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An Appraisal of the Accelerated Medical Laboratory Technician Program at Thomas Nelson Community College

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AN APPRAISAL OF THE
ACCELERATED MEDICAL LABORATORY TECHNICIAN PROGRAM
AT THOMAS NELSON COMMUNITY COLLEGE

A RESEARCH PROJECT
PRESENTED TO
GRADUATE FACULTY
OLD DOMINION UNIVERSITY

IN PARTIAL FULFILLMENT
OF THE REQUIREMENT FOR THE DEGREE
MASTER OF SCIENCE IN
OCCUPATIONAL AND TECHNICAL STUDIES

By

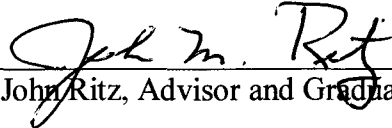
Christine T. Gillerlain

December 1999

APPROVAL PAGE

This project was prepared by Christine T. Gillerlain under the direction of Dr. John Ritz in OTED 636, Problems in Occupational and Technical Studies. It was submitted to the Graduate Program Director as partial fulfillment of the requirements for the Master of Science in Occupational and Technical Studies.

APPROVED BY:



Dr. John Ritz, Advisor and Graduate Advisor

Date 12-17-99

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*To my loving parents,
for their unconditional love and support in all my endeavors,
you have my love and devotion.*

*To my academic advisors, Dr. John Ritz and Mrs. Linda Dezerne,
for their guidance with this opportunity for my professional growth,
you have my heartfelt gratitude.*

*To all my students, past, present, and future,
for your challenges, complaints, and compliments,
you have my pledge that I will become a better educator.*

Christy Gillerlain

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CHAPTER I

INTRODUCTION

The education of medical laboratory technicians has taken place in both the civilian and military communities for the past thirty years. The same technical subject matter is covered in both curriculums. However, the military has historically trained or educated their students in half the time of their civilian counterparts. The cost of training, the purpose of the education, and philosophies of adult training are at the heart of the difference in time it takes to train the military and the time it takes to educate the civilian medical laboratory technician.

At Thomas Nelson Community College, these two different worlds are coming together. In January of 1999, the Navy and the college entered into a joint pilot program to explore the long-term potential of naval personnel trained or educated at an established civilian educational facility. This cooperative effort could benefit both institutions. The Navy's goals are to reduce the cost of training per student while maintaining the length of time in school and the competency level of the graduate. Thomas Nelson Community College's goals are to ensure the same high level of education to both the civilian and military student, while increasing revenues and the number of students enrolled in the medical laboratory technician program.

The major issue for Thomas Nelson Community College was to condense the didactic courses routinely taught in an eighteen month time period into a six-month schedule. The Navy student will attend classes eight hours per day, five days per week for a period of six months. The civilian student would take those same courses in three traditional semesters. The first naval class attended the condensed classes from January

through June 1999. According to the researcher, the first class experienced “burn out” and a high level of stress with the condensed schedule. Because of such high stress levels, a different approach to instruction was proposed. The curriculum was overhauled. During the first class, the program was divided into four six-week blocks. Each block consisted of five to six different courses. The second class began the newly designed accelerated schedule which ran from July through December 1999. During the second class, the program was a continuous process where the students took only two intense courses at any one time. The courses were more compressed and concentrated. The feeling was that the students would be more focused and therefore less frustrated and stressed.

The Navy would like this program to succeed. The medical laboratory technician (MLT) program was chosen for the pilot program because it is considered the most strenuous naval allied health school. In the Navy, the MLT program has the highest attrition rate and the longest school. According to the Naval Command representative, the success of this pilot program will determine if additional allied health programs will be contracted to the civilian educational community (H. A. Vandenberg, personal communication, June 18, 1999). Even with the stringent controls and demands of the contract, the financial benefits for TNCC outweigh the short-term frustrations.

Before any advantages or disadvantages to either the accelerated or traditional programs could be assessed, a thorough examination of the benefits or difficulties to the individual student was conducted. This research project evaluated the two programs by examining the structure of the program, as well as the competency and satisfaction of the

students from the first two Naval classes of the pilot program contract and their civilian counterparts.

STATEMENT OF THE PROBLEM

The problem of this study was to determine the effectiveness of the accelerated program model of the Naval Medical Laboratory Technician student compared to the traditional program of civilian Medical Laboratory Technician student at Thomas Nelson Community College in 1999.

RESEARCH GOALS

The goals of this study were to answer the following questions:

1. Does the accelerated MLT program provide the same educational experiences as the traditional MLT program?
2. Does a change to a more concentrated course schedule change the Navy MLT student's opinions about the program in which they are enrolled?
3. What are the major weaknesses and the major benefits of the accelerated program as indicated by the student?
4. How does the student performance compare in the accelerated MLT program with the traditional MLT program as measured by the final grades in Hematology, Blood Bank, Urinalysis, and Immunology?

BACKGROUND AND SIGNIFICANCE

Before 1999, the Navy conducted two Naval Laboratory Technician Schools. These schools were strategically located in large naval medical centers; one on the east

coast and one on the west coast. The east coast school was at Walter Reed Medical Center, in Bethesda, Maryland. The west coast school was located in San Diego, California. The two schools were identical in many ways. They utilized the same training materials, trainer credentials, and classroom militaristic discipline.

Since 1980, TNCC was accredited to administer a Medical Laboratory Technician program. The program was established with didactic and practical laboratories conducted on campus. After the student completed 39 hours, he/she was permitted to participate in practical internships located throughout the Tidewater area. After seventy-two hours of course work in both didactic and practical training, the MLT student is granted an A. S. in Medical Laboratory Science.

In 1997, a budget initiative prompted the Navy's east coast school to re-evaluate their program. After a year of discussion and debate, the leadership decided that the school was inefficient and too costly for the Navy to continue operating. In spring of 1998, the Navy accepted open bids from public and private educational facilities to train the Navy's east coast laboratory technicians. The bid detailed the limitations and expectations of the proposed contract. In August 1998, TNCC was granted the bid. The Navy and TNCC made several compromises and the two-year contract was signed that following month. A program schedule was developed. New instructors were hired in December. The first class began on January 2, 1999.

Growing pains were profound in those first six months. In an effort to respond to student concerns, the program was restructured for the second class that began July 5, 1999. The order and sequence of the courses were changed. The teaching methodologies were slightly adjusted. Also, the accelerated courses were opened to civilian students.

