

**JOURNAL OF
HEALTH
OCCUPATIONS EDUCATION**

Volume 14, Number 2

Fall 2000

Journal of Health Occupations Education

Editor: Larry R. Hudson, Ph.D., Associate Professor, Department of Instructional Programs and Educational Leadership, University of Central Florida, Orlando, FL 32816-1250

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2000

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ISSN0890-6874
Journal of Health Occupations Education

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About this issue:

Nancy Langley-Raynor provides new information about the Consortium and its' responsibilities toward Skills. Leslie Fehl reminds us about our first year of teaching and the trail and tribulations of this new challenge. Rajashree Parikh presents a summary of a doctoral dissertation research and based the article on a presentation at ACTE last December. Janice Bute and Bruce Roberts, along with students from a course about adult learners relate their review of research to their real world teaching and training. Overall this issue has over 100 pages of text, if printed.

Most sincerely,

Larry Hudson, Ph. D.

Editor

Journal of Health Occupations Education
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**U.S. DEPARTMENT OF EDUCATION ANNOUNCES 16 CAREER CLUSTERS:
NEW DIRECTIONS FOR EDUCATION**

Submitted by
Nancy Langley Raynor

For about two years, the U.S. Department of Labor and the National Skills Standards Board have been including in their commentary references to “economic sectors,” first 15 and now 16 in number. It has only been since last fall, however, that the U. S. Department of Education and the Office of Vocational and Adult Education have been addressing 16 career clusters. This was confirmed on March 16, 2000 at the Hyatt in Washington, DC when Secretary Richard Riley and Assistant Secretary Patricia McNeil recognized “career clusters” as new directions for education.

Speeches and discussion were introduced with a white paper. The following are segments from the white paper, “Career Clusters: New Directions for Education.”

“A major role for education has always been to prepare students for meaningful careers. To achieve that goal in today’s world requires education to adjust its focus. Over the past several decades-technological advances have significantly impacted the nature of work in the United States. Many careers, once accessible in the past to those who graduated from high school, no longer exist. The stark reality facing parents, students, schools and employers is that the jobs of today require much education and training of those individuals who fill them.

Experiences learned through Vocational Technical Education, such as Tech Prep and School-to-Work clearly show that in addition to increasing standards, providing relevance is an important key to improving student achievement and suggests a new direction for education. Students who grasp the relevance of what they are learning and recognize how it relates to their future are motivated to work harder and enroll in more rigorous courses.

Career Clusters provide a new structure, by which school can organize students according to their career goals and interests. They (Career Clusters) become a tool that counselors, students and parents can use to assist students in planning their pathways to college and/or employment. The 16 broad Career Clusters represent all careers from entry level through professional/technical management.”

U. S. Department of Education Career Clusters are identified as follows:

Arts, Audio Video Technology & Communications

Hospitality & Tourism

Business & Administrative Services

Information Technology

Legal & Protective Services

Transportation, Distribution & Logistics

Public Administration/Government Services

Financial Services

Agriculture & Natural Resources

Health Sciences

Human Services

Construction

Manufacturing

Education & Training Services

Wholesale/Retail Sales & Services

Scientific Research, Engineering & Technical Services

Making that Transition

By Leslie D. Fehl

Where is that teachers' manual when you need it? I have asked myself that question numerous times during my two years of teaching dental assisting. How does one know the no-no's when instructing a class of young to mature adults in a vocational setting? From what I have learned thus far, by trial and error.

Not knowing what is to be expected, prior to accepting a teaching position baffled me. I am a superb dental assistant of fifteen years. I have trained numerous assistants, but the role of a vocational educator is not what I expected. In fact, I did not know to ask the right questions about being a vocational teacher. I was given the course outlines and syllabus and basically I was on my own. Don't get me wrong, I had much support by my supervisor and fellow educators, but on how to conduct my class in a manner that is successful, I was sink or swim and I did a lot of bobbing.

My first semester teaching, I had 23 students ranging from seventeen years of age to forty-five. This particular class I had many strong personalities to contend with, not to mention the preparation of lectures and class activities for this many students. To me that was a lot of students!

First day of class. Shaking uncontrollably for the first hour. My voice trembled. I kept thinking to myself.... please don't let anyone ask a question I can't answer. Oh no!...two hands are up in the air.... What do they want? God please let me know the answer to their questions! That wasn't so bad. I answered the question gracefully and with confidence. Oh no! What if they ask another question and this one I can't answer? What if they ask about the tensile strength or weakness of glass ionomer cement? I have not mastered the elements of ALL cements. Fortunately, nothing like that was asked...This time.

Same first day, now I am teaching dental radiography. Boy, what a bummer this subject is. This particular subject is not my strongest discipline. However, I have taken thousands of radiographs in my fifteen years of being a dental assistant. This does give me the upper hand, right? Cathode, anode, electrons, short and long waves lengths, ionization...I haven't read about this stuff for six years. I studied and studied the material for three weeks in hopes to be prepared. Knowing this was going to be a difficult class to teach, I wanted to know as much as I could and be prepared for the unexpected infamous question. I have learned that many students are far more intellectual than I, but I have an advantage-- experience and ambition!

Teaching is nothing like it appears on television, Nobody told me I had to maintain a professional portfolio, attend meetings, workshops, seminars, be an active participant in the colleges recruitment, become a member in various associations, committees, attend classes towards a bachelors degree, AND teach! Someone may have mentioned these activities to me along the way, but initially ALL I could think of was preparing, learning, preparing, learning to be a successful educator. To me a successful educator is one that

creates and molds a successful student who then becomes successful in their chosen specialty. This is my goal. I so badly want all my students to be the best dental assistants they can possibly be, retain the knowledge and experiences from my classes, enjoy and respect the chosen profession, and be an asset to the community. I know that I am an inexperienced instructor, but through trial and error, time, advice from fellow instructors, mentors, and the students, I am in the making of becoming a successful educator.

Let me take just a few comments about my social life. What social life? There is none, does not exist... poof...its out of here! The time I spend at the college, on my computer, attending meetings and classes, preparing lectures and activities with my nose deep in a book and fingers aching from typing. I am just very busy keeping up with all the responsibilities of a teacher. Am I there yet?

I can't tell you how much I have learned from being a teacher. My brain used to be like a dry sponge that is now thirsty and wants more. I am acquiring a vast amount of information, so much that I have started taking ginkgo biloba in hopes to retain it all! A day does not go by that I do not learn; whether it be a teaching concept, a resource that may aid to a pertaining discipline, or managing my class and time.

Teaching is an underestimated career choice. I have never dreamed of the commitment and dedication required. However, I am in the mode to do just that. My values in life have changed considerably. I not only care for my family, but I have students who

depend and rely on me to aid in their dental assisting careers and becoming successful as well.

The path I am on is a long winding, bumpy road. I accept this, I want this! Needless to say being a "newbie" is a hard, gut wrenching experience. With much support from my family and friends, I too will succeed.

About that Teachers Manual

The missing link. The "how" to book. I am currently taking a college class, "The Professional Role of a Vocational Education Teacher." This is my first on-line course.

Let me tell you something. This class and teacher are phenomenal! The information, resources, and support obtained from this class is countless. I wasn't completely aware of the unlimited resources until I visited the campus for a showcase of Internet classes. I met one of the faculty and we spoke a little. In the short time we spoke, I learned of various resourceful educators on-line web sites and how to utilize the on-line library. To top that, the best resource provided was a book. "I Make A Difference; Making the Transition from Clinician to Educator", edited by Larry Hudson, Nancy Raynor, and Phyllis Olmstead. Dr. Hudson even wrote an inspiring message on the inside cover, " Leslie, you are making a great transition. My very best wishes, Larry Hudson." This message gave me much hope. He may write this in all the books he signs, but I feel it was written personally for me.

When my husband and I went on our vacation during spring break and the first day out on the water, I broke out this book. As I turned the pages and began to read, I began to get really excited about all the information in this book. I got my highlighter out and began to highlight! As I began taking notes, relating to experiences being described, I was in awe. This is the new teachers manual! I gained many terrific realistic ideas as to my role as an educator. Motivation tactics, teaching concepts, self and student assessments, and not be forgotten, recruitment tactics. These are just a few items this book discusses. I have gotten more ideas from this book in such a short period of time than from any other source. I am sure I will refer to this book countless times before I lay it to rest.

Have I Made that Transition?

My voice doesn't tremble anymore....my knees don't wobble. Have I learned all I need to in order to be a successful teacher? Not by any means. BUT. I am on the right path and I will stay on this path till I feel confident in my role as a teacher. I know I will make boo-boos along the way, but I also know I learn and grow from these mistakes. A teacher has got to start somewhere... and here I am.

Journal of Health Occupations Education
Fall 2000, Volume 14, Number 2

Competency Assessment for Medical Laboratory Practitioners and Existing Rules and
Regulations

by

Dr. Rajeshree P. Parikh

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Ed.D. University of Central Florida, 1998
S.B.B. American Society of Clinical Pathologists, 1993
M.S. University of Central Florida, 1992
M.Ed. Gujarat University, 1975
B.Ed. Gujarat University, 1974
B.S. Gujarat University, 1972

An article based upon a presentation
at the Health Occupations Education session of the annual conference
Association for Career and Technical Education
Orlando Convention Center on December 12, 1999

Competency Assessment for Medical Laboratory Practitioners and Existing Rules and Regulations

Abstract

Some of the challenges clinical laboratories faces today are the design and implementation of competency assessment programs. Section 493.1451 (b) (8) of the Clinical Laboratory Improvement Amendments of 1988 (CLIA, 1988) regulations states that technical supervisors are responsible for ensuring that staff maintain competency to perform test procedures and report results promptly, accurately, and proficiently. CLIA (1988) requires that the skills of technical personnel be assessed annually.

The purpose of this study was to compare the perceptions of certified medical laboratory personnel who worked as educators, employers, or practitioners regarding the required competencies of three levels of laboratory personnel: Medical laboratory technician (MLT), medical laboratory technologist (MT) and clinical laboratory Specialist.

Descriptive statistics, which included means, standard deviations, ranks, and Spearman Rank-Order Correlation, revealed some degree of discrepancies among the respondents. However, educator's response reflected the appropriateness of the competencies in direct relation to increasing competency level of laboratory roles, Medical Laboratory Technician (MLT), Technologists (MT) and Specialists. Employers and Practitioners, on the other hand, rated MTs and Specialists as almost equal. Furthermore, comparison among the practitioners revealed distinct discrepancies in the perceptions of performing and evaluating laboratory tests. The greatest variation was noted among practitioners in their rating of competency level required for specialist roles.

These specific results will be useful for further development of required personnel qualifications and their relationship to competency-based performance evaluations intended to maintain quality control practices and laboratory proficiency. Result of the study will also provide guidelines for further discussing curriculum revision for practitioners training and to establish distinct levels of competencies for three different levels of medical laboratory personnel: MLTs, MTs, and Specialists.

Introduction

One of the challenges clinical laboratories have faced is the design and implementation of competency assessment programs. Section §493.1451 (b) (8) of the Clinical Laboratory Improvement Amendments of 1988 (CLIA'88) regulations stated that technical supervisors are responsible for ensuring that staff maintain competency to perform test procedures and report results promptly, accurately, and proficiently (Federal Register, 1992). CLIA' 88 requires that the skills of technical personnel be assessed annually. The accreditation standards (1992) of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) emphasize the quality of interdepartmental functions and performance improvement (Hansen, 1996). As a result of such rules and regulations all laboratories were required to document competency assessment of their employees. Over the past twenty years there has been significant investment in the laboratory to improve and establish the roles and responsibilities for laboratory medical personnel. Despite this, however, there is very little empirical evidence to suggest that competency levels of laboratory personnel have been evaluated objectively.

During the 1990's, hospital administrators, physicians, insurance providers, and patients have expected more for their health care dollars (Berte & Nevalainen, 1996).

