Clinical Laboratory Educators' Conference 2015 Abstracts

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Poster Presentations

Clinical Laboratory Education and Instruction through a Simulation Based Environment

*Brenda Betz MS, MLS (ASCP) H[CM], DeVry University, Phoenix, Arizona

Traditional clinical rotations have encountered a host of challenges in today's marketplace. The competition for clinical rotation slots and the cost of training students have forced CLS programs to embrace alternative methods. Students transitioning from the college laboratory to a clinical environment have often expressed angst and trepidation of this unknown. Our clinical partners have expressed frustration that students are experiencing "data dumps" and not retaining the theoretical concepts of instruction, especially information that was taught early in the program. My hypothesis is that structuring a simulation laboratory as a bridge and not as a clinical replacement will benefit the CLS program, clinical site and the student. DeVry University has incorporated a simulation lab to address these issues. The simulation lab is designed to replicate a small laboratory and is utilized as a bridge between the didactic elements of a classroom and those of a clinical setting. Surveys were sent to students and clinical affiliates to obtain and score their perspectives of psychomotor and cognitive skills with and without simulation experience. The survey questions were ordinal in scale and will be measured using a nonparametric tool to assess criterion validity. Students expressed the simulation lab fostered increased critical thinking through QC interpretation and the testing/ resulting of specimens. Affiliates stated less time was spent re-teaching core concepts which allowed more time for critical psychomotor development. When used as a preclinical bridge we have achieved our goal thus; decreased competitive slots, increased student independence and a platform to review complex concepts.

Medical Simulation: An Opportunity to Emphasize Interprofessional Communication and Teamwork

*Michelle R. Brown, MS, MLS(ASCP)[CM]SBB[CM], Brianna V. Miller, MS, MLS(ASCP)[CM], Tera Webb, MS, MLS(ASCP)[CM], The University of Alabama at Birmingham, Birmingham, Alabama

The Institute of Medicine (IOM) and the Interprofessional Education Collaborative (IPEC) have made team-based approaches to healthcare a priority. In response, our faculty team sought to expand upon a previously successful interprofessional simulation and increased both the number of simulated patients and the number of professions involved. We developed a 7 patient, extended time (45 minute) intensive care unit simulation as a tool to reinforce the concept of team-based care in a controlled environment. Students from Clinical Laboratory Science, Medicine, Nursing, Respiratory Therapy, Nuclear Medicine Technology, and Physical Therapy participated in the simulation. The simulation center housed the high fidelity patient simulators and a stat lab for rapid testing, specimen receiving, and issuing blood products. We ran a second laboratory in a separate building on campus where the CLS students routinely have labs and offered a full array of diagnostics. This accurately reflects the reality that the lab is often not near the intensive care unit. Students had to effectively communicate with all professions; this included calling critical results, notifying practitioners of blood available for transfusion, and specimen integrity concerns. Twenty-five specimens were prepared for analysis in blood bank, hematology, microbiology, and chemistry. Each included a test requisition, specimen, and relevant patient history. Debriefing occurred on three levels: scenario, full simulation, and discipline-specific. CLS students felt the simulation emphasized the importance of effective communication, how to prioritize specimens, and work as part of an interprofessional team.

Improving Patient Safety through Laboratory Communication

*Karen Golemboski, Ph.D., MLS(ASCP)[CM] , Bellarmine University , Louisville, KY , Catherine Otto, Ph.D., MLS(ASCP)[CM], Salisbury University, Salisbury, MD

Improved communication with care providers during the pre-

analytic phase of testing may lead to better specimen quality and test utilization. In the post-analytic phase, appropriate communication with care providers and with patients may lead to better understanding, interpretation, and application of laboratory test results. However, a recent publication from the Clinical Laboratory Integration into Healthcare Collaborative confirms that physicians seldom contact laboratory professionals for advice regarding test ordering. Although communication skills are included in the NAACLS standards for Medical Laboratory Science (MLS) education, and are part of university education in general, MLS students and entry-level practitioners have little experience dealing with specific professional communications, and may even be discouraged from engaging in conversations, especially with patients or the public. We have provided opportunities for students to practice laboratory-related communication through assignments, using a discussion board through the campus learning management system. This activity was initially included in Hematology courses. Weekly, questions related to course content from hypothetical care providers or patients were posted; individual students were assigned to answer the questions, and other students were assigned to peer-review their entries. A rubric was used to score student responses and peer reviews. This assignment entails the use of discipline-specific content in a real-world context and requires students to use critical thinking skills to determine how to present information which is appropriate for the questioner. A survey of participating students indicated that 90% considered this activity to be useful, and 80% felt that it could be applied in other laboratory disciplines.

