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## Can MLS Programs Offer a Personalized Education?

In today's "information age," the ability to distinguish useful from misleading information becomes essential. Thus, critical thinking becomes more crucial in order to facilitate integration of presented material and aid in the acquisition of new material. Through class activities, group discussions, technology, and intellectual interaction, students should be challenged to look beyond the boundaries of the classroom and to integrate the world outside of it.

The curricula of most, if not all, medical laboratory science (MLS) programs require mental abilities, such as thinking, remembering, and learning, in addition to psychomotor skills, to perform tasks and procedures in the medical laboratory. A goal of these educational programs is for students to understand the connections between concepts, break down information, and rebuild their knowledge with logical connections. This relates to and incorporates all forms of knowing,



including memory, thinking, comprehension, perception, and motivation. Memory is an important component of this learning pedagogy. Learning much of the material in college depends on rote memorization of declarative or factual knowledge. Recent attempts have been made to introduce methods of teaching based on meaningful integration of material and mastery of procedural knowledge. Thinking, which varies from situation to situation, greatly affects how individuals behave in

a given situation. Comprehension and perception allow individuals to interpret information. Lastly, the overall motivation of the student determines how effectively the information is retained or processed.

Students do not learn to their full potential due to the fact that, more often than not, they use rote memorization in the classroom. With increased competition in the workforce and jobs becoming more demanding, students

need to be more prepared for the job market with skills acquired while enrolled in their academic programs. These skills, including study skills, social skills, problem solving, and organizational skills, to name a few, should be taught and integrated across the curriculum.

Across-the-curriculum applications are practical intelligence needed to survive and thrive in MLS programs. Here, attention is directed to combine the theory-based approaches to the study of intellect to determine whether a combined approach would help students. Despite several educational reform movements in the last few years to determine appropriate curricula for the different levels of practice in the field, most discussions of reform have not involved altered concepts of intelligence or the need for approaches that equip students to deal with the increasing demands of their academic progression and later in life.

A similar approach can be systematically applied to enable both teachers and students to focus on learning strategies across a range of topics, from using a set of base words as analogies for learning new terminology, to developing the habit of writing down homework assignments and keeping their college materials orderly. The goal of schooling is believed to be an understanding that leads to a lifetime of meaningful application. Therefore, what students really need to know is "how" to learn. Our ultimate goal, as educators, is to empower students with the skills to find, analyze, integrate, interpret, and apply their knowledge. The professional growth and ongoing development of teachers are crucial to innovative instruction. However, for change to take place in an academic program, the faculty and administrators need to recognize the value of innovative teaching methods, and institutions must cultivate environments where professional growth is valued, high-quality staff development is provided, faculty input into the change process is encouraged, and adequate time is allowed for change to take place.

Students are expected to learn things in college they might not learn without formal instruction so that they can function more intelligently in the workplace. If so, recommendations for curriculum reform should explicitly appeal to and implement our best current understanding

of what learning and intelligence are. To design better learning environments, we must start at the level of student-teacher and student-student interactions in the classroom. We must exploit what we already know about how students think, remember, and learn, and we must strive to further our understanding of how learning and intelligence develop.

To the extent current practices are based on common sense and outmoded theories, cognition research provides a needed correction where it guides instructional design. More importantly, one should apply research to real-world problems in learning and teaching. The premise of the cognitive theory is that knowledge is incorporated into the mind through action (eg, posing questions and developing answers), and through interacting with and interpreting the environment. Passive reading or listening may develop reading or listening knowledge, but it is unlikely to foster useful knowledge [aren't reading and listening useful knowledge? Maybe "practical" knowledge?]. If new knowledge is constructed using pre-existing knowledge, then instructional materials and activities must be well matched to the learners' existing knowledge.

Our MLS academic programs are guided by a responsibility to focus on the development of occupational competence that requires a balance of ability (know-how) and knowledge (know-what). We should explore the mental networks of association through which people acquire, process, and use knowledge. We should seek to describe an individual's mechanisms of memory, reasoning, problem solving, and interacting with the social and physical environment. Learning improves if the learner can find meaning by placing new information in context; for example, if the new information possesses characteristics that enable the learner to associate it with previous learning, the student will most likely retain the new material longer. This approach also stresses the use of insight and the learner's ability to solve a problem by reconstructing a problem or the environment so that a new solution can emerge.

MLS programs these days are full of courses that constitute what the accreditation and certification agencies believe students must learn to be qualified as medical

laboratory scientists. The curricula for these courses are (almost) fixed, which removes control from the faculty and administration. Instructors often would like to expand their students' horizons, but cannot afford to if it does not fit the lesson plan. Abandoning classroom discussion will eventually destroy the curiosity and creativity of students. Therefore courses need to be redesigned so they are not just a collection of facts to be acquired. Courses and curricula should include a set of experiences that allow students to acquire knowledge by practice. However, learning a topic, much less practicing one, is almost impossible unless the learner has motivation. To motivate students to learn a topic, the content of the curriculum needs to fit into the concerns of the students. But since areas of interests or concerns are different for different people, matching individual interests in a fixed curriculum is impossible. To force something to be relevant to all students, faculty members try to evaluate that knowledge with tests and grades; when students do not care about what they are learning, tests and grades force them to learn it. Students, therefore, instantly forget the material they "crammed" into their heads the night before the test. That leads to the problem of assessment. Students use their intelligence to figure out how to get a better grade instead of to think and explore. It is not that these students are not motivated, just that they are not as motivated to learn as they are to get good grades. Students fear open-ended assignments and would rather spend time studying for a test than getting engaged in a discussion. These students will graduate from college with the idea that the world is run by authority figures that have inflexible points of view.

One of our ultimate goals is to involve students in the process of learning. In the classroom, students should be encouraged to explore and discover ideas in an environment that acknowledges and respects that each learner learns differently. On the other hand, teachers should spark interest in their students' imaginations, equip them with cognitive skills to think for themselves, and encourage them to communicate in the classroom. Those teachers will best prepare their students for life.

Depending on an individual's situation and goals, and in order to define what knowledge a student should

acquire, taking into account that individuals do not need or want to do the same things, his or her curriculum must be individualized, or personalized. Courses should be designed to be more skill centered and learner guided, so they navigate between the desires of students and curriculum designers. Teachers should be given the possibility of allowing real inquiry and discussion into the classroom, without which real learning cannot take place. Moreover, academic programs should focus more on eliminating competitive tests, not improving students' performance on them. Our educational system cannot be changed until fixed curricula are eliminated, which comes from changing the way students are assessed. The best signs of a successful educational system will be that students want to go to class, remain excited about learning once they get there, and in the end are prepared to respond to open-ended problems in the real world.

The teacher as primary source of knowledge no longer suffices in a world where knowledge doubles every seven years and 100,000 scientific articles are published every day. An education process that pushes students to the center changes the teacher's role to one of facilitator, guide, and coach. It places emphasis on students as active participants in the process of finding, organizing, analyzing, and applying information in novel ways to solve problems. Students become part of a learning community where they collaborate to discover information from a variety of sources, including peers, teachers, experts, real-world data, simulations, and experiences. Ultimately, they apply that information in novel ways to solve problems, communicate ideas, and continuously add to their knowledge base.

We can enhance teaching and learning, and no doubt teachers will continue to play the most important role. In this role, teachers need to teach how we came to learn what we know. The classroom should be cooperative and collaborative, not competitive.

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