Health care costs have risen tremendously and the general public wants the costs reduced. Furthermore, the impact of health care reform, managed care and prospective payment systems (PPS) has led hospital management to make more concerted efforts to control costs within their institutions (Karni, 1997).

The impact of managed care and PPS along with the increase of automation and computerization has generated incentives to reduce laboratory testing and personnel. In addition, because of simplified instrumentation, fewer individuals with baccalaureate or advanced level degrees were required. On the other hand, more sophisticated procedures and analyses, the emergence of new laboratory subspecialties, and laboratory participation in test selection, utilization, and interpretation have suggested a need for more personnel trained at the baccalaureate, masters, and doctoral levels (Karni, 1997).

According to the result of an American Society of Clinical Pathologists' Board of Registry (BOR) survey (1995), students have been facing increasing difficulties in receiving training and finding jobs. Concurrently, however, many allied health care industries have experienced personnel shortages due to the effects of restructuring, reengineering, downsizing or rightsizing. Some schools of allied health in the United States have made an effort to train multi-competent allied health professionals to meet the personnel needs of small hospitals, physicians' offices, clinics, comprehensive health care centers, and rural areas (Bamberg & Blayney, 1984). However, the selection of curriculum for clinical laboratory technology programs has presented an ongoing problem for educators. In order to prepare students for entry-level positions and future professional competence, educators have been seeking a way to make sound decisions concerning curriculum content.

This article was prepared to provide information that would help in determining an optimal competency-based performance evaluation. The focus of this article was to identify how medical laboratory personnel view competency levels according to their education, experience, on-the-job training, orientation, and employment status. The level of congruency among various laboratory personnel levels was identified as a starting point for dialogue and curriculum planning. However, since certifying agencies have already established criteria for expected competency levels, this study was not intended to define competency according to the laboratory personnel level. The question still remains regarding the characteristics of performance levels expected of entry-level personnel of medical technology programs.

The goal of clarifying expected competencies of the various personnel levels serve a number of functions. Identification of desired competencies removes curricular discussions from discipline-specific considerations and territorial issues, which in turn facilitates a focus on desired characteristics of medical technology graduates. Results of such a study can provide information about areas of mutual agreement among diverse laboratory departments and different levels of laboratory personnel. This data may also suggest a means for the restructuring of knowledge and technical skills in medical technology education and on-the-job training. A competency-focused approach to achieve quality performance goals may be valuable for addressing the educational needs of a diverse population of students and employees. For educational leaders anticipating curricular review or revision, knowledge of employer's expectations of competency for the various levels of laboratory personnel can provide the groundwork for deliberation. Many features of the laboratory have changed in recent years, but the underlying

principles of laboratory analysis and work ethics have remained the same. Evaluation of laboratory personnel was always documented in different ways, such as performance evaluations, certifying examinations, and proficiency testing. Competency assessment is another form of evaluation for laboratory personnel that does not eliminate traditional patterns of evaluating, but instead refines these patterns to make them more objective. By comparing the perceptions of medical laboratory professionals, it is assumed that a true reflection of differences in competency levels in current medical laboratory practice can be obtained. This seems to reflect the rater's experience of the real world in terms of perception. In other words, it supports the definition of the Hutchinson Dictionary of Ideas (1994) that perception is an individual's assessment or personal ideas of the real world. People's perception of the world is necessarily based on incomplete or unreliable information. Perception affects the attitude of people and events.

Griffin supported this notion of perception in 1988: "The most remarkable capacity of the human perceptual system is that it can take in an array of ambiguous information and construct a coherent, meaningful representation of the world. But we generally do not realize how subjective this construction is. Perception seems so immediate to us that we feel as if we are taking in a copy of the true world as it exists."

(5).

The BOR Research and Development Committee presented a 30-item list of laboratory tasks, representing six broad categories of competency criteria used for the performance evaluation of laboratory personnel: technical skills; judgement and analytical decision making; knowledge base; communication; teaching and training; and supervision, management, and administration. These categories are used by many

organizations to evaluate the performance of medical laboratory personnel. The majority of employers directly observe a laboratory employee performing selected tasks in assigned areas. They document participation in proficiency testing, quality control, and an external competency assessment program to gauge technical performance as well as cognitive skills (Minard, 1995).

Roles and Responsibilities Determined by the ASCP

Technically trained laboratory workers are usually categorized as technologists, technicians, or specialists, depending upon their training, education and certification. Although job descriptions and responsibilities can overlap, generally specialists have more education and greater depth of experience than technologists do, and technicians are expected to be capable of accepting greater responsibilities. Technologists, or clinical laboratory scientists, as they are designated by the certification agency, are capable of supervising and directing the technical components of even the most complex clinical laboratory. Technicians are often required to work under the direct supervision of technologists or specialists in a hospital or independent laboratory (Crowley & Tillman, 1986).

Each level represents a definition for the six competencies: technical skills, judgement and analytical decision-making, knowledge base, communication, teaching and training, and supervision and management. In evaluating responses across the six competencies, the greatest amount of overlap between MT and MLT occurs in the technically oriented categories: technical skills, knowledge base, and

judgement/analytical decision making. As responsibilities increase in complexity, autonomy, and authority, the differentiation between the MT and MLT increases as well.

The tables D1 to D6 presented in this article establishes a comparison in the ASCP Professional Levels Definitions for each of the six skills in 1982 and 1996. In these fourteen years, levels of competency requirements have changed dramatically for technicians and technologists, while expected competencies of specialists have not changed at all. Medical laboratory technicians are performing more routine testing and medical technologists are becoming increasingly involved in supervision and management. Medical technologists are performing more than expected work and has to involve in training others and getting trained as well. To achieve reliable, cost effective laboratory outcome, it is important that appropriately ordered tests are correctly done, interpreted and reported.

Due to automation manual dexterity is not as great as it was emphasized in 1960s and 1970s. It has been vicious cycle, and technologists are becoming increasingly frustrated and angry at the process (Johns, 1996). Those who are very easily frustrated by the ongoing changes may consider competency assessment as another quality fad and continue business as usual, harboring bitterness about staff and resource cutbacks and business as usual (Berte and Nevalainen, 1988).

It is no longer enough to be technically competent. In order to succeed in competitive environment updated skills, flexibility, and positive attitude is very important (Burke, and Rolen-Mark, 1996). It is important that undergraduate and professional courses are firmly rooted in the basic sciences and liberal arts with professional preparation in clinical laboratory science courses. It is essential that educators encourage

and enhance skills in communication, critical thinking, problem solving, and leadership so laboratory personnel can become confident about what they learn and apply to laboratory tasks and push their professional competency limits to the highest level.

What is Competency?

Competency is an outcome or demonstration of adequate ability as measured by a relatively simple, observable behavior that can be clearly identified and precisely measured as to its frequency of performance (Johnson, 1977). Competency defines the ability to carry out the total performance responsibilities of the given practitioner's generic position (Wilson, 1976). Barrasso in 1981 defined competency as the combined knowledge and skill factors necessary to fulfill work obligations adequately. In other words, competency is the ability to carry out a specific task within given parameters of control. Formal education is, perhaps, the most efficient route to achieving competence. Continuing education ensures its maintenance. Validation of the initial achievement occurs with successful completion of a certification examination.

The ability to communicate effectively is a generally accepted indication of competency in general education. Various authorities of medical laboratory technology educators have provided lists of competencies. Six of the competencies presented by the American Society of Clinical Pathologists are technical skills, judgment and analytical decision making, knowledge base, communication, teaching and training, and supervision and management. Competency assurance is the certainty that the practitioner is able throughout a career to carry out the responsibilities of the position filled (Wilson, 1977b).

What is Competence?

The standard of Training Agency (1988) defines competence as a wide concept, which embodies the ability to transfer skills and knowledge to new situations within the occupational area. It encompasses organization and planning of work, innovation, and coping with non-routine activities. It also includes those qualities of personal effectiveness that are required in the workplace to deal with co-workers, managers, and customers. Price (1978, 1981) defines competence in relation to definition of profession. The definition of profession implies that a practitioner has certain intellectual and technical skills as well as appropriate values and attitudes, which can be defined in terms of competence (Brown, 1978). The competence required for clinical laboratory personnel reflects performance in many dimensions such as knowledge, intelligence, technical skills, problem solving abilities, interpersonal skills, and skills in oral and written expression. If any one of these components is deficient or inadequate, performance by the clinical laboratory employee may be affected. In the clinical laboratory science curriculum, theoretical knowledge, technical skills are emphasized as key elements for developing individual's competency level. But interpersonal skills, attitudes, values, feelings, and emotions are neglected in professional education and evaluation because of the time and effort necessary to include them. In most cases effective objectives are taught by example only or left to chance (Anderson, 1986).

Competencies may be defined as identified and assessable behaviors reflective of requisite professional knowledge, performance skills, therapeutic applications and attitudes. A competency-based curriculum, then, is a purposefully provided vehicle for

ensuring that learners possess predetermined professional attributes (Broski ET al., 1977).

Why Competency Assessment is Necessary?

The introduction of recent health care reforms such as the Final Rule of Clinical Laboratory Improvement Amendments of 1988 (CLIA '88) released on February 28, 1992; the Final Rule of Occupational Exposure to Blood-Borne Pathogens released on December 6, 1991; the Final Rule of Occupational Exposure to Formaldehyde on May 27, 1992; and the 1992. The rules and regulations cited in the recent literatures are as follows (Best, 1993; George, 1996; Hansen, 1996):

Joint Commission on Accreditation of Health Care Organizations (JCAHO) standards will cause tremendous changes in the next five to ten years. Expanding areas in the clinical laboratory of the twenty-first century will require a higher level of skills, education, and training for medical laboratory personnel to perform highly sensitive and complex assays. The American Society for Medical Technology (ASMT) published a position paper in 1982 charting professional levels of laboratory skills at career entry for CLA, MLT, MT, and specialists in the medical laboratory field. This philosophical delineation of the laboratory personnel categories does not, however, describe differences in required competency levels for the performance of tasks among levels.

Recent literature represents the anticipation of implementing the regulations of the Clinical Laboratory Improvement Amendments of 1988 (CLIA'88), which will address the quality of laboratory testing and consumer safety. The ASCP noted that the statutory revisions proposed would exempt nearly one-half of the nation's laboratories from any quality standards or inspections. Laboratories not inspected under CLIA'88 would be

those that historically have been shown to benefit the most by introducing quality practices. Several issues under CLIA'88 remain to be addressed in future regulations that include personnel standards, changes within the complexity models, and proficiency testing. However, on December 6, 1994, the Health Care Financing Administration (HCFA) and the US Public Health Service did release a final rule recognizing the ASCP as a certifying agency for cytotechnologists. According to the regulation, cytotechnologists certified by the ASCP now meet the cytotechnologist personnel qualification requirements under CLIA'88. In its comments, the government stated that "the qualifications used by the ASCP to qualify an individual as a cytotechnologist include both educational and training components that are similar to or more stringent than the current CLIA requirements for cytotechnologists (Stombler, 1995, p. 104)."

1. The new accreditation standards of the Joint Commission of Accreditation of Healthcare Organizations (JCAHO) emphasize the quality of interdepartmental functions and performance improvement.
2. The JCAHO requires assessment of a person's competency on the job as part of the organization's quality improvement plan.
3. JCAHO requires individual competency to perform tests safely and accurately and to prevent transfer of infection. The laboratory director must maintain competency of staff initially and continuously.
4. The JCAHO team confers with representatives from departments throughout the institute, reviews documentation as a proof of performance, interviews group of staff members, and visits various areas of the institute, especially where staff members directly serve patients.