Getting Out of the Silo: Introducing Clinical Laboratory Science to Interprofessional Education

*S. Renee Hodgkins PhD, MT(ASCP); Eric Elsinghorst PhD, MB(ASCP)[CM]; Jennifer Jones BS, MLS(ASCP)[CM], University of Kansas Medical Center, Kansas City, KS

The practice of medicine is becoming patient centered requiring the use of healthcare teams. In contrast to this trend, the education and instruction of medical professionals has historically been sequestered to silos where each profession learns their own role in the diagnosis and care of a patient. The introduction of interprofessional education (IPE) has begun to change the way we educate new medical professionals. The IPE initiative at the University of Kansas Medical Center (KUMC) has the largest number of participating professions in the country, including CLS. The KUMC approach to IPE provides three distinct levels of interaction in a team-work oriented learning environment including a platform to educate on our respective professions, a foundation for cohesive communication utilizing TeamSTEPPS®, and high fidelity simulation experiences. Pilots of this program have been extremely successful. Students evaluated the experience using structured surveys on attitudes and objectives (T-TAQ and OSCE) and stated that the events provided a unique opportunity to learn about and with other professions and enhanced their ability to work in a healthcare team. The KUMC IPE program allows CLS students to work productively in a healthcare team environment in an educational setting. With time and practice, this approach will provide a stepping stone to help break down the silos that separate the medical professions and to change the face of healthcare education and practice.

Challenges of Medical Laboratory Science and Medical Laboratory Technology Educators

Alison Kovach, MLT(ASCP), Maria Delost, Ph.D., MT(ASCP), Teresa Nadder, Ph.D., MLS(ASCP)[CM], Joseph P. Lyons, Sc.D, Youngstown State University, Youngstown, OH

This study researched current issues facing directors of Medical Laboratory Science (MLS) and Medical Laboratory Technology programs. A survey of 26 questions was sent using Survey Monkey to program directors of 441 NAACLS accredited MLS and MLT programs. Demographic information (program type, location, and years of experience of the program director) was also collected. Data from 242 respondents (54.8% response rate) revealed that enrollment has increased or remained the same in 212 (87.6%) of the programs. Recruitment challenges were reported by 144(59.5%) of the respondents and were most often related to lack of knowledge about the profession (78, 31.8%). Only 37(15.3%) of the programs had a designated recruiter and only 68(28.1%) had a marketing plan. Clinical placement issues were reported by189 (78.1%) of the respondents, with microbiology and blood banking cited as most problematic. The program director was the only full time faculty member in 81(33.5%) of the programs; 152(62.8%) indicated that their program has up to two adjunct faculty. Only 62 (25.2%) stated that there are research requirements at their institution. Of the respondents, 163 (67.3%) indicated that their budget is comparable to other allied health programs within their division. Responsibilities of being a program director were challenging to 200(82.6%) of the respondents. Identification of challenges in medical laboratory science education is an important step for program directors in order to investigate options and to create successful program strategies.

Selecting Molecular Diagnostics Learning Objectives Using a Modified Delphi Process

*Barbara Kraj, MS, MLS(ASCP)[CM]MB[CM], Georgia Regents University, Augusta, GA, Teresa Nadder, PhD, MLS(ASCP)[CM], Virginia Commonwealth University, Richmond, VA