Since this is a pilot program, TNCC was and still is the site of on-going research. This study focused on comparing the elements of the traditional program with the elements of the accelerated program. Student responses and perceptions about the two programs will be evaluated in order to monitor the success or failure of the accelerated program. If this accelerated program is a success, the Navy will contract more allied health programs to the public or private educational facilities. These contracts could be very lucrative for the chosen institutions.

LIMITATIONS

The limitations of the study were as follows:

1. The surveyed students involved in this study were enrolled in the first two classes of the Navy MLT pilot program or civilian students matriculating in the traditional MLT program at TNCC during the period of January through December, 1999.
2. The comparisons made between the two programs were obtained from data on the navy program and the traditional program in use between January through November 1999.

ASSUMPTIONS

This study was based on the following assumptions:

1. The surveyed students differed widely in age, ethnic background, level of formal education, and career goals.

2. The traditional program must comply with the Virginia State Guidelines in order to continue to offer the MLT program.
3. The accelerated program must comply with the Naval Contract in order to continue to offer the accelerated MLT program.
4. The survey was developed to permit the students to report their results accurately.

PROCEDURES

Thomas Nelson Community College was the site of this study. A review of the curriculum of the accelerated and traditional programs was conducted. This review included an examination of the program content compared to the VCCS course guidelines. The Naval contract was reviewed for completeness to ensure total compliance with VCCS guidelines and TNCC course requirements.

The accelerated program for the first naval class was compared to the accelerated program for the second naval class. The civilian traditional program was compared to the accelerated naval program. The programs were evaluated for the number of contact hours and the number of credit hours. The students enrolled in the programs were surveyed. A comparison of student satisfaction and grade point average was determined.

DEFINITION OF TERMS

The following definitions should be applied when reading this research paper.

MLT – a medical laboratory technician. The technician may receive a diploma or an Associate degree, depending on the type of program from which he/she graduated.

ASCP – American Society of Clinical Pathologists. It is an accrediting organization for hospitals, schools, colleges, and the individual technician.

“Accelerated Program” - the MLT program at TNCC, in which the student attends lectures and labs eight hours daily for a period of twenty-four weeks. Afterwards, the student participates in a practical internship at a local hospital eight hours daily for a period of twenty-four weeks. A total of sixty college credits are available should the student pass all courses in this program. A diploma is granted at the completion of the course work. The student is encouraged to take the remaining twelve credit hours in order to acquire the associates degree.

“Traditional Program” – the MLT program at TNCC, in which students attend lectures, labs, and practical internships. The minimum amount of time required to complete the program is two years. At the completion of the program, the student has earned seventy-two credit hours and received an Associate Degree in Medical Technology.

TNCC – Thomas Nelson Community College. A two-year community college located in Hampton, Virginia.

PNMC – Portsmouth Naval Medical Center. It is the Navy’s regional medical center located in Portsmouth, Virginia. It is the site of the naval MLT student’s internship.

Program I – The first class of Naval students who were enrolled in the first accelerated MLT program. The class began January 1, 1999.

Program II – The second class of naval students who were enrolled in the second accelerated MLT program. The class began July 1, 1999.

Program III – The first and second year civilian students who were enrolled in the traditional MLT program at TNCC from January 1 – December 31, 1999.

MDL or Med Lab – Medical Laboratory course identifiers used at TNCC.

OVERVIEW OF CHAPTERS

Chapter I provided a description of the joint venture between TNCC and the Navy. This venture is a pilot program to investigate the feasibility of a private educational facility providing training to naval staff in an efficient manner. This study evaluated two aspects of the overall program. The two accelerated programs were compared to each other to determine which one is the better method to teach the military student. The accelerated program was compared to a traditional program in order to prove or disprove that the course content and curriculum met the standards of the VCCS. By evaluating and identifying the best program to utilize, TNCC will better serve the educational needs of the student and thereby, better satisfy the requirements of the naval contract.

In Chapter II, a thorough review of existing literature will be presented in an effort to detail how the Navy currently trains, how the community college teaches abstract reasoning and problem solving, and what the advantages or disadvantages were of accelerated training. In Chapter III, an explanation of the surveys, and the methods and procedures used to analyze the collected data, will be presented. Chapter IV will state the findings of the data. Chapter V will provide a summary with conclusions and recommendations for TNCC and the Naval MLT programs.

CHAPTER II

REVIEW OF LITERATURE

Robert F. DeHann, in 1963, reported that accelerated learning programs generally increase the student's motivation to learn. Provision of meaningful, advanced, novel, and challenging experiences is one of the important aspects of accelerated learning programs. DeHann was referring to the gifted student in elementary school. He expanded the definition of accelerated learning programs to include any program where the learning experience is over and above what the common learning program has to offer. "Accelerated learning programs provide more material to be learned at a faster pace, a greater variety of learning experiences, and learnings of more complex and novel nature that require a higher level of generalizing and abstracting ability than is required for the usual educational programs" (DeHann, 1963, p. 4-5).

Accelerated learning programs provide a greater quantity of learning. Rapid exposure to more facts, principles, and generalizations builds up the student's storehouse of knowledge. The student may not realize that he/she knows more than a traditional student until later in college or at the workplace where he/she may compare themselves to others from traditional educational models. One objective of the accelerated learning program is to carefully select the reason, facts, principles, and generalizations that should be taught in the program. Rapid learners cannot be expected to learn everything, nor should educators present every detail of the subject matter. The accelerated learner needs only to learn the most pertinent and applicable data to solve the problems. Students

should be taught the necessary skills to apply their knowledge creatively in order to solve a problem (DeHann, 1963, p. 6-8).

When reviewing literature on accelerated learning programs, an examination of time, the curriculum, and examples of post-secondary accelerated programs was performed. The amount of class time is regulated, but time is also defined as the time for instruction, student practice, and application of the new knowledge. The curriculum in accelerated learning programs was investigated with regards to the strategic plan of the accelerated courses. Two examples of accelerated allied health programs were discovered during the literature review, which will be discussed in this chapter. A description of the MLT programs available at TNCC will be presented at the end of this chapter.