5. The Clinical Laboratory Improvement Amendments of 1988 (CLIA' 88) requires that the competency of technical personnel performing moderately complex testing be assessed semiannually during the first year of employment and annually thereafter.
6. CLIA' 88 requires that facilities participate in proficiency testing (PT) for all regulated analytes. The legislation requires semiannual verification of unregulated analytes.
7. The American Association of Blood Banks (AABB) requires that at least annually, the employee must demonstrate their abilities to perform their duties.
8. AABB requires a quality assessment and improvement program to ensure personnel are knowledgeable and skilled in their assigned duties.
9. College of American Pathologists (CAP) requires a sufficient work force with adequate documented training and experiences to meet the needs of the laboratory with periodic evaluation process.

Thus, The Joint Commission on the Accreditation of Health Care Organizations (JCAHO) recently developed guidelines for clinical laboratory testing requires that for a diagnostic clinical laboratory "personnel responsible for test performance and those responsible for direction/supervision of the testing activity are identified. Personnel performing tests have adequate and specific training and orientation to perform the tests and demonstrate satisfactory levels of competence." The CLIA '88 demands that almost all laboratories require certification based on the scope of testing offered. Physicians' offices will be required to perform regular laboratories that offer similar services.

Although there is no standard number of tests that a physician must perform to acquire or maintain competence, less than one procedure per month is thought to be not enough to

attain competence. For physicians in practice, it is not known with what level of competence simple laboratory procedures are performed.

On the other hand, technologists have moved from being on the bench and running tests to consulting management and troubleshooting. They are also involved in teaching, research, and development, and acting as liaisons for laboratory testing. The education and training of medical laboratory technicians must be strengthened to accommodate these increased demands. The major growth areas of testing in the 1990s will be in flow cytometry, DNA probes, molecular biology, and cytogenetics. These areas will continue to require the education, skills, and training of degree-holding medical technologists. The final impact of CLIA '88 on the clinical laboratory will be the disappearance of on-the-job trainees and certified laboratories by 1997. By 1997, all high-complexity testing laboratory personnel will be required to have associate's degrees in medical laboratory science.

Because CLIA '88 has legalized the use of less highly trained and educated personnel for most technical and administrative laboratory functions except in the cytology laboratory, hospital administrators may no longer see the need to differentiate between the duties and responsibilities of medical technologists and those of technicians. In many hospitals laboratory productivity will decrease and costs will increase as a result. The traditional bachelor's degree in medical technology and four to six years of experience required for supervisory positions may also be downgraded to an associate's degree and two years of experience as a result of CLIA '88. This level of education and training is insufficient to successfully manage a high complexity laboratory setting. Because the quality of laboratory testing is more reliant on the qualifications of the

laboratory supervisor than on any other position, quality will be most affected by the decreased standards. However, due to risk management factors, laboratories may continue to hire the most qualified individuals for professional and technical positions.

The important factor that relates to this study is under CLIA '88. Medical technologists must be assessed for competency semiannually during the first year of employment and annually thereafter. This assessment must include all of the following: direct observation, review of intermediate results, blind testing using proficiency testing samples or internal samples, assessment of problem-solving skills, and monitoring. It would be the responsibility of the technical supervisor to assure that medical technologists are competent.

A grandfather provision was also recommended, allowing an individual serving as a general supervisor on or before the date of the published rule to continue to qualify if he or she meets the requirements. Such requirements include earning an associate degree in laboratory science, medical technology, or its equivalent, which is defined as a total of sixty semester hours; achieving two years of experience as general supervisor; graduating from high school or attaining an equivalent degree; or receiving laboratory training as described in the CLIA '88 rule for high-complexity testing, six years of which must be taken in a supervisory role (McNett, 1993).

Furthermore, prevention of error is accomplished more through effective training and continuing education than through surveillance. This system will force more conscious attention to meeting the expectations of the many clients who must be satisfied by laboratory services, including patients, physicians, third-party payers, and managed care organizations.

Modern health care managers are looking for better ways to motivate their employees as well as to document and evaluate employee performance and competencies. The term productivity is familiar to most health care managers, while the term efficiency is less familiar. Productivity and efficiency are unique and valuable indicators of effective employee performance. A performance-based incentive program using an Intensive Pay Index Chart is proposed as a tool through which hospital or company managers can provide technicians or technologists with ongoing motivation to improve both their productivity and efficiency on the job (Lodge, 1991).

Training professionals must be able to respond to the needs of medical laboratory personnel accurately, quickly, and cost-effectively. The best solution is a comprehensive framework that delineates a distinct hierarchy of competencies required by the managers in an organization. The competency domain model used for the Sandwith (1993) study identifies and orders five domains of managerial competency: conceptual/creative, leadership, interpersonal, administrative, and technical.

Substantial modification in the medical technology curriculum is needed to prepare graduates for changing technological regulations, staffing requirements, and operational changes that will occur in laboratory medicine in the 20th century. The interdependent roles of laboratory technicians and technologists need to be more clearly defined. Promotion of a career-ladder should be a continuous pattern, from phlebotomist to laboratory assistant, then from laboratory assistant to technician. Curriculum reforms are also necessary to improve the products and services that laboratory educators provide to their customers (Best, 1993).

How competency is measured?

Performance appraisals have recently become the focus of legal scrutiny. Because the appraisal process may lead to salary adjustments, promotions, opportunities for development, discipline, or even termination, issues such as fairness and discrimination are raised. Snyder (1991) discussed specific constitutional and statutory laws that prohibit discrimination in performance appraisals. In addition, specific rulings from selected court cases illuminate key legal defense factors in performance appraisal. How to assess the competency of each staff member represented below was published in Technical Supervisor responsibilities, Section 493.1451 Federal Register, 1992, and literature written by Allered and Steiner, 1994; Best, 1993; Berte and Nevalainen, 1995; George, 1996; Hansen, 1996; Christian, Peddecord, Francis, and Krolak, 1997.

1. Directly observe the individual performing routine tests including patient or donor preparation, if applicable, specimen handling, processing and testing.
2. Monitor the individual recording and reporting test results.
3. Review the individual's intermediate test results or worksheets, proficiency-testing results, quality control record, and preventive maintenance records.
4. Directly observe the individual checking functions on instruments and maintaining instrumentation.
5. Provide hands on testing to assess test accuracy by requiring that the individual analyze a previously analyzed specimen, internal blind testing samples, or external proficiency-testing sample.
6. Administer written test.
7. Conduct oral test and critique oral responses to procedure queries.

8. Document performance deficiencies or critical incidents related to procedure and use to assess trouble-shooting skills.
9. Assess the individual's problem solving skills for example by case studies.
10. Assess completion of learning activities.

Benefits of Competency program

Competency assessment program would be useful to educators, employers and employees. It provides information of employee's progress, objective documentation for each task performance, and opportunity to employee to evaluate own strength and weaknesses to perform required task for promotion and merit pay increases. Increases supervisor's awareness of employee's performance level and improves communication between supervisors and employees along with job performance and employee satisfaction. Competency assessment program enhances employee understanding of what is expected of them and how they are doing to facilitate employee orientation, training and counseling. Furthermore, it identifies areas that requires training or retraining and encourages employees to read carefully and review critically policies and procedures. In addition to these benefits competency assessment criteria facilitates identification of incompetent employees and provide appropriate training program to improve their performance level. Improves ability to implement corrective action plan and self-improvement opportunities. Improves quality of results, products, and services which results in establishing image of competent staff to outside customers and assures consistency of performance with personnel and instruments. This benefit promotes confidence in peers and fosters better morale (Christian et. al., 1997).

It is essential that progression of competency assessment be documented appropriately. Use of checklists and forms for orientation, initial training checklists, form for direct observation of each test with detail steps for required skills, method of assessment of problem solving skills, and competency assurance checklist. Interactive machines or computer programs to provide feedback and training for theory and practical aspects or case studies for problem solving skills can be used. Documentation of proficiency testing, and required training to meet the demands during all shifts that include operating new machines, quality control process, and common problem or malfunctions. Checklists or documentation of case study discussions for enhancing trouble-shooting skills demonstrate recognition of the problem and managing it by finding the solution or taking corrective action.

Characteristics of competent staff

Study of Christian et. al (1997) identified seven major characteristics of a competent staff, which are listed as follows:

1. Competent staff produces accurate results in a timely manner.
2. Recognizes problems and errors, trouble shoots, take initiatives and solves problems.
3. Makes no errors or few errors as possible.
4. Possess education, training and continuing education
5. Follows policies and procedures and correctly performs testing.
6. Knows what and why the test is needed to be done.
7. Processes good communication and interpersonal skills.

Failure to provide competent services includes three major principles (Fortune, 1976): Failure to stay current in their field; failure to make day-to-day adjustments to

practice; and failure to one or more fundamental skill areas needed for competent practice. In another words, factors that influence human performance includes but not limited to are:

1. Deficiency in desired to reach optimum performance level, for example and incentive or motivational deficiency.
2. Deficiency in skill or knowledge to understand the information and perform the task.
3. An environment or time constraints due to over work and interference from other job responsibilities.
4. A physical deficiency such as visual acuity, color blindness, physical strength and weakness, and motor dexterity.
5. Deficiency in problem solving and decision making skills.

Allred and Steiner (1994) supports the above principle stated by fortune and states that prevention of problems by adequate initial training is far less costly than subsequent detention of errors and corrective actions, which would have to include some degree of retraining. CLIA regulations require personnel to be completely trained in procedures before performing analysis.

According to Haynes (1991) there are three basic reasons for making an appraisal for employee performance: 1) To encourage good behavior or to correct and discourage substandard performance; 2) To satisfy employees' curiosity about how well they are doing; and 3) To provide a firm foundation for later evaluations in an employee's career. Such matters as pay raises, promotions, transfers, or separation can be handled more smoothly if the employee is aware of the possibilities beforehand.

Elements of performance appraisals include:

1. Competencies are derived from an assessment of the required knowledge, skills and attitudes to perform the task.
2. Competencies are stated in observable and measurable terms.
3. Achievement of competencies are compared and evaluated against performance standards
4. Committed to write instruction modules containing competency statements, assessment of prerequisite skills, alternate learning activities, feedback and motivational statements for the corrective action.
5. Aimed to improve performance
6. Regular, periodic scheduling that allow self-paced instruction to master each competency.
5. Prepare set of measurement criteria for each competency level.

Unfortunately, there is no standardized curriculum or certification process for the technologist or technician. There is also no licensure for them in most states, but there are agencies that offer certification based on various educational and experimental requirements. Certification requirements for technologists can range from a baccalaureate degree to on-the-job training (OJT), depending on the agency (e.g., HEW, HHS). The purpose for these examinations is to qualify technical personnel as technologists so independent laboratories can meet Medicare's personnel standards. The diversity in education and experience for persons certified at the technologist and technician levels means that the employer must rely on personal interviews, references, and observation as sources of information about a prospective employee's true capabilities.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Some of the challenges clinical laboratories face today is the design and implementation of competency assessment programs. Section 493.1451 (b) (8) of the Clinical Laboratory Improvement Amendments of 1988 (CLIA, 1988) regulations states that technical supervisors are responsible for ensuring that staff maintain competency to perform test procedures and report results promptly, accurately, and proficiently. CLIA (1988) requires that the skills of technical personnel be assessed annually.

The purpose of this study was to compare the perceptions of certified medical laboratory personnel who worked as educators, employers, or practitioners regarding the required competencies of three levels of laboratory personnel: Medical laboratory technician (MLT), medical laboratory technologist (MT) and clinical laboratory Specialist. All respondents were certified by the American Society of Clinical Pathologists.

Descriptive statistics, which included means, standard deviations, ranks, and Spearman Rank-Order Correlation, revealed some degree of discrepancies among the respondents. However, educator's response reflected the appropriateness of the competencies in direct relation to increasing competency level of laboratory roles, Medical Laboratory Technician (MLT), Technologists (MT) and Specialists. Employers and Practitioners, on the other hand, rated MTs and Specialists as almost equal. Furthermore, comparison among the practitioners revealed distinct discrepancies in the perceptions of performing and evaluating laboratory tests. The greatest variation was

noted among practitioners in their rating of competency level required for specialist roles. No apparent differences were found according to demographic factors.