The MLS profession is in need for published molecular

diagnostics competency-based standards and curriculum. To assess their expectations of new MLS graduates, professionals performing and supervising performance of clinical molecular assays were surveyed to rate the importance of relevant cognitive and psychomotor learning objectives. A modified, asynchronous, iterative online Delphi process was utilized for assessment of consensus on the importance of the objectives. The survey was delivered through online RedCap application. Program directors of 221 NAACLS accredited programs were asked to forward the first Delphi survey to target participants at their affiliated clinical sites. Ninety-four experts submitted complete surveys, including 88 who provided email addresses, indicating agreement to participate in future Delphi rounds. Most of the participants were certified by ASCP or NCA (81%), had over 10 years of laboratory experience (76.6%), and worked in a hospital setting (43.6%). The reliability of the first survey, assessed using Cronbach's alpha, was 0.96. In the second survey, the objectives assigned low importance by the majority were removed; and others, assigned high importance were expanded. Respondents were given the opportunity to confirm or change their opinion on the objectives after reviewing the results of the preceding survey. Upon completion of the Delphi process, the objectives rated "very" and "most important" by at least 70% of the participants were identified as necessary for inclusion in the competency-based, entry-level MLS curriculum. Objectives rated "very" and "most important" by 50-69% were considered optional; and objectives rated "very" and "most important" by 25-49% were suggested for extra credit.

Successful Interprofessional Partnerships: Education and Exposure

*Brianna Miller, MS, MLS (ASCP)[CM], Michelle Brown, MS, MLS (ASCP)[CM]SBB [CM], Kristopher Maday, MS, PA-C, CNSC, University of Alabama at Birmingham, Birmingham, Alabama

There are two primary issues facing the medical laboratory today. These are the gaps in education of other healthcare professionals about what occurs in the medical laboratory and lack of exposure of the assistance that medical laboratory scientists can provide. At the University of Alabama at Birmingham, the Clinical Laboratory Sciences program has developed a relationship with the Physician Assistant program in hopes of filling these gaps. The PA program teaches a course, Clinical Laboratory Medicine, in which PA students learn about medical conditions and their relationship to laboratory results. The CLS and PA programs have partnered to allow the expertise of the CLS faculty to aid in teaching the course. This has allowed for exposure of how a MLS can be used for consultation roles when the PA is unsure of what results mean or further testing needed. Multiple CLS faulty teach in the course, while a member of the PA faculty also gives information specific to PA. This has allowed the PA students to gain an understanding of how a MLS can help them professionally, be used in a consultative role, and how laboratory tests are used in the diagnosis and treatment of patients (100% agreement, n=25). It is our hope in the future to take this same concept to other programs to develop more courses in laboratory medicine. These partnerships will aid in addressing these issues of educating other healthcare professionals about laboratory medicine and the exposure of how the MLS fits into the overall healthcare model.

Simulated STAT Laboratory in a University Based Program

*Matthew Nicholaou, DrPH, MT(ASCP); Janice Thomas, MEd, MLS(ASCP)[CM]; Janet Oja, MHA, MLS(ASCP)[CM], Weber State University, Ogden, Utah

The ability for students to rotate in clinical laboratories can be limited in some university based Medical Laboratory Sciences (MLS) programs. These shorter rotations can be supplemented with extensive simulated laboratory work that often is discipline specific. A course was developed to replicate the environment of a clinical STAT laboratory and enhance students' exposure to this type of multi-discipline work setting. The simulated STAT laboratory consists of five areas: receiving and specimen processing, chemistry, hematology, urinalysis, and microbiology. Students are given scenarios related to customer service, workflow, instrument maintenance and troubleshooting, time management, data entry, and result reporting; thus addressing the specific training needs expressed by an advisory board represented by local clinical affiliates. In the summer of 2014 this laboratory was renovated and equipped with new instrumentation, including a Laboratory Information System (LIS). Students rotate each week between the five areas of the lab and two students are selected to act as laboratory managers. Specimens are dropped off at the beginning of each laboratory section and students are required to accession, process, analyze, and report the results of these samples. Students are graded on the timely and accurate reporting of results, as well as compliance with a number of laboratory tasks such as quality control. A pre and post survey consisting of 12 questions addressing the main educational outcomes of this course was given and showed that students felt more confident in performing a variety of laboratory testing under real-world conditions after taking the course.

Online Graduates in Clinical Laboratory Sciences: Are They Prepared for the Workplace?