TIME

Post-secondary classroom time is regulated by the Department of Higher Education. The department sets the standards by which the individual institutions must comply. In the traditional semester session, one credit hour is given for each lecture hour in the formal classroom per week. For example, a three-credit course meets three hours per week for the sixteen weeks in the semester, for a total of forty-eight contact hours. In accelerated programs, such as summer sessions or new alternative concentrated programs, the amount of contact hours must be the same for the sake of compliance but more importantly for the program's accreditation. In accelerated programs, the learner is in a fast-paced, intense learning environment. In the accelerated pilot program at TNCC, the total lecture contact hours remain the same but the courses are taught in four weeks instead of sixteen. The practical laboratory session time has been cut in half to facilitate

the addition of supplementary courses in the overall program. This reduction of practical time has stirred debate about the quality of instruction and the degree of learning. In this accelerated learning environment, the learner must focus intently on the task at hand. Therefore, a review of time is important.

According to Fischer and Berliner (1985), the concept that the sheer quantity of time allocated to learning is not necessarily the critical variable. Rather, the concept of academic engaged time is what is crucial (p. 40). This time-on-task principle is the time accompanied by student involvement. Student involvement can mean programmed instruction or self-paced learning. The function of time-on-task is the amount of time that a student is willing to spend on learning. Student motivation is a major factor in the willingness of a student to spend time on learning a task. Another factor effecting time-on-task is the student's general intelligence or general scholastic aptitude in the subject matter.

The term, quality of instruction, is the all-encompassing concept of instruction and instructional material that conveys a clear, concise picture of the learning task. It is measured by the student who learns successfully from it, not by the amount of time spent in instruction (Fisher & Berliner, 1985, pp. 43-45). However, learning is effected by the amount of time. Three determinants of the amount of time learners need to accomplish a given task are: (1) the learner's aptitude for learning the task, (2) the quality of the instruction provided to the learner in an attempt to facilitate his/her task accomplishment, and (3) the ability of the learner to understand the instruction actually provided (Fisher & Berliner, 1985, p. 159). Thus, timing can be defined as the extent to which learning a task and the instruction relating to a learner's accomplishment of the task is appropriate

for the current state of the learner. The better the timing, the shorter the amount of time needed to learn.

CURRICULUM

Accelerated programs in the mathematics, sciences, and foreign languages have been used in programs for gifted children since the fifties. The curriculums focused on deductive reasoning, inductive method of discovery, scientific thinking and theorizing, and increasing applications (DeHann, 1963, pp. 33-37). The accelerated MLT program at TNCC is primarily composed of science and math courses. Strategic planning of the courses will help ensure the success of the program.

Course goals, instructional objectives, learning activities, and methodical evaluation are essential elements of a strategic plan in course development. In developing course goals and instructional objectives, the medical technology educator must make difficult decisions because there is so much material to be covered and there is only a limited amount of time in which to cover it. Beck and LeGrys state that a task analysis should be performed to identify the essential knowledge and technical skills that are needed to perform various tasks (1988, pp. 13-16). Learning activities include instructional materials, classroom presentations, discussions, demonstrations, laboratory sessions, supervised practice, and experiences that support the course objectives. Learning activities should focus on improving reasoning skills, developing scientific thinking, and increasing the application ability. Evaluating the effectiveness of the learning activity should identify whether or not the students were able to master the objectives. Evaluation methods may include objective tests, practical competency assessments, or oral review between the learner and the educator.

Curriculum development in an accelerated medical technology program is a dynamic process and requires continual reassessment to determine whether or not current strategies are meeting the needs of the students and the profession. Consideration of basic college requirements must be met in addition to the specific requirements of the program. Effectiveness of the program should be assessed on a regular basis. An assessment of the program's success can be measured by surveying the graduates and their employers. The students can be evaluated on the rate of program completion, rate of passing the certification test, and rate of employment within the field upon graduation. The employers can evaluate the graduates on entry-level job knowledge, graduate job responsibility, and satisfaction with graduation employment (Beck & LeGrys, 1988, p. 18).

EXAMPLES OF ACCELERATED ALLIED HEALTH PROGRAMS

A review of literature revealed only two examples of accelerated programs at the post-secondary level of education. The University of South Carolina, College of Nursing, offers an accelerated LPN-to-BSN program. Old Dominion University, College of Allied Health Professions, offers an accelerated MLT-to-MT program. Both universities report high success rates indicated by higher grade averages in accelerated programs and higher student satisfaction rates than found in traditional programs.

At the University of South Carolina, a licensed practical nurse can work toward a Bachelor of Science in Nursing. He/she can earn credit-by-examination for previous education and experience, thereby accelerating their course of study. The credit-by-examination may be earned in up to seven courses or twenty-six semester hours (Gross,

1994, p. 14). Of the thirty-three LPN-to-BSN students, seven have graduated, taken the boards, and all passed. A diagnostic readiness profile examination reveals that the LPN-to-BSN students score ten percentage points higher than those of their traditional peers. This form of accelerated program does not meet the definition of an accelerated program for this research study because the LPN-to-RN does not teach foundational material. However, the fact that the program was successful leads the researcher to believe that it has implications on the concept of accelerated allied health programs.

At Old Dominion University, a different concept was developed to encourage MLTs to further their careers by earning a Bachelor of Science in Medical Technology by attending accelerated courses in a weekend program. In the fall of 1996, Old Dominion University initiated the program. In 1998, a comparison of the traditional and accelerated programs was made. The conclusions revealed that the weekend students received higher scores than the traditional students in four out of five required medical technology courses. The weekend college students also scored higher on the final comprehensive examination than the traditional students in three of the four disciplines and they scored the same on the fourth discipline. Students revealed that they were very satisfied with the weekend program. They rated their satisfaction a five on a five-point scale (Harrison, Somma, & Coleman, 1998).

MLT PROGRAMS AT TNCC

Three MLT programs were conducted at TNCC. Program I was an accelerated schedule of courses used by the first Naval MLT class. Program II was a different

accelerated schedule which was established with the second Naval MLT class. Program III was the traditional program which has been used by civilian students since 1980.

Program I was established for the first Naval MLT class. It was designed to give the Naval student a sense of being in college. It reflected the traditional program in that courses were available on different days and at different times. The didactic portion was divided into four six-week blocks. The blocks attempted to resemble the traditional semester program scheduling, however the semester was condensed into four six-week time blocks. There was a mixture of core courses and MLT courses throughout the first three blocks. The students attended classes eight hours per day, five days per week. They were expected to study at home three to four hours per night, except Friday and Saturday. The students complained that the schedule was too demanding, that the program was not cohesive, and that they were unable to learn all the material. They reported that three Medical Lab courses at one time were too much technical information to absorb. Refer to Table I to view the didactic schedule for Program I.