Although educators, employers, and practitioners ranked competency statements slightly differently for each section, it is apparent that all three groups were congruent in their perceptions regarding Section IX, Supervision/Management as the least important and Section I, Specimen Collection, as the most important. However, responses reflected the appropriateness of the competencies for each of the levels of clinical laboratory specialist, medical laboratory technologist and medical laboratory technician, with more competencies and complexity of competencies attributed to the higher levels of practice.

The results of this study will be useful for further investigation and development of required personnel qualifications and their relationship to competency-based performance evaluations intended to maintain quality control practices and laboratory proficiency. These results will be useful in discussing curriculum revision for practitioner training. The study will also provide guidelines for employers to establish distinct levels of competency for three different levels of practitioners in order to utilize the workforce efficiently for what educators have prepared them.

Recommendations

The clinical laboratory field is changing dramatically, and opportunities are shifting as well. It is no longer enough to be technically competent. Increasingly less qualified people are doing less-technical testing, and more experienced people are taking on supervisory roles. Rapid changes in the current health care environment raise the importance of clarifying the roles of MLTs, MTs, and Specialists in the clinical laboratory. These days it is the job of the MT to undergo the greatest change in the new

health care environment and to require technical work and communication, problem solving, management and consultation skills. The survey prepared for this research included the tasks required to be performed by MTs as well as Specialists in the first year on the job were included in the Competency survey. This notion was supported by the comments of one respondent, who described the situation at her community hospital: "The techs who work in this institution must be able to do everything...from drawing blood to being able to answer insurance and billing questions, machine maintenance, QC testing, CAP surveys, inspections by CAP and other agencies, etc." Furthermore, her comments elaborated the current position of smaller institutes by stating that because of downsizing and budget cuts most small community hospitals are operating with "skeleton staffs" that possess knowledge and abilities in five major areas of the lab.

What is needed first is a clear understanding of the functional role of the laboratory, which includes job description, grouping of tasks involved, required skills, responsibilities and accountability required from the employee or student. Understanding of job description, performance standards, task analysis, amount of judgment and degree of responsibility required for each task permit a job evaluation or competency assessment rating that reflects hierarchical order on a career track.

It is essential that educators and employers understand the functional roles of the different levels of certified personnel to help improve existing educational standards. While educational experiences and academic competency scores should coincide with the performance requirements of an entry-level position, it is the responsibility of the employers to institute these standards.

This research has provided information regarding perceptions of competency levels for three different categories of laboratory personnel: MLT, MT and Specialist. Competency is an interaction of knowledge, intelligence, technical skills, and attitude. If any one of these skills is deficient or inadequate, performance by the clinical laboratory personnel may be affected. CLIA' 88 and JCAHO require competency assessment documentation for all analysts performing moderately complex testing. However, the precise mechanism of the annual certification of competency is not specified in the regulations but is left up to the individual laboratory (Allred and Steiner, 1994). Many of the competency aspects depend on how training was provided in the fundamentals of laboratory science and in the practical aspects of performing analyses. Along with the results obtained for the research, comparison of the professional definitions provided by the ASCP (1982, and 1996) clearly points in the direction of curriculum reform. Since roles and responsibilities have not been changed since 1982, it is reflected in the results as MTs were almost equally rated as Specialist.

Optimal task performance of clinical laboratory personnel should be the greatest concern of present and future laboratory medicine. The result of this study indicated that, while there is a great deal of overlap in the levels of practice at career entry for MLT, MT and Specialist, perceptions for the performance of tasks are not congruent among each other. These findings were also supported by the comments of one respondent who wrote that "the expertise of the individual is the key to their ability to perform laboratory functions, not their registration level." The respondent explained by personal experience the perception of incongruity between the various levels of laboratory personnel: "I have personally seen ASCP (MT) techs that could not function as well as an MLT. It

really boils down to the individual motivation and intelligence and not what level of education or registry they have." Many respondents felt that specialist competency levels were equivalent to those of MTs. This may indicate that specialists may not have the opportunities to enhance their higher-level skills enough to distinguish their tasks from MT-level performance.

It is certain that our clinical laboratory profession requires a standardized training program. Organizations such as the Health Care Financing Administration (HCFA), the Food and Drug Administration (FDA), JCAHO, the College of American Pathologists (CAP), Commission on Office Laboratory Accreditation (COLA) and CLIA'88 have all set laboratory quality standards that require a prescribed level of employee education and training. However, training and documentation prerequisites in these standards are ambiguous (Berte & Nevalainen, 1996). The discrepancy among practitioners for the entry-level position presents a challenge to educators and to employers. Evaluating the competency level of an individual is the most variable and unknown factor in testing and is therefore the weak link in the analytical sequence.

However, Beck, Doing, and Nettles (1997) reported a comparison between technicians and technologists, resulting in the identification of distinct differences between the roles of different levels of personnel. While skills within the categories of problem-solving, supervision, management, and interpersonal relations are often overlapping between MTs and Specialists, the exclusion of these skills from the Beck, Doing, and Nettles study eliminated the possibility of comparing job similarities between the three levels of laboratory personnel.

Harmening (1995) and others asked program directors to assign a set of competencies to MLTs, MTs, both groups, or neither group. They found the greatest overlap between MLTs and MTs in the areas of technical skills, knowledge base, and analytical decision-making skills. In view of these educators, the largest distinctions between the MLT and MT levels of practice were in the communication, teaching and supervision competencies. They concluded that the program directors in this study could distinguish between the two levels of practice and that the MT has a broader scope of practice than the MLT. However, they did not include the Specialist category as part of the comparison. In addition, the survey items had more than one concept to establish appropriate congruencies for each competency statement. A unipolar question provides more reliable responses than one question containing double or triple concepts (Sudman and Bradburn, 1982, 21, 41, 132-136). Therefore roles and responsibilities should be reevaluated by developing appropriate survey instrument with one question referring to one specific concept.

To meet these challenges, the educational experiences of MLT, MT, and specialist programs and new employee training programs must change. In order to support the self-directed team approach, laboratory personnel at all levels must develop problem solving, interpersonal, and evaluative skills. Beck, Doing, and Nettles (1997) recommended that educators must devote less educational time to teaching technical skills. On the other hand employers must be willing to hire less technically proficient personnel at the entry level if they want MTs to manage the laboratory, relate to other health care workers, evaluate laboratory tests, and educate others. However, that would contradict the results of a study reported by Harmening et.al (1995), Hunter and LoSuituto's study (1993), and

other research that conclude that performing analytical tests requiring technical skills is the most important job competency for entry-level practitioners. Employers need to acknowledge the training provided for each level and utilize it by hiring them for that purpose. For example, if MTs are trained less in technical skills and more in supervisory and teaching skills, then they should hire them to perform those tasks. Employers need to provide new orientation programs that can allow new employees to rotate through technical duties in addition to quality assurance, evaluation of results, personnel management, purchasing reagents and instruments, etc.

The incentive for this sort of change involves the employers' and educators' combined effort to build the bridge between the understanding of level of training provided by the educators and expectations of the employers for entry-level personnel. Educators must find a way to make sound decisions regarding curriculum content to prepare students for entry-level positions that meet the required expectations of employers for competency level. Educators and employers need to reengineer the laboratory work force to create appropriate distinctions between the levels of practice and to realize that educators are preparing them with distinct levels of skills. As stated by one of the respondents in this study, in order to decrease the frustration and dissatisfaction levels of employees; and to retain qualified, experienced, knowledgeable personnel who wants to recognize their skills and knowledge in the workplace expectations of educators, employers and practitioners should be unified: "I have given this survey a lot of thought and time because I think technicians are being given too much responsibility for their training and we need to unify expectations." However any person who has been trained only in one institute with higher levels of competency should not be considered a

"technologist" capable of across-the-board laboratory testing. Eventually an industrious person may acquire depth and breadth of knowledge in each discipline and then can be considered as qualified as one who acquired knowledge of each discipline in formal course work at a medical technology school (LaMotte, 1981).

Frustration exists within all three levels of laboratory personnel because the assigned duties do not always reflect certification level. Although some entry-level MLT personnel can perform tasks at specialist-level competency, opportunities for them to achieve higher levels of authority are minimal. This same principle also applies to specialists who may be qualified and trained to perform at the highest level of competency, yet find their tasks equivalent to MT-level duties. As a result, specialists often decide to change career goals in which they can perform according to their competency level. Otherwise, those who remain in the field as MTs may experience a lack of motivation to perform at the levels they are qualified for. Students of the medical technology programs and Specialist programs should also focus of a didactic curriculum that includes courses in hematology, blood banking, chemistry, and microbiology, and get exposure to specialized areas such as flow cytometry, molecular biology, supervision and management, and teaching and consulting. They should also broaden their scope with computer and financial management of the health care industry.

Thus, result of the comparison of perceptions of competence for medical laboratory personnel and provided review of the literature would be extremely valuable in developing curriculum for the medical technology programs . It is important that educational systems incorporate continuous education and clinical laboratory work experience to facilitate the completion of higher-level degrees (i.e. MLT to MT, MT to

Specialist). Computer courses would be an excellent method to promote the education of those employees who do not have the opportunity to set aside time for attending in-class courses. In addition to certification, objective competency assessment scales should be used to determine the roles and responsibilities of each of the three medical laboratory positions and to decrease frustration levels among the employees.

The comparison of ASCP Professional Levels Definitions, 1982 and 1996

Table D-1

ASCP Professional Levels Definitions, 1982 and 1996: Knowledge

	1982	1996
<u>Technician</u>	<ul style="list-style-type: none">• Has a working comprehension of the technical and procedural aspects of laboratory tests.	<ul style="list-style-type: none">• Has a working comprehension of the technical and procedural aspects of laboratory tests.• Maintains an awareness and complies with safety procedures and ethical standards of practice.• Correlates laboratory tests to disease processes and understands basic physiology, recognizing appropriate test selection and abnormal test results.

Technologist

- Understands the underlying scientific principles, as well as of the technical and procedural aspects of laboratory testing.
 - Has a general comprehension of the physiologic, biochemical, immunologic, microbiologic, and genetic factors that affect health and disease, laboratory tests, and the importance of laboratory tests to medical care.
 - Is familiar with the various services available in the hospital and has an appreciation of the roles and relationships of paramedical and other health-related fields.
- Understands the underlying scientific principles of laboratory testing as well as the technical, procedural, and problem-solving aspects.
 - Has a general comprehension of the many factors which affect health and disease, and recognizes the importance of proper test selection, the numerous causes of discrepant test results, and ethics including result confidentiality.
 - Correlates abnormal laboratory data with pathologic states, determines the validity of test results and the need for additional tests.
 - Understands and enforces safety regulations, uses statistical methods and applies business and economic data in decision-making.
 - Has an appreciation of the roles and interrelationships of paramedical and other health-related fields and follows the ethical code of conduct for the profession.