*Jennifer D. Perry, Ed.D., MT(ASCP), Marshall University, Huntington, WV

With the increase in online programs in clinical laboratory sciences (CLS) there is limited research regarding how well prepared the graduates are for the workplace. Prior research

suggests that online CLS graduates perform as well as their traditional graduate counterparts on national registry examinations; however, there is no information on their job preparedness and performance. A qualitative multi-site case study was performed exploring the job preparedness of clinical laboratory science (CLS) professionals with online degrees in the Associate in Applied Science in Medical Laboratory Technology (MLT) and the Bachelor of Science in Medical Laboratory Science (MLS). Data collection involved interviews of laboratory managers, supervisors, educators, and online graduates in four hospital cases and two higher education online programs that provided employees to the hospitals. Four salient themes emerged from the findings, the first theme regarded participants' prior experiences with online education. The second theme regarded the nature of online programs and concerns about the lack of hands-on activities graduates had during their degree programs. The third theme was the importance of online program quality and reputation. Finally, the influence of job market conditions on hospital hiring practices of CLS graduates, online or otherwise, was the fourth theme. Of the four themes, some crossed over MLT and MLS- level education, and others pertained only to MLT or MLS-level education. The implications of these findings for future research for laboratory professionals, and CLS education administrators are included that pertain to hiring practices of online CLS graduates and CLS online education program design.

Improving Quality of Education in Clinical Laboratory Data Analysis

*Kim A. Przekop MBA MLS(ASCP)^{CM}, Zoe Brooks ART, David Plaut BA, Kathleen Kalinowski MGA MT(ASCP) , Rutgers, The State University of New Jersey, Newark, NJ

Fundamentals of clinical laboratory data analysis are not well understood and there is often a disconnect between quality metrics and patient care implications. The authors collaborate with students in the evolution of an online graduate course, "Analyzing Data in the Medical Laboratory," taken by practicing laboratory professionals. This course's innovative teaching strategies provide up-to-the-minute information to ensure that students are competent in designing QA experiments in their workplace. The course schedule parallels the process of installing a new laboratory method, including the planning phase, experiments, QC, and proficiency testing. Each unit focuses on linking laboratory quality to patient care by selecting appropriate statistics in real-life cases and literature articles in peer-reviewed journals. Excel-based "Q-See Simulators", divided into incremental steps, allow students to see how eight individual and independent variables change the clinical outcomes. Student feedback on the simulators allows immediate upgrades to the software; student end-of-course input has resulted in a significant redesign and refocus of course content in the subsequent semesters. Lively discussion forums are scored and an integral part of the learning process and sharing as students are challenged with critical thinking and to use the 'DIMS test' (Does It Make Sense?). For the fall and spring 2013-14 course evaluations, 89-100% of the students (n=26) strongly agreed/agreed that the course added to their knowledge base and professional development, and would recommend this course to others. We are actively working on the introduction of completely new QC concepts developed by Professor Brooks, molded by the input of students.

An Analysis of Academic Integrity among University Undergraduates: A Comparison between Traditional University Students and Allied Health University Students

*Wade Redman, Ph.D., MT(ASCP)DLM^{CM}, Texas Tech University Health Sciences Center, Lubbock, Texas

Educators within academic institutions need be aware of the ever-present expectation of academic integrity, which encompasses various components including, but not limited to, cheating and plagiarism. Understanding the academic integrity environment of one's university, which not only includes the students' perceptions and attitude, but educator alike, is essential in education today. Fortunately, the academic integrity environment of a university can be measured via the McCabe Academic Integrity Scale (M-AIS) which measures the academic integrity behaviors of students and faculty alike via Likert-type responses. Data was collected using statements which are intended to obtain participants' opinions of the following: severity of academic dishonesty penalties on campus; student and faculty understanding of policies, support of policies, and the effectiveness of the penalties; the average students' understanding of campus policies concerning cheating; whether students have been informed about academic integrity or cheating policies; how frequently student have been informed about the cheating policies; how frequently cheating/plagiarism occurs; how frequently students inappropriately work on group assignments; and how frequently cheating occurs during tests or exams. The purpose of this study was to compare the academic integrity environment between Texas Tech University (TTU) undergraduate students (n = 1,043) and the Texas Tech University Health Sciences Center (TTUHSC) School of Allied Health Sciences undergraduate students (n=72, of which 34.8% were CLS students). Data were analyzed utilizing the nonparametric Mann-Whitney test in order to determine if a statistically significant difference exists in the academic environment between TTU undergraduate students and TTUHSC undergraduate students. A statistically significant difference existed between undergraduate students at the traditional university (TTU) versus those of the health sciences center (TTUHSC). Based on the significant findings, TTUHSC students appeared to be more sensitive to academic integrity issues than those of

their TTU student counterparts.