Program II was created in response to student complaints about Program I. It was designed to focus the student's attention by offering fewer but more concentrated courses. The altered accelerated program attempted to limit the number of MLT courses to two at any one time. The program also reduced the number of final exams given at any one time by staggering the Medical Lab courses. A holistic approach to course scheduling was undertaken. There were no blocks; courses began and ended independent of each other. A course in phlebotomy was added to the curriculum because the group of students were reported to have less phlebotomy experience than did the first class. Table II details Program II.

Program III is the program used at TNCC since 1980. It is a traditional semester program. Medical Lab courses are sequential and available only on an annual basis. It includes two additional Medical Lab courses that are necessary for the civilian student who has had no medical training or experience. It also includes a humanities course to fulfill the college's basic requirements. Table III outlines the traditional schedule.

Table I

Program I: Accelerated MLT Program Utilized in the First Naval MLT Class

	Course number	Number of credit hours
Block 1:	Chemistry 110	3
	Biology 100	3
	Chemistry 122 laboratory	-
	Med Lab 110	2
	Math 126	2
Block 2:	Chemistry 122 lecture	3
	Biology 205 lecture and laboratory	4
	Chemistry 122 laboratory	1
	Med Lab 125 lecture and laboratory	3
Block 3:	Med Lab 225 lecture and laboratory	3
	Med Lab 251 lecture and laboratory	3
	Med Lab 210 lecture and laboratory	2
	English 101	3
Block 4:	Med Lab 262 lecture and laboratory	4
	Med Lab 216 lecture and laboratory	3
	Med Lab 252 lecture and laboratory	2
Practical Instruction for the following six months at Portsmouth Naval Medical Center		
	Med Lab 266	4
	Med Lab 276	4
	Med Lab 277	4
	Med Lab 278	4
	Med Lab 280	2
	Med Lab 109	1
Total credit hours		60

Table II

 Program 2: Accelerated MLT Program Utilized in the Second Naval MLT Class

Week	Course name	Number of credit hours
1	Introduction to PNMC and TNCC	0
2	Chemistry 110 and Biology 100	-
3	Chemistry 110 and Biology 100	6
4	Math 126 and Chemistry 122 lecture	-
5	Math 126 and Chemistry 122 lecture	5
6-15	Monday and Wednesday: Med Lab lecture and lab Tuesday and Thursday: a different Med Lab lecture and lab Every Friday: English 101 and Chemistry 122 laboratory	4
6	Med Lab 109 and 125	-
7	Med Lab 109 and 125	1
8	Med Lab 110 and 125	-
9	Med Lab 110 and 125	3
10	Med Lab 110 and 225	-
11	Med Lab 110 and 225	2
12	Med Lab 210 and 225	-
13	Med Lab 210 and 225	3
14	Med Lab 210 and 216	-
15	Med Lab 210 and 216	2
16-24	Every Monday, Wednesday, and Friday: Microbiology Every Tuesday and Thursday: a different Med Lab course	
16	Biology 205 and Med Lab 216	-
17	Biology 205 and Med Lab 216	4
18	Med Lab 251 and 216	3
19	Med Lab 251 and 262	-
20	Med Lab 251 and 262	3
21	Med Lab 262	-
22	Med Lab 252 and 262	-
23	Med Lab 252 and 262	6
24	Customer Service training and review	-

 Practical Instruction for the following six months at Portsmouth Naval Medical Center

Med Lab 266	4
Med Lab 276	4
Med Lab 277	4
Med Lab 278	4
Med Lab 280	2

Total credit hours = 60

Table III

Program 3: The Traditional MLT Semester Program

Semester	Course name	Credit hours
Summer	Biology 145	5
	Math 157	3
	Med Lab 100	1
Fall	Chemistry 101	4
	English 101	3
	Biology 205	4
	Med Lab 101	3
	Humanities elective	3
Spring	Chemistry 112	4
	Med Lab 125	3
	Med Lab 110	2
	Med Lab 210	2
	Med Lab 251	3
	Computer science elective	3
Summer	English 101	3
	Med Lab 190	1
	Med Lab 220	2
	Fine arts elective	3
Fall	Med Lab 216	3
	Med Lab 225	3
	Med Lab 252	2
	Med Lab 262	4
	Med Lab 290 first level	1
Spring	Med Lab 280	2
	Med Lab 290 second level	4
	Social Science elective	3
Total credit hours =		72

SUMMARY

In summary, accelerated learning programs have been in existence since the fifties. They are primarily used to challenge and educate the gifted child in the elementary and high schools. The accelerated programs in the sciences and mathematics at the elementary and high school levels have many citations throughout the literature. However, little research has been reported on the comparison of accelerated programs at the post-secondary level of education. This may be in part due to lack of interest or necessity.

At TNCC, a comparison is necessary to ensure the same high quality instruction and degree of learning is taking place in both the traditional and accelerated MLT programs. The accelerated program at TNCC is unlike either the University of South Carolina program or the Old Dominion University program because it builds a foundation of clinical laboratory science knowledge. The LPN-to-BSN and the MLT-to-MT programs continued the formal education of individuals already trained and working in the field. At TNCC, students come from a diverse educational background and the program introduces them to the field of medical laboratory science. Therefore, this research project is the forerunner in the investigation of accelerated programs providing a foundational education at the post-secondary level of education.

CHAPTER III

METHODS AND PROCEDURES

In Chapter III, the methods and procedures used to compare the accelerated MLT program and the traditional MLT program at TNCC was established. The topics that were examined in this chapter included the: (1) population, (2) instrument design, (3) data collection, (4) statistical analysis, and (5) summary.

POPULATION

The population for this research project consisted of MLT students enrolled in either the accelerated or traditional MLT programs at TNCC during the 1999 calendar year. Two classes of accelerated students were involved in the study. The first accelerated class consisted of eighteen Naval students and attended lecture classes on campus between January and June. All students in this class were students with English as a first language. The second accelerated class contained 48 students and attended lecture classes on campus between July and December. Twenty students in this class were classified as “English as a second language”. The traditional students attended lecture classes on campus between January and December. The traditional class was comprised of 12 civilian students in either their first or second year of study. Two students in the traditional program were classified as “English as a second language”. The total sample size was 78 students. The three groups were identified as: (1) Program I, (2) Program II, and (3) Program III.