Specialist

- Has knowledge of advanced scientific principles, as well as of the technical, procedural, and research aspects of laboratory testing in the specialty area and of factors that influence disease processes and laboratory tests.
 - Has knowledge of the structure and function of the organization, principles of management and education, as well as of the roles of other members of the health care team.
- Has knowledge of advanced scientific principles as well as the technical, procedural, and research aspects of laboratory testing in the specialty area and of factors which influence disease processes and laboratory tests.
 - Has knowledge of the structure and function of the organization, principles of management and education, as well as the roles of other members of the health care team.
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Table D-2

ASCP Professional Levels Definitions, 1982 and 1996: Technical Skills

	1982	1996
Technician	<ul style="list-style-type: none"> • Can read and follow directions and perform those tests in a clinical laboratory that are considered to be of a straightforward nature. • Has a practical understanding of quality control that is sufficient to enable him/her to determine whether or not tests are within ? limits and to make requisite adjustments according to specified procedures. • Is capable of performing simple instrument maintenance. 	<ul style="list-style-type: none"> • Comprehends and follows procedural guidelines of laboratory tests to include: 1) quality control monitoring; 2) computer applications; 3) instrumentation troubleshooting; and 4) specimen collection and processing requirements.
Technologist	<ul style="list-style-type: none"> • Is capable of performing technically demanding tests. • Has an understanding of quality assurance sufficient to enable him/her to monitor and implement quality control programs. • Can participate in the introduction and implementation of new procedures, and in the evaluation of new instruments. • Has a basic knowledge of accuracy, precision, normal ranges, and correlation with existing methods. 	<ul style="list-style-type: none"> • Can perform and interpret standard, complex, and specialized tests. • Has an understanding of quality assurance sufficient to implement and monitor quality control programs. • Can participate in the introduction, investigation and implementation of new procedures and in the evaluation of new instruments. • Evaluates computer generated data and troubleshoots problems. • Understands and uses troubleshooting, validation, statistical, computer, and preventative maintenance techniques to insure proper laboratory operation.
Specialist	<ul style="list-style-type: none"> • Can perform all laboratory tests and appropriate equipment maintenance in the 	<ul style="list-style-type: none"> • Can perform all laboratory tests and appropriate equipment maintenance in the

specialty area.

- Has the knowledge, ability, and technical skill to research, develop, implement, and evaluate new and existing methodologies, including instrumentation and quality assurance.

specialty area.

- Has the knowledge, ability, and technical skill to research, develop, implement and evaluate new and existing methodologies, including instrumentation and quality assurance.
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Table D-3

ASCP Professional Levels Definitions, 1982 and 1996: Judgment and Decision-Making

	1982	1996
Technician	<ul style="list-style-type: none"> • Can recognize the existence of common procedural and technical problems to take corrective action according to predetermined criteria. 	<ul style="list-style-type: none"> • Recognizes the existence of procedural and technical problems and takes corrective action according to predetermined criteria. • Prioritizes test requests to maintain standard patient care and maximal efficiency.
Technologist	<ul style="list-style-type: none"> • Can exercise initiative and independent judgment in dealing with the broad scope of procedural and technical problems. • Can participate in, and may be delegated the responsibility for decisions involving quality control programs, instrument selection, preventative maintenance, safety test procedures, and reagent purchases. 	<ul style="list-style-type: none"> • Can exercise initiative and independent judgment in dealing with the broad scope of procedural and technical problems. • Can participate in, and may be delegated the responsibility for decisions involving: quality control/ quality assurance programs, instrument and methodology selection, preventative maintenance, safety procedures, reagent purchases, test selection/utilization, research procedures, computer/statistical data.
Specialist	<ul style="list-style-type: none"> • Can implement and delegate decisions regarding laboratory operation and of exercising independent judgment in problem solving. • Can anticipate and respond to unique situations regarding patients and/or samples in a laboratory setting. • Can participate in policy decisions affecting laboratory performance or laboratory personnel in the specialty area. 	<ul style="list-style-type: none"> • Can implement and delegate decisions regarding laboratory operation and exercising independent judgment in problem solving. • Can anticipate and respond to unique situations regarding patients and/or samples in a laboratory setting. • Can participate in policy decisions affecting laboratory performance or laboratory personnel in the specialty area.

Table D-4

ASCP Professional Levels Definitions, 1982 and 1996: Communication

	1982	1996
Technician	<ul style="list-style-type: none"> Communicates straightforward information, e.g., reports test results and quotes ? ranges and specimen requirements. 	<ul style="list-style-type: none"> Communicates test results, reference ranges and specimen requirements to authorized sources. Prepares drafts of procedures for laboratory tests according to standardized format.
Technologist	<ul style="list-style-type: none"> Communicates technical or general information to medical, paramedical, or lay persons, including problems or matters of a scientific, technical, and/or administrative nature. 	<ul style="list-style-type: none"> Communicates pertinent technical information to medical, paramedical, or lay individuals through lectures, conferences, work group interaction, memberships, publications, legislative activities, and continuing education. Develops acceptable criteria, laboratory manuals, reports, guidelines, and research protocols.
Specialist	<ul style="list-style-type: none"> Can communicate in depth with other health care personnel on the application and validity of laboratory data, as well as on the policies and operation of the specialty area. Can represent the specialty area to the community at large. 	<ul style="list-style-type: none"> Can communicate in depth with other health care personnel on the application and validity of laboratory data as well as the policies and operation of the specialty area. Can represent the specialty area to the community at large.

Table D-5

ASCP Professional Levels Definitions, 1982 and 1996: Teaching and Training Responsibilities

	1982	1996
Technician	<ul style="list-style-type: none"> • Is capable of demonstrating ? technical skills. 	<ul style="list-style-type: none"> • Trains new technicians and provides information to the patient and public as needed and participates in continuing education lectures and conferences for departmental personnel, and demonstrates technical laboratory skills to students and new employees.
Technologist	<ul style="list-style-type: none"> • Can provide instruction in the basic theory, technical skills, and application of laboratory test procedures. • May participate in the evaluation of the effectiveness of educational programs. 	<ul style="list-style-type: none"> • Provides instruction in theory, technical skills, safety protocols, and application of laboratory test procedures. • Provides continuing education and professional development for laboratory personnel. • May participate in the evaluation of the effectiveness of educational programs.
Specialist	<ul style="list-style-type: none"> • Can plan, implement, and evaluate effective educational programs. 	<ul style="list-style-type: none"> • Can plan, implement, and evaluate effective educational programs.

Table D-6

ASCP Professional Levels Definitions, 1982 and 1996: Supervision and Management

	1982	1996
Technologist	<ul style="list-style-type: none"> • Has a basic understanding of management theory and functions. • Can participate in and develop responsibility for establishment of technical and administrative procedures. • Can supervise technicians, aides, and clerical personnel as directed. 	<ul style="list-style-type: none"> • Has an understanding of management theory, economic impact and management functions. • Participates in and takes responsibility for establishing technical and administrative procedures, quality control/quality assurance, standards of practice, safety and waste management procedures, information management and cost effective measures. • Supervises laboratory personnel.
Specialist	<ul style="list-style-type: none"> • Can perform and direct administrative functions in the overall operation of the laboratory in the specialty area. • Can provide direct supervision of other personnel in that discipline. 	<ul style="list-style-type: none"> • Can perform and direct administrative functions in the overall operation of the laboratory in the specialty area. • Can provide direct supervision of other personnel in the discipline.

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Journal of Health Occupations Education
Fall 2000, Volume 14, Number 2

TECHNIQUES OF TEACHING ADULT LEARNERS

Compiled by Janice Bute and Bruce Roberts

Co-authors:

Beasley, Peter

Black, Robin

Blackburn, Jennifer

Brown, Daniel

Bufford, Tameka

Chandler, Ralph

Durgin, Janet

Edge, Judith Rubino, Shelley

Edmonds, Mary

Gallant, Tracy

Hale, Micheal

Hill, Jennifer

Johnson, Donald

Klingensmith, Pamela

Long, Vicki

Metzler, Lori

Moehl, Geoffrey

Peak, Jason

Porter, Heather

Prasch, Tara

Rethman, Mary

Ryder, Phillip

Smith, Cynthia

Smith, Darlene

Vonkadich, Amy

Warnick-Ellis, Alica

Wetherington, Renee

Woolbridge, Devin

Yates, Eugenia

Zink, James

OVERVIEW

This project is the compiling of class discussion related to characteristics of adult learners from a course "Teaching the Adult Learner–ADE 4382" offered through the University of Central Florida. A Web-based course was offered during the spring semester 2000 and taught by Dr. Larry Hudson. The course can be accessed at <http://reach.ucf.edu/~ade4382>

Introduction

After reading and compiling the postings made by the adult learners in this course, it was interesting to learn that "Learning" takes place among different targeted groups and in different settings. The following targeted groups were identified by the students in this course:

- Radiation Therapist
- HVAC personnel
- "GenerationXers
- "Newbies" Internet Users
- Middle and High-school Teachers
- American Red Cross
- Pre-School teachers
- Community College beginners writers
- Beginners piano students
- K-12 teachers for the deaf
- Post secondary vocational adults
- Nuclear power plant technicians
- Beginners internet users
- Professional adult students
- Diverse middle school teachers
- Reserve army units
- Elementary teachers and administrators
- Youthful offenders in prison
- Returning adult students
- Adult learners 55 years and older
- Experienced construction workers
- Beginners ESL adults 30-60 of age

- Middle-school teachers
- Skycaps
- New and experienced bank tellers
- Fellow employees age 20-50
- Office Technology students
- Pre-school teachers and learning center directors
- Adult learners age 18-25
- Automotive and Autotronics students

Whether it be teachers, Radiation therapists, or Computer "Newbies" learning in a classroom, lab, or in the field; a learning experience can be gained with effective teaching techniques that will help adult learners acquire the knowledge, skills and values needed to achieve their desired goals.

Review of relevant Web references

Methods and techniques used for teaching adult leaders were found on the World Wide Web. The students of this class then discussed their reviewed research and related it to their own methods, techniques and situations.

The majority of techniques discussed involved active participation, open group discussion, activities and learning, visual aids, demonstrations, hands on activities and relevance to the student. With the use of choice, students participate in the decisions that involve them, there by increasing student participation and motivation.

Modern technology, combined with self paced, hands on, and computer technology training has made possible the ability to do independent work and study. It has allowed distance study and teamwork that was impossible before. Combine this with the fact that Adult Teaching has moved from teaching a skill to learning how to solve problems and life long learning has lead to the need for continuing support, facilitation and mentoring.

Employers are looking for employees with the ability to learn new technologies, help solve problems, and work as a team remotely, not just the ability to do a particular skill, individually, and only locally. This is where the new technologies and methods come in.

The last point might be the most important. It is important to communicate with respect, listen with patience and interest, and set the example for your class by modeling what you teach and what is expected of the student.

"Creating a learning environment that meets the needs of adult learners is a key element of successful adult education programs. The challenge is to create a non-threatening atmosphere in which adults have permission and are expected to share in the responsibility for their learning". DS

Teaching by demonstration is an effective method of helping students to learn to carry out practical skills, or to understand processes. As a visual aid, a demonstration makes learning easier and creates interest, which helps student to remember what is being taught. Inquiry teaching is an effective method of delivery, which aims to help students teach themselves. The teacher sets the problem and provides the learning resources to enable to problem to be solved. It requires students to carry through systematic thinking or research to arrive at reasonable solutions to the problem. PK

Adult learners find many techniques effective when attending staff developments. Some include presentation of theory, modeling, practice,

structured and open-ended feedback and coaching. All of these are very important for trainers to implement when conducting training. It is also important to give learners a choice in the staff developments that they attend. Through modeling, the learner is not only given time to think about how it is that they will use the new knowledge as it relates to them but they will also feel a sense of importance. If the learner does not feel a sense of importance in the training then you have lost them from the beginning. RW

It is necessary for the adult students to know the knowledge of the subject matter for the age group they work with in their field. Modeling and demonstration are techniques that will be used with these adult learners. EY

Using cooperative/collaborative learning groups is important to my ideal writing instruction. Students get more out of writing reviews performed by peers. Peer review of assignments in cooperative or collaborative groups is the best way to work with adults learning how to write effectively. AW

The techniques most important when we train is first, making the information meaningful to the learner, second, giving options to choose from, and third, providing time for practice and support. One great advantage to setting up the training sessions for teachers away from their school and routine is they have the opportunity to interact with other teachers facing similar challenges. SR

In the self-directed technique the students set their own goals for the class and how they want to attain them. Self-directed learning focuses on the process by which adults take control of their own learning. In particular how they set their own learning goals, locate appropriate resources, decide on which learning methods to use and evaluate their own progress. The other technique is humanistic. Humanist theories are concerned with the human potential for growth. Humanism holds that perceptions are centered in experience. They also believe that adults are open to change and lifelong learning. Humanistic education focuses on the individual learner rather than on the content. VL

Key learning strategies include motivation, utilization, interest, stimulus, transfer, logic, immediate application, participation and repetition. The two that I have focused on are participation and immediate application. For the kinesthetic learner, hands on applications are important for them to gain an understanding of the concepts. Applied learning support retention. The use of the computer labs assists in the retention of the lecture or presentation. The labs are designed to be completed outside of the classroom environment, and the students are encouraged to perform them as often as possible in order to increase understanding and retention.

