate electronic student response systems throughout the CLS curriculum. This technology presentation will include demonstration of software and student response devices in a variety of formats suitable to lecture and laboratory class settings.

Conversion of Existing Clinical Chemistry Web-based Materials into Sharable Learning Objects

Wendy L Arneson MS, Vicki S Freeman PhD, *University of Texas Medical Branch, Galveston TX.*

In a review of electronic educational materials available to CLS programs, very little can be found in a format that is easily identifiable or transferable between programs. Limited videodisc and CD image collections are available from only a few textbook publishers and professional associations. These collections are not user friendly for faculty, have not been appropriately cataloged for easy faculty accessibility, and are not readily available to students without additional expense. In terms of web-accessible materials, few sites can be found that distribute more than un-cataloged images. Existing materials are primarily embedded in platform specific course delivery systems, are course specific, and are not readily sharable. This presentation will demonstrate how Clinical Chemistry course materials were broken down into small instructional units called learning objects. It will then be demonstrated how these "mini" instructional units are cataloged into a web-accessible database and shared with faculty to provide lecture and laboratory teaching to a variety of audiences in a variety of settings. Usage data, user evaluations, and access information on the developed learning objects will be shared. The information presented will demonstrate the broad potential that this format has for CLS educators across the country and internationally for use in clinical chemistry education.

Interdisciplinary Healthcare Training: Bridging Clinical Laboratory Science, Genetic Counseling, and Physical Therapy

Lorraine Doucette, MS, MT(ASCP), *Karen Gordes DScPT, Stephanie Ashley MS, Fran Huber EdD PT OCS, Shannon DeLany MS, Lisa Steinberg MS, Niharika Khanna MD, University of Maryland School of Medicine; Howard Levy MD, Johns Hopkins University School of Medicine; Baltimore MD.*

Interdisciplinary healthcare is specific health care disciplines working together as a team to provide care to patients. At the University of Maryland School of Medicine three allied health programs, Medical and Research Technology (MRT), Genetic Counseling (GC), and Physical Therapy (PT), entered into a collaborative effort that led to the awarding of a three-year Allied Health Special Project grant from the Health Resources and Services Administration (HRSA) entitled "Interdisciplinary Healthcare Training and Delivery". The project's goal is to increase the number of allied health professionals trained in interdisciplinary delivery of healthcare, regulatory updates, health promotion and disease prevention, multiculturalism, geriatrics, long term care, home health and hospice care, ethics, disaster preparedness, and bioterrorism. A web-based interdisciplinary course was developed to meet this goal for the graduate students within each of the three allied health programs. A secondary goal is to increase awareness of each other's professions to students and the general public. This will be accomplished during the clinical component where interdisciplinary teams of students will provide healthcare to underserved individuals during ten health fairs in the Baltimore MD metropolitan area. Students will be assessed both during the didactic course and while participating in the health fairs by means of three interdisciplinary projects, pre and post surveys, and discussion board participation. The didactic course will become available to practitioners in each field to further the reach of interdisciplinary training. In conclusion, disparate allied health fields can work collaboratively to benefit patients and each other's field of practice.

Online Orientation: A Tool to Increase Student Success

Kara Hansen-Suchy M Ed MT(ASCP)SH, *Weber State University, Ogden UT.*

Despite the increasing popularity of online college degree programs, the attrition rate of students enrolled in these programs is higher than that of the conventional classroom. Initially, not all students are equipped with the skills required

to do well in an online environment. Technical and communication problems can create frustrations with homework and assessments. There can be feelings of isolation and a tendency to procrastinate when routine attendance is not mandated. Response time for instructor questions is not immediate and provides no visual cues for the online student. Research has indicated the need to support students and prepare them for the rigors of an online environment by addressing the issues that hamper students from excelling in this environment. By improving student interaction, technical skills, resource availability, and the quality of the initial online experience, it is likely that students will be more successful in the pursuit of an online education. The development of an online orientation course allows for these issues to be addressed specifically for students in the Online Clinical Laboratory Sciences (CLS) Degree Program at Weber State University (WSU). Will the implementation of an orientation class contribute to the initial success of the student? Success was defined as completion of the orientation class and continued enrollment in online classes in the subsequent semester. The results demonstrate an excellent positive correlation between the addition of an orientation class and student success. Implications may benefit other online degree programs or those administrators beginning the implementation of online studies.

Student Information Management for Dummies

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The University of Texas Medical Branch (UTMB) Clinical Laboratory Sciences Program has developed a student information management system that allows access to student contact information, degree plan, grades, GPA, prerequisite completion data, and courses remaining within the CLS program to be completed. The concepts that are embodied in the Internet-based system may be generalized to the management of any large database. This system also provides a means of scheduling preceptorships, courses, and examinations. Password-protected full access is granted to all faculty. Students have limited password protected access to their own information and some general information, such as that regarding preceptorship sites.

This customized web application manages recruiting and admissions processes in addition to student and alumni information. Examination grading may be accessed and assessments may be re-keyed through this system as well. UTMB uses the Questionmark Perception system for offering on-line assessments. A web-based database-driven application linked with the Perception server manages the post-assessment process independent of the test administrator. Faculty may manipulate questions, adjust scoring and view final grades. The management system schedules students into preceptorship sites using clinical site information and student prerequisite completion data. This customized web-based information system provides an efficient, departmental-specific student management system.

2007 CLEC Abstract Deadline

The deadline for abstracts for poster presentations or technology demonstrations at the 2007 ASCLS Clinical Laboratory Educators Conference (CLEC) is October 1, 2006. Submission instructions and the proposal form may be found at www.ascls.org/conferences. The completed proposal form and abstract must be submitted electronically by the deadline.

The 2007 CLEC will be held February 22-24 in Louisville, Kentucky. Additional meeting information will be available at the ASCLS Conferences website.