INSTRUMENT DESIGN

This research project required the development of an instrument which measured the students' attitudes using a five-point Likert scale. The opinion survey was administered to each participant to determine the student's perception of their program and that of their counterparts. The closed form attitudinal inventory was composed of three sections: (1) the student's satisfaction with their program, (2) the student's perception of their counterpart's program, and (3) their opinions on the how to best design future accelerated programs. At the end of the survey, an open-ended question allowed students to list any assets, weaknesses, or recommendations about their program. See Appendix A for the survey.

DATA COLLECTION

Data was collected on the students enrolled in the three programs at TNCC. Final grades in the medical laboratory courses and student demographics were collected on each student in the three groups. The collection of student grades was conducted in November 1999, after the students had completed urinalysis (Med Lab 110), immunology (Med Lab 210), hematology I (Med Lab 125), hematology II (Med Lab 225), and blood bank (Med Lab 216). The numerical final grades were averaged for each group.

The three groups of students were administered the satisfaction inventory in October, 1999. Two groups, the Program II and III, were administered the opinion inventory during class time. The third group, Program I, was administered the inventory during a monthly class meeting.

STATISTICAL ANALYSIS

Statistical analysis was performed on the data sets to compare the three groups of students and tabulate the attitudinal inventory. Results from the survey were tabulated using a Likert scale to measure the mean and median on each survey item. The course averages were calculated and compared using the t-test.

The numerical final grades of each group in urinalysis (MDL-110), immunology (MDL-210), hematology I (MDL-125), hematology II (MDL-225), and blood bank (MDL-216) were calculated. The mean of each group in each course was calculated. The t-test was first applied to determine if there was a significant difference between the Programs I and II, the accelerated Naval groups. Afterwards the data obtained from Programs I and II were combined and compared to the traditional class, Program III, using the t-test calculation.

The students' opinions of the MLT programs were measured using the Likert attitudinal inventory. The mean and median scores for each question were tabulated. The Likert scores of each group were calculated to determine if there was a significant difference in their satisfaction with their program as compared to the other groups.

SUMMARY

Chapter III presented a description of the sample populations, instrument design and method of data collection with statistical analysis. The methods and procedures employed in this research study evaluated participant attitudes and group grade point averages. The next chapter will discuss the findings of these methods and procedures.

CHAPTER IV

FINDINGS

This research project was conducted to determine if MLT students, enrolled in an accelerated or traditional program at TNCC, had similar educational experiences. By conducting a survey that investigated their opinions about their program, the students were assessed in Program I, Program II, and Program III. The groups were also compared by calculating class averages in five Medical Laboratory courses. The topics that were explored in this chapter included: 1) Presentation of Data, 2) Comparison of Groups, and 3) Summary.

PRESENTATION OF DATA

Three groups of students were studied for this project. Program I was the first naval class, consisting of 18 students, all with English as a first language. Program II was the second Naval MLT class, consisting of 48 students, 20 with English as a second language. Program III consisted of 12 traditional civilian students, two with English as a second language, who attended MLT classes at TNCC during the time period, January through December 1999.

The Program I students had an 89% participation rate with 16 out of 18 completing the survey. The Program II students had a 96% participation rate with 44 out of 46 students taking part in the survey. The Program III students had a 67% participation rate with 8 out of 12 students completing and returning the survey. The overall survey participation rate was 89% with 68 out of 76 students submitting completed surveys.

SURVEY RESULTS

Item 1 of the survey questioned the student's perception of the traditional program in comparison to the accelerated programs. Program III students responded most favorably with an average score of 4.1, agree, and a median score of 5.0. The Naval students also agreed that a traditional semester MLT program provides a better educational experience than an accelerated MLT program. Program I students reported an average score of 3.4, undecided, and a median score of 4.0 on this question. Program II students favored the traditional program more than the Program I students. The questionnaire revealed that Program II students scored an average 3.7, agree, and a median score of 5.0 on this first item in the questionnaire. See Table IV for a complete report of the opinion survey results.

Item 2 on the survey questioned the student's perception of the accelerated program in comparison to the traditional semester program. The students enrolled in Program II reported the lowest average on this item with an average score of 2.3, disagree, and a median score of 2.0. The Program III students scored an average of 2.6, undecided, with a median score of 2.0 when questioned how they feel about the Accelerated Program in comparison to the traditional MLT program. Program I students scored an average of 3.4, undecided, and a median score of 4.0 on item 2 of the survey.

Item 3 of the survey questioned how the students felt about on-campus study time in the Accelerated programs. Students in Program I scored an average of 3.6, agree, with a median score of 4.0, while the students in Program II scored an average of 3.5, agree, with a median score of 4.0. The students in the traditional Program III scored an average of 3.2, undecided, with a median score of 3.0 or undecided.

Items 4 through 7 described different program scenarios to determine if the students could make a clear recommendation of future program development. The students in Program I rated the scenario in item 4 the most favorable with an average score of 3.4, undecided, and a median score of 4.0. Eight students, 50% or the mode, enrolled in Program I, agree that future students in the Accelerated Program should take one Medical Laboratory course at a given time. Students in Program II responded most favorably to item 5, which proposed that future accelerated MLT students take two Medical Laboratory courses at any one time. Program II students rated the item 5 scenario with an average score of 3.5, agree, and a median score of 4.0. Eighteen students, 77%, enrolled in Program II responded that they agree with this scenario. Program III students rated the scenarios in items 4-7 on an average of 2.0, disagree, to 3.2, undecided. Of the scenarios, the scenario in item 4 was rated the least negative with an average score of 3.2, undecided, and a median score of 3.0.

Item 8 in the survey asked the student if he/she felt that the education they have received at TNCC had adequately prepared them for a career as an MLT. Students enrolled in Program I responded the most favorably with an average score of 4.3, agree, and a median score of 4.0. Seventy-five percent of the Program I students agreed that they felt adequately prepared for their careers. Forty percent of the students enrolled in Program II were undecided as to how they felt about their preparedness to enter their career. Program II students scored item 8 with an average of 3.3, undecided, and a median of 3.0. Program III students rated item 8 with an average of 3.9, agree and a median of 4.0. Forty-two percent of the students in Program III agreed that they felt prepared for their careers as an MLT.

Item 9 of the survey asked the students if they felt that the education that they had received at TNCC had adequately prepared them to be able to pass the registry exam. Students enrolled in Programs I and III reportedly agreed that they are adequately prepared, however Program II students are undecided. Program I students rated this item with an average score of 3.8, agree, and a median score of 4, with 75% of the students agreeing that they felt prepared to pass the exam. Program II students rated this item with an average score of 3.1, undecided, and a median score of 3.0, with 48% of the respondents reportedly undecided. Program III students rated this item with an average score of 3.9, agree, and a median score of 4.0. Fifty percent of the respondents in Program III agree that they are adequately prepared to pass the registry exam.