Evaluation of a Continuing Education Activity for Laboratory Practice Recommendations

*Nakeva Redmond, MPH; Bin Chen, PhD, Centers for Disease Control and Prevention (CDC), Atlanta, GA

Assessing the effectiveness and impact of voluntary laboratory practice guidelines is a common challenge for continuous quality improvement of laboratory services. In 2012, the Centers for Disease Control and Prevention (CDC) published a comprehensive guide of good laboratory practices in biochemical genetic testing and newborn screening for inherited metabolic disorders (http://www.cdc.gov/mmwr/pdf/rr/rr6102.pdf). CDC also provides an online continuing education (CE) activity to encourage laboratory and healthcare professionals to learn the recommended practices. We employed the Kirkpatrick training evaluation model to assess participants' responses to the CE evaluation, which was designed to measure reactions to the learning activity, understanding of the instructional content, and perceived usefulness of the CDC guideline. As of May 2014, 459 individuals registered for the CE activity, of which 319 completed it and earned CE credits. Laboratory (32%) and nursing professionals (25%) comprised the largest groups having completed the CE activity. The majority of participants agreed that the course learning objectives were met, and nearly 90% indicated that the course content and materials addressed a gap in their knowledge about newborn screening and biochemical genetic testing. Approximately 86% felt that they could apply the knowledge gained when given an opportunity. Participants planned to use the document for a variety of purposes including developing educational materials (39%), laboratory policies and procedures (19%), and future laboratory standards or guidelines (14%). However, further outcome evaluation activities are needed to assess the course's impact on sustained behavior change and actual improvement in laboratory practice.

Flipped Classroom: Implications in the Student Laboratory

*Amanda Reed, Ed.M., MLS(ASCP)^{CM}, Donna Duberg, M.A., M.S., MT(ASCP)SM, Mona Hebert, MLS(ASCP)^{CM}, Patrick Kelly, Ph.D., Saint Louis University, St. Louis, MO

Student disengagement during lecture and unpreparedness for laboratory motivated us to implement a flipped classroom model of instruction. This transformed our classroom from a teacher-centered, passive learning environment to a student-centered, active learning environment. Traditional lectures were replaced with online presentations utilizing lecture-capture software. These lectures introduced basic concepts and laboratory procedures within the following clinical laboratory science areas: chemistry, immunohematology, phlebotomy, safety, and urinalysis. During class, students were placed into groups and utilized information presented in online lectures to complete case studies and problem solving assignments. Traditional modeling of laboratory procedures was replaced with pre-laboratory instructional videos which students were required to view prior to attending the associated laboratory class. Students then completed a laboratory exercise reflecting objectives stated in the online lecture and video. Statistically, there was weak to moderate positive correlation between percent of online lectures watched and laboratory or quiz performance, but not both. This unclear association indicated a need to better align all course components. A comparison of student performance on laboratory activities using the traditional lecture model versus the flipped classroom model showed no statistical improvement. In fact, student scores on one laboratory activity significantly decreased. A student survey (n = 43) indicated the majority of students preferred the flipped classroom model and perceived it to be useful. Refinement and standardization of all components is needed to clarify student expectations, reduce student confusion, and increase student performance on laboratory activities.

Implementation of Student Projects: Blood Smears for the Hematology Academic Laboratory

*Letycia Catalina Núñez Argote, M.P.H, MLS(ASCP)^{CM}, Cherika Robertson, MLS(ASCP)^{CM}, University of Arkansas for Medical Sciences

To improve the quality of learning and training for laboratory science students at UAMS, the Hematology Academic Laboratory needs new peripheral blood smears. Teaching slide sets display deteriorated cells and faded stain overtime. This interferes with the students acquiring skills for proper normal and abnormal cell identification and differentiation required as part of learning objectives of the laboratory science curriculum. A senior student project was implemented as a time and cost-effective method to renew sets of slides. Senior laboratory science students built complete sets of new blood smears from patient specimens obtained from their clinical internship site. The project required the students to review disease history, to understand key characteristics of cells and morphology changes, use proper technique to make, stain and preserve slides, and perform cell counts on slides to be included in the set. Standardization of slides in the set took into account student, trainer and automated cell counts. Five senior students participated in the project and produced on average 30 slides each for leukemia cases (AML, CML, CLL and MM) and 39 slides from a newborn, 19 of which are reticulocyte slides. Feedback from a post-experience survey indicated overall student project satisfaction, resulting in gaining valuable experience and reinforcing clinical skills. All participants

agreed that this student project was very helpful and should be offered by the Laboratory Science Program every year.