The principle of immediate application directs students to try out the skills or verbalize the facts just acquired. In effect, tell your learners, "You've just

learned it; now do it, here in the classroom." As they begin actually applying what they've just heard or seen, they:

- Establish more relationships among the parts of the course.
- Perfect or test their understanding of the subject.
- Get involved
- Develop still stronger motives for learning.

Methods and techniques used for class participation can be used to apply the Principle of Application. The point here is: have learners do and verbalize as soon as possible after their exposure to new facts. An effective way to use this principle is to have your learners give (write-present-discuss) an application of the concepts to their own situations "back home." This could be done individually or in teams. The key is to "do it now." Thus, the principle of "immediate application" is activated." Interactivity does not necessarily have to be instructor to student; it also includes the critical interactions between students. Workgroups, newsgroups, and study groups represent concepts for establishing communication and shared discussion. PB

Discussion and classroom lecture has to be interesting to keep the students attention. Using videos, overheads, computer programs help to get the point across. Hands-on still is the best learning technique, especially when learning about new equipment. DJ

Involving the adult learners with hands-on, exciting, and motivating lessons will only strengthen their drive to successfully integrate technology in their own classes. It makes sense that adult learners will perform better if they are able to actually try out the software and work on the computers during training. But you can't just leave the learners hanging in limbo you have to follow up with support and guidance. Adult learners are usually more self-directed, but they do want a facilitator to let them know they're on the right track. ME

With Self-Pace, a syllabus is given to the student with the assignments and due dates. The assignments are introduced by the instructor, and students then work on the assignment at their own pace paying attention to deadlines. Students have the opportunity to work in class and get help from the instructor and peers but may have to do work outside to stay on target.

Self-paced learning has been found to be very successful for older adult learners. These individuals generally have sufficient self-motivation to learn the information, as they are present on their own direction. There is often resistance to moving at the same pace as everyone else in the class, and older adult learners prefer the ability to move through the material at their own pace. One of the reasons for this preference is the desire to reduce negative criticism. Older adult learners often require frequent positive reinforcement; however, they have a harder time recovering from negative feedback. These learners have been found to

perform at a reduced rate when faced with time pressures, primarily due to errors of omission.

A critical factor with self-paced learning is providing adequate time for the individuals' needs, as well as instructional needs. These include physical needs. One of the primary influences that has been found on the effectiveness of older adult learning is the distraction of physical requirements, such as vision, hearing, mental stimulus, and bodily requirements. If these can be controlled through adequate and appropriate timing, older adult learners have been found to perform at the same levels as other adult learners.

One of the most difficult areas for older adult learners is learning thorough interference. Research has suggested a number of strategies to reduce or eliminate interference. These include the following:

- learning one task at a time,
- reducing the visual or auditory distractions,
- ensuring that the technologies and learning materials aid learning, rather than distract from the learning goals,
- testing for understanding as the learning progresses to confirm that a task has been learned prior to going on to the next task.

Some researchers have suggested that older adult learners are less cognitively able to perform well when confronted with distractions and interference. These studies

suggest that as interference is reduced, the potential for effective older adult learning to occur dramatically rise. MR

Presenting the facts of the subject is best approached by presenting outlines and inspiring discussions within the group, thus keeping members involve and contributing. Stimulating relevant "real world" situations and drawing students into the discussion keeps the energy level up and running. This also allows knowledge to flow from individuals other than just the instructor.

After discussion, breaking into small groups to do hands-on practice and modeling of the necessary skills we are presenting, let's the students explore the work at hand while still having the instructor and other students available to lean on when needed. This is applied easiest when modeled on typical job tasks. MH

The importance of knowing where to begin with the student is key. Every student starts academically in different places. The important point the instructor has to make is to bring the information to the student's level. There are principles that the instructor must always instill in their teaching to be successful. RB

Classroom discussion (conversation): This technique involves the entire classroom working together. Bring up an open-ended topic and prompt students to respond or share their ideas. This technique allows immediate respond to incorrect

English usage and positive feedback to correct usage. This as an excellent ESL teaches technique because it models everyday use of language.

Research and report: The activity simply involves bringing in an English newspaper and/or magazines and having the students read an article and then summarize it in front of the class. This technique exposes students to the modern usage of words and idioms. Another factor that makes this technique such a success is the flexibility of the reading material. My target students will need exposure to specialized vocabulary depending on their field. They can choose a magazine close to their profession to practice those specialized words.

Journal reporting: With journal reporting, the students keep a daily journal in English of their everyday activities. The student then presents this journal to the class. This allows students to practice their oral and written use of the language. I would upgrade this technique to keeping a journal on work related issues. It should be noted that the instructor of the class would be heavily involved with this technique as the students tend to simply list activities instead of expounding on them. JB

Continued support mean more than just a "one day and you are done" staff development. Besides having two days of learning, set up an open email support system for any questions or hurdles the teachers would encounter. This will help them to share with each other some of the problems they are running into. By

relevant learning, try to have a clear statement of what the staff development is teaching. LM

Depending on the type of training, the techniques will vary a little but there will be basics. First, goal setting activity; second, student introduction; third, icebreaker activity. Once everyone was more relaxed I will then delve into the material. Do not talk down to your students or present the material in an intimidating manner. Keep an even playing field for all involved so that the students are more receptive to the teacher and the teacher achieves the goal of getting across the material in which he or she wants the students to learn. ED

Collaborative learning is an excellent way to involve the class. It draws heavily on experiential learning and both the facilitators and learners become an active part of the educational process. It also is a great way to begin brainstorming ideas, build group structure and work as a team. In the discussion group, the student switches roles from the observer, to the listener, to the note-taker. Collaborative learning gives the student an opportunity to work with different learning levels. In addition, students discuss, exchange ideas and experiences with each other.

Students use the hands-on methods when using practical application and higher-order skills. Some of these examples are keyboarding, filing, and telephone simulation. Another ways the hands-on method is used is through Job Training.

Job interviewing, job search and filling out the application is an excellent way to show students what to expect in the real world.

Techniques most important when teaching is to provide structured group activities, case studies that demonstrate real world practical application to real world problems, and the use of visual aids. Adult learners need to be encouraged to ask questions because that is the essence of learning. Lecturing involves conveying general knowledge and information to the learners.

It is crucial for the students to have the opportunity to be able to discuss the information because it reiterates the points in the lecture and also clears any concerns a learner may have.

By providing case studies the instructor is presenting an account of real or fictitious situation including enough information to make it possible for the students to analyze the problems involved. Case studies are an excellent way to "transfer knowledge into practice."

Instructors can provide a break from the traditional lecture with visual aids. Many adult learners are better able to grasp ideas visually even after they have heard the information. Teachers should consider using, "charts, graphs, diagrams, the blackboard, models, films, filmstrips, slides, overhead transparencies, videotape, a storyboard or actual materials used in the work place." HP

The Contextual Teaching and Learning technique includes strategies to help teachers relate subject matter content to real world situations and motivate students to make connections between knowledge and its applications to their lives. Some examples of strategies used in Contextual Teaching and Learning are creating relevant problem-solving situations and teaching students to monitor and direct their own learning so they become self-regulated learners.

Another technique that will be effective with students is called Cooperative Learning and can be described as learning which occurs as a result of interactions between members of a collective group (two or more individuals). By having students work in-groups with other students of their same major, they can share ideas and experiences and more easily relate and learn from each other. JH

In demonstrating, the instructor shows the students the proper technique, use of tools, use of learned short cuts and long cuts. In the demonstration, the student looks on and observes the technique(s). The instructor will disassemble; the students will use concentrated powers of observation. The instructor will reassemble, the students will observe. Then when the Instructor deems fit, the students will be given or delegated the task of disassembly and assembly. Here, under careful supervision, the student is given the chance to emulate the instructor's correct procedures. Since my subject was a hands on technical type, these two techniques profited the student. PR

Over the last decade, there has been a move to change the way vocational teacher teach, by using many of the methods that academic teachers now use. Such methods are designed to help students develop critical thinking skills, in an effort to make them more employable. The automotive industry has complained for many years that the "product" that vocational schools turnout is not complete. They expect graduating students to be fully prepared for the work place. Not only do they expect them to know the technical skills, but also be able to communicate and exhibit clear work ethics. JZ

Creating a learning environment that is non-threatening is a key element of successful adult education programs. Support for adult learners is provided through a learning environment that meets both their physical and psychological needs (Imel). Learning styles theory implies that how much individuals learn has more to do with whether the educational experience is geared toward their particular style of learning than whether or not they are "smart." In fact, educators should not ask, "Is this student smart?" but rather "How is this student smart?" (On Purpose Associates). Since everyone has individual preference in learning styles, it is important to deliver your lesson in a variety of ways. PK

When doing technology training, learners need to have hands-on practice in doing what they are learning. They should have choices as to what it is they are going to complete in the hands-on activity. They should also have some demonstration as

to what is that they are learning about ahead of time so that they can have time to process it and gather ideas as to how what they are learning relates to them. RW

Using the "lesson" approach, instead of the discovery or lecture approaches should lead to a give and take of information, appropriate to this subject and typical adult learning style. Cooperative and collaborative learning groups challenge each individual student to not only work as an individual, but also to work well in a society-a big part of adult life. AW

Discussion and non-judgmental listening: Listening to the student express his/her goals and discussing whether those goals are realistic or not is key to the success of the student. This process of listening and discussing must be initiated in the first session, and carried on throughout the entire duration of lessons. This discussion allows the student to express his/her concerns, sets the tone for the lessons, and puts the student at ease with me as an instructor.

Communication without intimidation: I have to communicate in a way that does not intimidate the student anymore than he/she is already feeling intimidated by the difficult process of assimilating all of the new information. The most effective way for me to verbally instruct my students is to make sure I smile, lower the tone of my voice, and address them in a light manner in the form of suggestions. JD

Because some courses are self-directed and self-guided, communication is key in keeping up with how they are progressing and what challenges they may be facing. I have learned that adults want to be spoken to at their level, as in eye level, so I do not speak "down" to them, but rather pull up a chair and communicate with them on their level. This technique helps the student feel more relaxed and they can feel more at ease about asking questions. TP

Learning should be an active process that engages more than just hearing. Adults tend to be self-directed and want to take charge of their own learning. Remember that learning objectives and relevancy should be established up front. Clear evaluation standards and constructive feedback should also be used. DW

Teachers should adapt to new ways of teaching those who will be learning from them. It is important to know what each student wants to achieve by taking this class. Learning is more effective when it is an active rather than a passive process. The big issues are relevancy and immediacy for adults. Information has to be relevant to our current wants and needs, and it must feel useful to us. Most people don't want to waste time if it does not benefit them directly. VL

If an adult student is to obtain an optimal education, it is important to learn in an environment that meets his or her particular learning style. The technical classes that I teach cost each student several thousand dollars, which in turn means the education must be worth its weight once the track is completed. The adult learners

in my target group come from diverse backgrounds and skill sets, but they are still in my classroom together with a combined goal to learn. It is critical to meet the needs of each student by incorporating multiple techniques that support various learning styles. PB

The success of the course relies mainly on the techniques applied to facilitate the learner's experience. Using the group's prior collective knowledge and ability to lead each other makes the task flow and models the work environment in which the skills are to be used. Working with the learner instead of talking at and down to them creates a more relaxed mood. Through conversation we can impart the info that is needed. MH

Andragogy states that instruction should be task-oriented allowing a student to learn by problem solving. This is exactly what simulation is all about as well. Allowing the student to have hands on practice so that they can use the skills that have learned to problem solve and achieve their class objectives. Although the names may vary and there may be varied perceptions, it is clear that adults are very task oriented and learn best in this manner. TG

Our goal is to help students see the connection between my class and the "real world," as well as motivating them in the meantime to show up and complete required assignments! Due to the differences, techniques should allow individuals to get with students of their same major, brainstorm together, problem-solve real-

life mock situations, and use each others' experiences and knowledge to learn from. JH

Summary

The students of this class discussed the importance of knowing which techniques work well with the group of adult learners they were working with. The bottom line is, if you do not use methods that make the adult learner as productive as possible, you as a teacher and your course as a whole will be marginally productive at best, and not productive at all at the worst.