Item 10 of the survey asked the students to rate their overall satisfaction with the program in which they were enrolled. Program I students agreed that they were satisfied, scoring an average of 4.1, agree, and a median of 4.0. Sixty-three percent of the students in Program I reported that they were satisfied, while twenty-five percent responded that they strongly agreed that they are satisfied with their program. Students enrolled in Program II rated this item with an average score of 3.5, agree, and a median score of 4.0. Forty-eight percent, 21 students in Program II, agree that they are satisfied, however three students (7%) disagree and another three students (7%) strongly disagree. Students enrolled in Program III rated this item with an average score of 3.6, agree, and a median score of 4.0. Sixty-three percent of the Program III students agreed that they were satisfied with their program, while thirty-seven percent were reportedly undecided. Refer to Table IV for data on the closed portion of the opinion survey.

The opinion survey also included an open-ended portion. The students were asked to make any comments about the MLT program in which they were enrolled. In Program I, only one student responded in this portion of the questionnaire. The student's comment was about the need for more time in the program. Eighty-four percent of the participants in Program II responded. The responses were categorized. Fifty-nine percent, of those students who made comments, discussed the need for more time in the program or the lack of time in their program. Other comments included: needed more laboratory practicals, requested no mandatory study time, noted that the class size was too large, requested that instructors lead the group study sessions, and reported that they lack the confidence to do the job. Sixty-three percent of the students enrolled in Program III made some type of comment in this open-ended portion of the survey. Of those students that made comments, eighty percent made comments about the lack of time or the need for more time in the classroom. One student in Program III reported that too much material was presented. The cumulative results of the open-ended portion of the survey can be found in Table V.

Table IV

Opinion Survey Results

Likert Scale Results

Item Number	Program I		Program II		Program III	
	mean	median	mean	median	mean	median
1	3.4	4.0	3.7	5.0	4.1	5.0
2	3.4	4.0	2.3	2.0	2.6	2.0
3	3.6	4.0	3.5	4.0	3.2	3.0
4	3.4	4.0	2.8	2.0	3.2	3.0
5	3.2	2.5	3.5	4.0	2.4	2.0
6	2.9	2.0	1.9	1.0	2.3	1.0
7	2.8	2.0	1.5	1.0	2.0	1.5
8	4.3	4.0	3.3	3.0	3.9	4.0
9	3.8	4.0	3.1	3.0	3.9	4.0
10	4.1	4.0	3.5	4.0	3.6	4.0

Table V

Opinion Survey Results
Results of the Opened-ended Portion of the Survey

Subject	Program I	Program II	Program III
Total number of responses	1	37	5
need more time	1	22	4
too much material	0	0	1
need more lab practicals	0	5	0
no mandatory study	0	4	0
class size too large	0	2	0
instructors should lead group study	0	3	0
lack confidence to do the job	0	1	0

COMPARISON OF RESULTS

After the data was tabulated, comparisons were made. Programs I and II were compared to evaluate the success of the Naval programs. The cumulative data from the naval groups were compared to Program III. Course averages were determined and t-test calculations were completed.

The final averages in five medical laboratory courses were tabulated. The overall class averages for Programs I, II, and III were 91.51, 90.04, and 90.41 respectively. Program I students consistently achieved the highest class course averages in the five Medical Laboratory courses. The Med Lab 216, blood bank, resulted in the highest-class average for all three groups. Programs I, II, and III had final class averages of 94.13, 93.85, and 94.38 respectively. On the other hand, Med Lab 110, urinalysis resulted in the lowest class averages of 89.31, 88.62, and 88.32, respectively. See Figures I for a graphic representation of the overall course average for each of the three programs as well as a presentation of the program averages in the five Medical Laboratory courses.

T-tests were applied to compare the findings of the five Medical Laboratory courses. The first t-tests were tabulated to compare the two Naval groups. Afterwards, the performance of the traditional students was compared to the Naval students using the t-test calculation.

Programs I and II were compared by their group performance in each of the five Medical Laboratory courses and their overall program averages. The overall t-test score was 0.6197, with a probability at 0.050 and 0.010 of 1.619 and 2.231, respectively. Hematology I and II resulted in the lowest t-test scores of 0.1604 and 0.1393, with a probability at 0.050 and 0.010 of 1.671 and 2.390. The blood bank course averages

resulted in a t-test score of 0.7352, with a probability at 0.050 and 0.010 of 1.671 and 2.390.

Program III was compared to the combined, accelerated Programs I and II. The overall t-test score was 0.7351, with a probability at 0.050 and 0.010 of 1.606 and 2.19, respectively. When comparing the traditional with the naval programs, the blood bank t-test score was the highest with a 0.9469 with a probability of 0.050 and 0.010 at 1.664 and 2.374. Again, the hematology courses gave the lowest t-test scores of 0.7950 and 0.6482 with a probability of 0.050 and 0.010 at 1.664 and 2.374 for Hematology I and II. See Table VI for additional test scores of the individual Medical Laboratory courses.

SUMMARY

This chapter has reported the results of the opinion surveys, the final class averages in five medical laboratory courses, and the t-test scores that compare those findings. Chapter V will analyze these findings as well as draw conclusions and make recommendations.