Academic Predictors for Medical Laboratory Science Students at Weber State University

*Ryan A. Rowe, MHA, MLS(ASCP)[CM], Weber State University, Ogden, Utah

The Medical Laboratory Science (MLS) program at Weber State University requires students to prove theoretical competence by obtaining a score of at least 80% on all lecture examinations. Students who do not reach this benchmark are required to take a parallel (re-take) exam and earn at least 80%. Students who do not reach 80% cannot advance to higher-level courses. Students attend two MLS freshmen level courses, and then apply to the program in order to further their MLS education. Applicant data has not previously included a parameter to capture if an individual has required a re-take examination. This longitudinal study evaluated data over a consecutive four-year period to see if the need for a re-take examination in either of the freshmen courses can be used to predict potential success in sophomore MLS courses. Sophomore level course outcome measurements included the need for a re-take in one or more sophomore level course and grade earned for each sophomore course. This data was compared to students who did not require a re-take examination during the same time period. Results show that students who need a re-take exam in their freshmen courses have an academic performance at the sophomore level courses no different than students who did not require a re-take examination. This information will now be used to evaluate future applicants to support the WSU MLS faculty in choosing the best applicants into the MLS program.

Development of a Capstone Project Course in a Medical Laboratory Science Curriculum

Carolina Vilchez MS, MLS(ASCP)[CM]*, Deborah Josko, PhD, Shashi Mehta, PhD, Elaine Keohane, PhD, MLS(ASCP)[CM], Rutgers-The State University of New Jersey, Newark, NJ

A capstone project course was implemented in 2010 to address higher level competencies required for Medical Laboratory Science graduates. The course design incorporates sequential learning activities that start from knowledge acquisition to applications of new and previous knowledge at analysis, synthesis, and evaluation levels. The course begins with sessions on research theory and clinical study design, evidence-based laboratory medicine, protection of human research subjects, critical analysis of published studies, literature search strategies, and scientific writing. Building upon this foundation, students individually conduct a literature search and write a literature review paper on an assigned disease topic. The next learning activity brings individual student competencies acquired from the paper assignment to a group activity. Students assigned to the same disease topic work together in groups of 3 or 4 to prepare a case report on a patient with that disease. The groups analyze de-identified patient data for key findings and present their case reports to peers and program faculty as both an oral PowerPoint and poster presentation. Comments and critiques obtained from peer and faculty review are then incorporated into a final poster presentation at a School-wide Interprofessional Research Day. This event provides a venue to explain laboratory diagnosis to students and faculty in other health-related fields. Since the implementation of this course, students have achieved annual recognition at this interprofessional event by being selected for oral presentations and/or undergraduate scholarship awards. Through this course, more than 90% of students achieved or exceeded applicable program and school learning outcome thresholds.

Microbiology Plate Rounds: Bridging the Gap between Didactic Coursework and Real-World Application

Tera L. Webb, MS, MLS(ASCP)[CM], University of Alabama at Birmingham, Birmingham, AL

Plate rounds can be a means to effectively bridge the gap between didactic coursework and real-world application. At the University of Alabama at Birmingham, the Clinical Laboratory Sciences program has implemented plate rounds into the Clinical Microbiology curriculum. The focus is not on just bacteria identification but also on antibiotic susceptibility patterns, clinical correlation, reporting guidelines, and consulting. During plate rounds, each of six stations were set-up to include a case, a microbial culture, a microscope with unknown slide, and a Mueller-Hinton with susceptibility or Microscan panel. Each station had rapid tests and, for reference, a Clinical Microbiology Standard Operating Procedure Manual. This manual is a reproduction of a hospital clinical microbiology manual which contains algorithms, testing procedures, work-up procedures, susceptibility testing guidelines, and reporting guidelines. Students were required to effectively correlate the cases with their findings, notate what would be released to the patients chart, and answer questions that would enhance their ability to consult on each specific case. One hundred percent of the students surveyed agreed that the activity helped them with their didactic coursework, their ability to correlate pathological manifestations with significant isolates, and it increased their interest in the application of microbiology in the clinical laboratory. Through simulation, students gained an understanding of how didactic coursework is applied in a hospital clinical microbiology laboratory.