With the emphasis on productivity, efficiency and economics nowadays and the limiting of funds, taxes and resources, you do not want an important program to be downsized or eliminated because you did not use the right methods and techniques to teach your group of adult learners.

Adults in general feel the need to be in charge of their own learning. This is even more important when it comes to generation X. Much of the old techniques do not work with this particular group. For this reason, it is important to experiment with different styles until you can settle in with several that work, not only for individual students, but the group as a whole. Without finding teaching techniques that work, you as a teacher become ineffective, causing frustration for both the students and yourself. JZ

The importance in knowing which techniques work well with this target group will guarantee that the needs of the adult learners and the course objectives are met. Teaching with the knowledge of which technique works best will make sure that these adult learners gain the skill and the knowledge they seek in a reasonable amount of time. DS

Using techniques that don't work well are a waste of time and money. Since the goal in technology staff development is empowering teachers to use existing and emerging technologies to enhance their teaching it is of prime importance to use methods that will succeed and make them technology evangelists. If that is not being done, the teacher-learners will tune out and then drop out.

When teachers have been mandated to attend a particular in-service training session, I have seen them undermine the trainer and draw others into their negative mindset. Those trainers had no clue about drawing them in with activities geared to make use of their interests and talents. We tell teachers that the lecture method isn't work the most effective presentation method today and then we expect them to listen to a lecture when we should be modeling the techniques we want them to use.

Because staff development is not the beginning of teacher training, the learners are already experts in their area and need to be treated as such. On the other hand, their knowledge of technology is generally below the expert level and they may

feel threatened professionally. Therefore various techniques that fit their comfort level need to be accessed. JE

The overall atmosphere of the classroom is important. Students need to feel comfortable and relaxed. Creating an atmosphere, which is non-threatening, is conducive to a positive learning experience. Because of the diverseness of my class, it is important for me to meet the needs of all my students. Not only are my students diverse in their personal characteristics, they are diverse in their learning styles. It is important for me to deliver the lesson in a variety of ways so that the different styles of learning can be met. PK

Technology integration in the classroom is important and will be a big part of every young child's life. In order for teachers to pass this on to their students, they need to learn the technologies themselves. This is where technology staff development comes into play. I have to conduct training that are inviting to teachers so that they will pass this down to their students. RW

As we discussed in many of the response posts to the last activity, the instructor needs to know which techniques will work with a specific group of learners for best results. If an instructor walked into a group of auto mechanics and started to teach them how to check the tire pressure on a car tire, would the audience learn anything new?

The best way to ascertain what techniques work well with adult learners would be to give them a learning styles quiz at the beginning of the semester or training session. Focusing in on those specific styles would be in the best interests of the students. I know how important it is to make an impact on learners from the beginning, so they don't lose focus in the class and drop out, so knowing which techniques will work best is very important to me.

The main reason why it is important to know which techniques work well with my specific adult learners is that I want to create effective writers for our growing society-effective writing is the tool most useful in all aspects of the business world. Teaching my learners in the best manner possible will enhance our society as a whole, leading to a better world for everyone. AW

The importance of utilizing effective teaching techniques in any given teaching situation is in the response of the learner. Learning how to get the student to respond in a way that he/she excels at the subject matter being taught is vital, and this is done by properly studying many types of teaching techniques, trying them on our students, and seeing which ones work well for our given teaching situations. JD

Treating your adult students as equals, by listening and communicating with them on their level is a very important teaching technique that will lessen the fear and insecurity that some adults have about going back to school. A lot of my students

have never received any higher education or even graduated high school. It takes a lot of courage to decide to change your life and they want to feel like they have made the right decision and that they can do it. TP

When designing the instruction for a training session, one should be familiar with various instructional techniques. This familiarity will allow the designer of the instruction to select the most appropriate technique for the learning objective. ... Providing instructional variety helps cater to the different learning styles that adult learners have. But first, one must be familiar with various instructional techniques. DW

An adult learner learns and retains his knowledge more efficiently if they feel that they have an open communication with the instructor. Find out as quick as possible which combination of techniques work for the students. VL

In a professional adult learning environment, it is critical to discover what techniques work for each person as well as the group as a whole. Not every learner will follow the model of the instructor, so observing, listening, and asking questions about what the students have learned is critical. Lecture and discussion should assist the auditory learner. Hands on application, utilizing the computers in the laboratory environment, will benefit the kinesthetic learners. A slide show during the lecture, and physical presentation prior to the lab, should benefit the

visual learner. All of the styles should be incorporated in the presentation to assure that the student has achieved the academic goals of the course. PB

The adults that I teach are professionals who do not have time to waste. As I continue to train them on more advanced computer skills they continue to evaluate what I am teaching them and how I am teaching it. My target audience will quickly become unavailable if my teaching techniques are not beneficial to them. In a nutshell, my teaching techniques are important because if I fail to reach my learners they will simply stop coming to the training that I offer. JP

It is very important to know what type of learners you have. If you teach a class and use more of the theory approach, and your students are better hands-on learners, you will miss the target. Some may get the idea, but a different technique would have better results. DJ

Student interaction is a necessary transition for developing problem solving skill (Sternberg 1988 in DeLuca 1991). To know which teaching techniques are successful is to match the adults' learning characteristics to both the type of material being presented and to the global goals of the student and the industry.

GM

Many older adult learners are faced with negative stereotypes from society regarding their ability to learn new technologies and skill sets. It is necessary for

these older adults to be successful in their learning so that they can stay in tune with the rest of society and gain the self-confidence to learn and grow as they age.

MR

We must get them to tell us, somehow, what they are here for, and how we can help them, after all they ARE the customers! After that we must know and use the methods that can best reach/meet their needs. MH

If a successful businessperson is paying me a hefty sum of money to increase his/her English speaking ability, I must make the majority of my teaching hours based on conversation. JB

Technology integration is important to student's learning and therefore, must be a part of a teacher's daily routine. I have personally seen that it makes a difference in my students. Teachers have to have a similar feeling about technology in order for them to be willing to learn the technology. Technology staff developments must be suited for the learners and be appropriate to what they are willing to learn. LM

It is necessary to understand adult learners have lives outside of work and/or school. The content that is given to skycaps is highly important in order to have a functional airport. DB

Students have varied backgrounds and unless we understand our audience and know how to meet their learning needs, we will not be successful in meeting our learning objectives. Not all students learn in the same manner. Nor are all methods successful. If you put a classroom to sleep, they are not learning. A student needs to be motivated, challenged and understand the value in what they have learned. These goals will be met when the instructor successfully implements various teaching techniques. TG

As a teacher it is my responsibility to ensure that my students get out of the class what they want as well as what I want them to. ED

Various learning methods help to reach the different types of adult learners. They all are used at various times depending on the educational needs of the students. In one-on-one teaching, the student is the only one getting instruction. The instructor has their focus on the student and in my opinion it is the best way to retain the student. CS

It is the teacher's responsibility to facilitate learning for every participant regardless of previous experience or educational background. It is essential for the instructors to be consciously aware of the characteristics of adults and understanding of their needs. "Telling is not teaching, nor is listening learning." It is the teacher's duty to engage their students in a variety of structured learning activities, which will lead to a full understanding of the information at hand. HP

Implementation

This is where the students of this class got to talk about how they would use this research in their own classes. They showed how to use traditional methods with adults and combine them with the new methods to reach all students.

The students would incorporate surveys of the adult learners at the beginning of class to ascertain the adult learner's best methods of learning, their choices on subject matter and their learning goals. The students discussed the use of hands on projects that would be related to the jobs that adult learner does right from the beginning of the course. They discussed the use of interactive techniques to involve the adult learners and allow the sharing of knowledge the group members already had with each other. The use of teams, and learning from each other would be included because this is directly related to the methods used in the work place. Even the use of research and report writing is directly related to methods used in the business world.

While the inclusion of these techniques would involve some additional planning and flexibility on the teacher's part, it would greatly increase the productivity of the teacher, the student and the class as a whole. Sending adult learners to the field who have learned the material to a higher standard, can directly relate it to their jobs and be more productive at their jobs, will improve the productivity of their companies and through their lives, improve the community as a whole. Now that is what I call a sound, efficient and economical approach to training.

After sufficient hands on practice the student is responsible for making the decision to perform a competency evaluation of a procedure with the instructor. The student practices up to that point and it is up to them when they feel that they are fully prepared. The student will be informed at the beginning of the program that they will be responsible for educating their peers in a presentation using a dummy on how to perform a particular treatment and also present a question and answer period at the end of the presentation. They are given sufficient time to prepare this presentation and must give it during the ninth month of the program. AK

With the class, I would take apart equipment, for example, in front of them and show them the parts. Or we would have a training mock-up of a certain piece of apparatus and I would explain how the item would be disassembled and assembled in a proper order. Then I would have the students do the same thing under my supervision. I would wait until the student(s) would complete the task before I would begin to make my judgments. Actually, you could say I just told them to do it for themselves without any help from me until they finished. PR

Group discussion can start as a problem solving session. The group is given a problem, which they must come-up with the solution (much like the group activities in our web-based classes). This will help develop critical thinking skills that will be need to diagnosis problems on automobiles in the field.

Demonstration is an old teaching technique, but is still very effective as a teaching tool.

In my class, the demonstration is given before the theory is taught. Over a period of time, I have found that students make greater learning strides by seeing the visual skill performed first. Then when the theory is taught, they have a visual reference point to visualize. JZ

Before I attempt to teach, I need to survey the learners as to what they already know, what they want to learn, and what is available to them in their own classroom and school. It is very possible that a whole group introductory session would be impractical if the levels are too varied. Ideally, levels should not work together at first so as not to overwhelm beginners, but a few well-placed helpers can speed up the process (adults want to get going in a hurry — just tell me what I need to do _____) and reduce frustration. One idea I read about — short videos on several topics that can be checked out and watched at leisure — is an excellent way to introduce topics. Our school has computer and video production classes where students could produce those types of videos for teacher use.