Class Averages

■ Over all average ■ Med Lab 110 □ Med Lab 210
 □ Med Lab 125 ■ Med Lab 225 ■ Med Lab 216

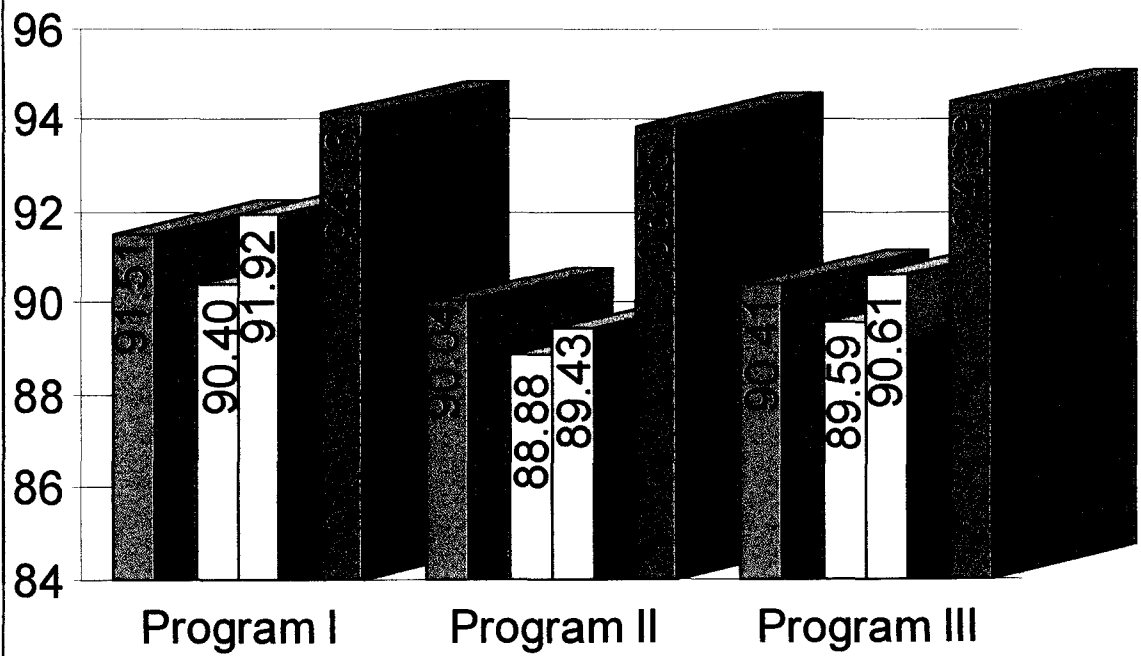


Figure 1

Table VI

T-test Results

Course name and number	T-test score comparing Programs I & II	Degree of freedom	Probability at 0.05 and 0.01	T-test score comparing Program III with Programs I & II	Degree of freedom	probability at 0.05 and 0.01
Overall	0.6197	320	1.619 2.231	0.7351	370	1.606 2.199
Urinalysis MDL-110	0.6569	64	1.671 2.390	0.8252	74	1.664 2.374
Immunology MDL-210	0.4087	64	1.671 2.390	0.9047	74	1.664 2.374
Hematology I MDL-125	0.1604	64	1.671 2.390	0.7950	74	1.664 2.374
Hematology II MDL-225	0.1393	64	1.671 2.390	0.6482	74	1.664 2.374
Blood Bank MDL-216	0.7352	64	1.671 2.390	0.9469	74	1.664 2.374

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

In 1999, the United States Navy entered into a contractual agreement with Thomas Nelson Community College in order to provide instructional training in the field of Medical Technology for its sailors. The agreement brought together two educational practices, that of academic education and that of task oriented skills training. Thomas Nelson Community College developed a unique curriculum which served the Navy's goals and complied with the college's mission.

The purpose of this study was to determine the effectiveness of the accelerated program model of the Naval Medical Laboratory Technician student compared to the traditional program of civilian Medical Laboratory Technician student at Thomas Nelson Community College in 1999. The goals of this research were to answer the following questions:

1. Does the accelerated MLT program provide the same educational experiences as the traditional MLT program?
2. Does a change to a more concentrated course schedule change the Navy MLT student's opinions about the program in which they are enrolled?
3. What are the major weaknesses and the major benefits of the accelerated program as indicated by the student?
4. How does the student performance compare in the accelerated MLT

program with the traditional MLT program as measured by the final grades in Urinalysis, Immunology, Hematology I, Hematology II, and Blood Bank?

In 1997, a budget initiative prompted the Navy to re-evaluate their MLT training program. One MLT school was located in San Diego, California, and the other in Bethesda, Maryland. After a year of discussion and debate, the Navy decided to take bids from public and private educational facilities to train MLT's on the east coast. In August 1998, TNCC was granted the bid to start the pilot program. The first class began on January 2, 1999. The program consisted of a six month period of didactic instruction on the TNCC campus followed by a six month practical internship at Portsmouth Naval Medical Center in Portsmouth, Virginia.

TNCC was previously accredited to administer a Medical Laboratory Technician program that granted an Associated Degree after completion of the required seventy-two credit hours. The traditional program generally took two years to complete. The Navy contract stated that MLT training must be completed in twelve months. A special accelerated program was developed to meet the needs of the Navy contract. The first six months of the accelerated were challenging. Therefore, the didactic program was restructured in response to the complaints from the students in the first class. Both accelerated programs were completed in one year, which consisted of six months of didactic followed by six months of practical instruction. The first accelerated didactic program was composed of four six-week blocks consisting of three to five courses in each block. The second accelerated program was a holistic design. The program limited course load to two concentrated courses given at any one time. The courses were staggered throughout the six-month period.

One limitation of the study was that the students involved in this study were enrolled in the first two classes of the Navy MLT pilot program or civilian students matriculating in the traditional MLT program at TNCC during the period of January through December, 1999. Other boundaries on the research project were compliance with the Virginia State guidelines and the naval contract in order to continue to offer the MLT program.

The populations studied in this project were classified as Program I, Program II, and Program III. Program I consisted of eighteen students enrolled in the first accelerated naval program, which began on January 2, 1999. Program II consisted of forty-eight students and began on July 1, 1999. Program III contained the civilian students who were enrolled in the traditional program any time from January through December 1999. Program II contained twenty students who were classified as “English as a second language”, while two students in Program III were classified as such.

An instrument was developed to measure the student’s attitudes about their program and their perceptions of other programs. The opinion survey was composed of ten closed-ended questions to measure the student’s satisfaction with their program, their perception of their counterpart’s program, and their opinions on how to best design future accelerated programs. At the end of the survey, an open-ended question allowed students to freely state the assets or criticisms of their program and make recommendations for improvements.

The data for this project were collected in the fall of 1999. At that time, students in Program I were in their six months of practical laboratory internship, while students in Program II were in the middle of their six months of didactic instruction. Students on

Program III were at various points of completion; some were first year students while some were second year students.

Statistical analysis was performed utilizing the data on the three programs. The numerical final grades for each course and group were calculated in order to perform t-tests on each data set. The t-test was applied first to compare student performance in Programs I and II to compare the two accelerated models. Afterwards, the data from Programs I and II were combined to compare the accelerated programs with the traditional program.