Technology Demonstrations

Teaching the Principles of Semi-Automated Clinical Chemistry Testing with Cost-Effective and up-to-date Technology using the Pointe 180 QT Chemistry Analyzer

Larry Noel, MT(ASCP), *Kevin Johns, MLT(ASCP), Pointe Scientific a MedTest Company, Canton, MI

A daunting challenge many Clinical Laboratory Educators face with limited budgets is sourcing new analytic equipment that is both inexpensive and ideal for teaching. The Pointe 180 QT is a proven and inexpensive semi-automated clinical chemistry analyzer that is the link between manual testing on basic spectrophotometers and automated testing on more sophisticated systems. The Pointe 180 QT is similar in cost to basic spectrophotometers and tens of thousands of dollars less than fully automated chemistry analyzers. The teaching advantage is that the Pointe 180 QT offers the same analyzer programming, operational functions and touch-screen technology used on automated chemistry analyzers in clinical laboratories today. Thus the Pointe 180 QT will prepare students for the workplace much better than teaching with a basic spectrophotometer. In this demonstration, educators will learn the basic functions of the analyzer including: basic features, assay set-up, reagent blanking, assay calibration, calibration curve print out, running controls and review of data. Testing methodologies covered include: end-point, kinetic and initial rate reactions and immunoturbidimetric assays with multi-point calibration. There will be time for open discussion of other teaching applications such as setting up linearity, precision and correlation studies. In summary, the Pointe 180 QT is ideal for teaching the fundamentals of semi-automated clinical chemistry testing.

Teaching the Principles of Automated Clinical Chemistry Testing with Cost-Effective and up-to-date Technology using the Mindray™ BS-200 Chemistry Analyzer

Larry Noel, MT(ASCP), *Kevin Johns, MLT(ASCP), Pointe Scientific a MedTest Company, Canton, MI

A daunting challenge many Clinical Laboratory Educators face with limited budgets is sourcing new analytic equipment that is both inexpensive and ideal for teaching. The Mindray™ BS-200 analyzer is a proven and inexpensive fully automated clinical chemistry analyzer ideal for teaching the principles of automated clinical chemistry testing. The BS-200 can be used to teach many different automated testing methodologies including end-point, kinetic and initial rate reactions as well as immunoturbidimetric assays. The BS-200 is used in many physician office laboratories and is ten to twenty thousand dollars less expensive than similar analyzers. It is also an "open system" allowing for either bar-coded, packaged reagents or generic bulk reagents that are much less expensive. Most other chemistry analyzers on the market are "closed systems" and allow for only a few non-packaged reagents. In this demonstration, educators will learn the primary functions of the analyzer including an overview of the user-friendly software, barcode scanning system, open channel assay set-up, reagent blanking, assay calibration, running controls, review of data and an overview of enhanced features. There will be time for open discussion of other teaching applications such as setting up linearity, precision and correlation studies. In summary, the Mindray™ BS-200 is a cost-effect tool for teaching the principles of automated chemistry testing.

iPads® in the Student Laboratory: Utilizing Cloud Technology for Data Management

*Lisa M. Perkins, MS, MLS(ASCP)^{CM}, Lara U. Mabry, MS, MLS(ASCP)^{CM}, Virginia Commonwealth University, Richmond, VA

To stay on pace with technological advances in clinical laboratories, clinical laboratory science programs need to include 21st Century skills in their curriculum. One way of accomplishing this is by integrating cloud technology into the student laboratory. The Virginia Commonwealth University CLS program is utilizing Google Drive as a means of allowing students to record and manage laboratory data. Students access Google Drive using iPads® provided during laboratory sessions. The use of mobile devices allows for electronic bench-side data recording, analysis, and storage. Data management can be performed at bench-side or at a later time from different devices and locations using Google Drive. Instructors are then able to access the student data, provide immediate feedback, and enter laboratory report grades via Google Drive. Since the introduction of Google Drive in laboratory sessions, preliminary findings indicate increased student organization, reduced transcription errors, improved understanding of data findings, and quicker grading turnaround time. In addition, students have expressed their excitement with having access to familiar technology in the CLS student laboratory. This technology demonstration will concentrate on how utilizing cloud technology, specifically Google Drive, can improve the CLS student learning experience. A review of Google Drive features and how they can be applied to CLS programs will be covered.