Teaming learners to produce a product — a multi-media presentation, word-processed document, Hyper-Studio stacks, for example - to be used in a subject area or as an interdisciplinary unit will help the process continue after the initial in-service is finished. Having the primary trainer and/or a co-worker 'expert'

available for consultation will keep the learners from getting discouraged. These could be just a phone call, or small follow-up sessions set up to accommodate the learner's schedule. With the right amount of support and nurturing, many will want to expand their knowledge. Shorter sessions held before or after school, during planning periods, on Saturdays, and during the summer will keep pushing them forward to follow their interests at their own pace. JE

To build rapport I employ informal room arrangements setting up the tables in a U-shape. I also provide snacks and drinks. ...In delivering the basic first aid and CPR courses I use a variety of approaches so I can accommodate the various learning styles represented. Part of the lesson is delivered through lecture. The students are given a book to follow along. ...Basic first aid and CPR skills are viewed on VCR tape and then I reinforce the teachings from the videotape by demonstrating the skills on a mannequin. ... Students are given time for return demonstration. It is at this time that the students learn from each other's mistakes. As skills are performed successfully, positive reinforcement is given. Through inquiry learning, the students are given a scenario and then asked pair up in groups of two or three and asked to respond to the situation at hand. PK

At the beginning of each training session, I will model what it is that the learner is going to learn and at the end, I will give the learner choices in how to implement whatever technology it is that they have learned. RW

At the beginning of the workshop I will survey the learners as to what they already know, what they want to learn, and what is available to them in their own class or age group. At each workshop, I will demonstrate what the group is going to learn then offer the learners' opportunity to make choices on how to implement the technology to the area or age group of their work field. EY

Using the lesson approach in a writing class rather than the lecture approach seems like the best way to put forth the necessary information. Subsequently using collaborative/cooperative groups to reinforce the ideas the class has discussed will be a big benefit to all people in the classroom. AW

The implementation of discussion and non-judgmental listening has been the main key to my success with adult piano students. Setting the tone and basic overall attitude by the way I listen to my adults, and talk to them is the main issue that keeps them coming back to lessons. JD

Participants choose sessions on specific titles they could use in their classroom to enhance language development. ...Participants were also given time for guided and independent practice. Participants had time to do what they learned and try to create a start to their own project and receive support from trainers. ...Participants also worked on topics specific to the needs of their classroom and worked with others in the group that may have similar ideas. SR

I will implement these techniques by setting time aside to speak one-on-one to each of my students. We will go over how they are progressing, any obstacles that they might be facing, and their immediate and long-term goals they have for being in the program they have chosen. TP

At the beginning of the course, the instructor lets the students start out by introducing themselves and telling the other students why they are taking the Internet for Beginners class and what they hope to gain by taking this course. After a brief introduction, the instructor shows them how to set up an email account. They are instructed to email the person sitting beside them. This self-directed activity will show them instant results on what they are doing, by receiving and sending the email. At this time the instructor tells all the students to email them their main objective for taking this particular class. This will give the student a chance to feel connected to the instructor and at the same time give the instructor more insight to the individual students objectives. Letting the student know that they can email the instructor with any questions or concerns they have about the class is less intimidating than for a student to let his peers know in public what he knows or does not know about the particular subject. VL

While presenting a lecture, an instructor should involve the class with an open forum on the topic that is being presented, as well as have them follow the lecture with a handout, which requires them to fill in the blanks. This motivates the students to maintain focus on the instructor. While concentrating on the lecture,

and filling out the study guide, the presentation is reinforced and put into a visible format for students to refer to later.

Application of learned concepts is simpler if the course is structured appropriately. The students utilize their lab manual to complete labs which are directly associated with the lecture. Each student has their own computer and works either independently, or with a partner, to perform predefined tasks. It is critical for the instructor to present the objective of this lab project prior to the beginning the lab, so the students will have a larger picture of what they are about to do. Once the lab is completed, it is important for the instructor to summarize, using interactive discussion, what was performed and learned. PB

Group discussion and group activities are very appropriate for the teaching setting that I am in. With a small computer lab and only four computers I will be able to assign two teachers per computer and allow two groups of four to work at the same time in the lab. A mini-lecture will be appropriate for the groups but will have to be less formal when I am addressing teachers in their classrooms.

Solutions to real world problems will be the easiest teaching technique to use when I am dealing with the teachers in their classrooms. JP

If I am teaching about specific software, be it educational software for the classroom or software that can be used to assist teachers with their jobs, I will be sure that everyone has the opportunity to experiment with the programs on a

computer. If I am teaching about equipment, I will have them on hand to try out.

When giving lessons on integrating the Internet, I will have my learners visit specific sites that I am referencing. I will give continuous support and facilitate learning by giving follow up training. I will also be in contact to make sure my adult learners are on the right track. ME

Self-paced learning can be implemented by providing some instruction at the beginning of a section, then allowing the older adult learners to review the materials and complete an activity on their own. If you place a break at the end of the activity, this will allow some individuals to take additional time if necessary.

The goal of interference reduction should be attempted in all classrooms. This can be instituted by setting ground rules regarding behavior, and structuring class activities so that they do not interfere with the ability of older adults to successfully learn the material. MR

Every student would introduce him or herself, let us know why they have chosen to take the course. Also, students would be given a survey to fill out informing the teacher of their needs towards this course. The survey would let the teacher know what level the student is on.

Students would be paired in-groups of two. Each person in the group would have certain responsibilities for the activity given. RB

The journal teaching technique can be used daily as an icebreaker. Every class can open with journal reporting. Once the tone has been set, we can begin an activity.

JB

I will give real examples that have been used in a middle school classroom to integrate technology. I will start with basic, simple tools like using PowerPoint for notes, to using software and the Internet as a resource, to testing using PowerPoint in a computer lab setting. I have will have all these examples on a disk for the learner to keep and refer to on their own as necessary. LM

As we progress, the material becomes more complex. Decision-making is a skill that is addressed daily. Without the prior day's information, they would not be able to make a decision using all of the factors involved. This decision making as well as each skill that is addressed is practiced daily in our classroom. Both in group activities and individually at their teller stations. It is this technique of simulation that I find most successful. There is no better experience than when a student can learn from their mistakes. It is also in the simulation that I see the confidence growing in my students. TG

Personal

Teaching Techniques can impact your students in such a way that the learning experience can be made easier. The adult learners in this course were and are impacted by many teaching techniques.

"As an adult learner these teaching techniques, lecture, demonstration, and inquiry impact me in that I learn not through only one best way but through a variety of ways." RC

"It was a great experience to have the support and experience of others to draw from." SR

"While performing these techniques the student will feel more as if they have more control of their education and they will also feel as if they are always using their time wisely." AV

"Then when the Instructor delegated me the task of doing it my self without any interference from him, that raised my self-confidence." PR

"As a visual learner myself, I understand the need for students to visualize components and repairs before understanding the theory behind why they work."

JZ

"Verbal information along with a visual aid is a technique that makes learning very easy for adults." DS

"I don't think quickly and like to ponder new ideas for awhile before I comment on them or ask questions, so ongoing learning sessions would be especially good for me." JE

"Being able to return a demonstration not only affirms the notion that I understand the delivery of the skill, it also gives opportunity to build up self-confidence in myself." PK

"I am able to take their successes and mistakes and apply them to my own training that I facilitate." RW

"By taking evaluations from the students on the workshops I can learn which techniques were useful and productive." EY

"Perhaps that was the purpose of this activity, to bring out the best teaching techniques we have been involved with." AE

"I have observed that the courses that have professors that are a bit "lighter" in their overall approach and teaching style tend to have happier, more productive students." JD

"They have communicated to me that they feel cared for and comfortable in discussing any issues or challenges that they face." TP

"I know that these techniques (self-directed procedure development, observation and practice) work well for me." DW

"If you get their attention at the start, chances are you will keep them interested."

VL

"This is probably due to the fact that I must be active in presenting this information to those learners different than myself, which in turn forces me to rely on my talents as a kinesthetic learner." PB

"Like most adults, I am pressed for time; I enjoy learning but become very frustrated when time is wasted." JP

"I can learn the info better if I use it, operate it, and then learn why it's works."

DKJ

"We had a support system that continued throughout the school year with follow up training sessions and opportunities to share with other adult learners what projects we attempted in our classrooms." ME

"I was more than surprised at how many and varied the techniques that I use daily. A shotgun approach might describe this well, with at least one pellet technique hitting each targeted population." GM

"If you are ahead in class, you can get help from the instructor and you are looked to help others but if you fall behind and your peer is ahead, they have no problem helping you out and learning is better because you're not competing and not really rushing." TB

"I believe that the reduction of interference is important to achieve for all learners, adult or non-adult, however, I do not believe that the cognitive aspects of the importance of this technique is the same for other groups." MR

"Now I must practice, practice, practice them until they are as smooth enough to go unnoticed." MH

"As a teacher, I personally will have to keep insight to every technique available to be the best teacher I can be." RB

"By intermingling these activities with activities in our text, I believe the students will get a well-rounded ESL education." JB

"I do not like to waste my time or learn about something I cannot use. I would prefer small staff developments where the learning is very defined." LM

"When they discover the value in the knowledge that they have gained and when they are confident that they can go out there and "WOW" their clients, then I am more than pleased and know that the techniques I have used were successful." TG

"As an adult learner I find goal setting very important and a great way of focusing on what I want to accomplish." ED

"Giving attention and being aware is important in the educational environment. The teacher needs to know what is going on with her students." CS

"The personal impact on me as an adult learner should let the importance of the issues at hand make sense." DB

"Adult learners are concerned about feeling comfortable in the classroom so, providing an inviting environment is crucial." HP

"I really appreciate any learning environment that attempts to make what I have to learn relevant and beneficial to me and my life." JH

"I can still remember the skills that I was taught and the words of encouragement that was said to me by my instructors. These skills and words of encouragement

helped me to finish high school, earn an associate degree and gave me the courage to come back to college after seven years to earn my bachelors degree. JLB

It is very important to know which techniques work well with adult learners. Whether the adult learner learn a skill to get a job, promotion or enjoyment, the techniques used to teach them these skills can really have a great impact on their understanding and learning experience.

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Karen L. Clark, Ed.D. Assistant Professor, School of Education and Human Services
INNOVATIONS IN HIGHER EDUCATION: MEETING THE NEEDS OF THE
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Contacts for this Issue

Brandt, Joyce, R.N., Ph.D., Program Consultant, Health Occupations Education,
University of Iowa,
Email: joyce-brandt@uiowa.edu

Bute, Janice, student, University of Central Florida
Email: jbute@mail.ucf.edu

Conlin, Judy, State Supervisor, Health Science Education, Florida Department of
Education,
325 W. Gaines Street, Room 714, Tallahassee, FL 32399-0400
Email: conlinj@mail.doe.state.fl.us

Fehl, Leslie D., CDA Dental Assisting Instructor, Daytona Beach Community College,
Deland Campus, Daytona Beach, FL
Email:

Gable, Karen, RDH, Ed. D., School of Allied Health, Indiana University, Indianapolis,
IN
Email: kgable@inpui.edu

Hoeksema, Paul, Ph.D., Professor, Emeritus, Allied Health Education, Ferris State
University, 488 Hayes, Holland, MI 49424
Email: pfwindmill@sirus.com

Hudson, Larry R. Ph.D., Associate Professor, Department of Instructional Programs and
Educational Leadership, University of Central Florida, Orlando, FL 32816-1250
Email: lhudson@mail.ucf.edu
Web site: <http://rech.ucf.edu/~voced>

Parikh, Rajeshree P. EdD,
Email: RPParikh@aol.com

Raynor, Nancy L., Section Chief Instructional Services NC Department of Public
Instruction 301 N. Wilmington Street Raleigh, NC 27601-2825 Tel: 919-715-1765 Fax:
919-715-1628

Email: nraynor@dpi.state.nc.us

WebSite: www.dpi.state.nc.us/workforce_development

Sandiford, Janice, R.N., Ph.D., Associate Professor, Florida International University,
Miami, FL

Email: sandifor@mail.fiu.edu

Torricelli, Kathryn, Principal Consultant for HOE, Illinois State board of Education, 100
North first Street, Room N 242, Springfield, IL 62777 (217) 782-2826, Fax: (217) 785-
9210

Email: ktorrice@smtp.isbe.state.il.us

Whiteman, Jo Ann M., Graduate Assistant, University of Central Florida, Orlando, FL

Email: jwhitema@mail.ucf.edu

Journal of Health Occupations Education
Fall 2000, Volume 14, Number 2

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