CONCLUSIONS

The first goal of the research project was to answer the question, does the accelerated MLT program provide the same educational experiences as the traditional MLT program. Three major differences were discovered between the accelerated Naval Programs I and II and the traditional Program III. Program requirements, completion awards, and enrolled time were different. The traditional program required a student to complete 72 credit hours for graduation. Upon completion, the student is granted an Associates Degree in Applied Science with an emphasis in Medical Technology. The traditional program takes two years to complete, if the student takes the courses in the recommended sequence. The accelerated programs, designed specifically for Naval MLT students, required a student to complete only 60 credit hours, rather than the 72 credit hours contained in the traditional program. The Naval program was limited by the contract to one year for completion. This one year educational experience demanded that the student attend classes 40 hours per week, rather than the traditional twenty in-class

hours. The opinion survey revealed that students in Programs I, II, and III felt that the traditional semester MLT program provided a better educational experience than the accelerated program. Item 1 of the questionnaire asked the students to rate their opinions about the traditional program. The students enrolled in the traditional Program III rated item 1 the highest with a mean score of 4.1, agree, and a median score of 4.5. Students enrolled in Program II rated item 1 with a mean score of 3.7, agree, and a median score of 5.0. Program I students rated item 1 with a mean score of 3.4, undecided, and a median score of 4.0. Therefore, real as well as perceived differences in the traditional and accelerated programs were identified in this project.

After the first naval class reported a high level of stress with the accelerated program, the program was redesigned. Another goal of this research project was to investigate this change. Did the change to a more concentrated course schedule change the Navy MLT student's opinions about the program in which they are enrolled? Students in all three programs were given a survey to rate their survey. Four scenarios were described. One of those scenarios was their current program. The students enrolled in Program II rated their scenario the most favorably with a mean score of 3.5, agree, and a median score of 4.0, agree. The students enrolled in Program I were undecided about this program design. They preferred the scenario that described a situation where only one MLT course is taken at one time. They rated that scenario with a mean score of 3.4, undecided, and a median score of 4.0, agree. While the students in Program II, recommended that future students take two MLT courses at a time, they were less satisfied than students enrolled in Program I. Another item in the survey asked the students to rate their satisfaction with the program in which they were enrolled. Students

in Program II rated this item with a mean score of 3.5, agree, and a median score of 4.0, agree. Program I students rated this item with a mean score of 4.1, agree, and a median score of 4.0, agree. Six students in Program II either disagreed or strongly disagreed with this item, while zero students enrolled in Program I rated this item negatively.

The research project also measured the major weaknesses and benefits of the accelerated program in the open-ended portion of the survey. The students felt that the major weakness of the accelerated MLT program was a lack of time. Only one student in Program I responded in this portion of the survey. The response stated that more time was needed in the program to cover the large amount of detailed material. Eighty-four percent of the participants in Program II responded. The responses were categorized. Of those students that made comments, fifty-nine percent discussed the need for more time in the program or the lack of time in their program. Survey results indicated that they felt that more in-class time was necessary and that more time should be allowed for absorption of the material. The students identified no benefits of the accelerated program.

The fourth objective of this research project was to compare student performance in the three programs. The final course averages from five Medical Laboratory courses were compared as well as the over-all final averages. The t-test was utilized to compare the first two Naval MLT classes at TNCC. The t-test scores from the cumulative Naval classes and the traditional classes were tabulated to determine if there was a true difference in student performance based on their enrolled program. The t-test scores revealed that there was no significant difference in student performance from naval Program I and Program II. When comparing the two naval programs, the t-test score was

0.6197. The 0.050 and 0.010 probability result is 1.619 and 2.231, respectively. There was also no significant difference in student performance, whether they were enrolled in an accelerated program or a traditional program. The t-test score was 0.7351 when Program III was compared to the accelerated Programs I and II. The probability at 0.050 and 0.010 was 1.606 and 2.199, respectively. Therefore, there was no significant difference in student performance between the three groups of students studied.

RECOMMENDATIONS

Based on the results of this research project, the following recommendations were made:

1. The traditional and accelerated programs offer similar educational experiences, therefore, the traditional student should be allowed participation in the accelerated program, if they so desire.
2. The accelerated program design needs on-going re-evaluations and re-configurations, in order to increase student satisfaction in the areas of time management and instructional methodologies.
3. The traditional program should remain available to students who prefer that type of learning model.
4. The accelerated programs should continue to be offered for students who prefer that type of learning model.
5. Further studies should be conducted to identify and describe the ideal accelerated MLT program, for both military and civilian participation.

6. Students should be surveyed again one year after program completion to determine how well they were prepared for the registry and their careers.

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APPENDIX

Appendix A, Opinion Survey

MLT Student Opinion Survey

You have been selected to participate in an opinion poll. This survey investigates the opinions and attitudes of current MLT students at TNCC. Your opinions and recommendations, in regards to the academic portion of TNCC's MLT programs, are important in the development of future programs.

For each question, please mark the appropriate box that best reflects your opinion.

Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
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1. Do you feel that a traditional semester MLT program provides a better educational experience than an Accelerated MLT program?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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2. Do you feel that the Accelerated MLT program provides a better educational experience than a traditional MLT program?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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3. Do you feel that on-campus study time should be scheduled in the Accelerated MLT program?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

4. Do you recommend that future MLT students in an Accelerated program take one MLT course at a time (eg: take hematology I for 1½ weeks, 8 hours each day)?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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5. Do you recommend that future MLT students in an Accelerated program take two MLT courses at a time (eg: take hematology I and immunology for a period of 3 weeks, 20 hours each week)?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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6. Do you recommend that future MLT students in an Accelerated program take three MLT courses at a time (eg: take hematology I, immunology, and microbiology for a period of 5 weeks, 13 hours per week)?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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For each question, please mark the appropriate box that best reflects your opinion

Strongly agree	Agree	Undecided	Disagree	Strongly Disagree
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7. Do you recommend that future MLT students in an Accelerated program take five MLT courses at a time (eg: take hemo I, urinalysis, immunology, microbiology, and clinical chemistry for a period of 8 weeks, 8 hours per week)?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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8. Do you feel that the education you have received at TNCC has adequately prepared you for a career as a MLT?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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9. Do you feel that the education you have received at TNCC has adequately prepared you to pass the registry exam?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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10. Overall, how satisfied are you with the program in which you are currently enrolled?

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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In the section below, please comment about the MLT program in which you are enrolled. List assets or criticisms about the program. Make recommendations for improvements.

Thank you for your time and opinions.

