PRIOR COURSE EXPERIENCES AND ACADEMIC ACHIEVEMENT

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CHAPTER 1
INTRODUCTION

Statement of Problem

The National Registry of Emergency Medical Technicians (NREMT) (2006) recently reported that of the 92,090 Emergency Medical Technician-Basic (EMT-B) examinations administered in 2005, only 65% of the candidates taking the test for the first time passed. This finding is quite disturbing when taking into account that the NREMT requires that the students taking the exam must have successfully completed a state-approved EMT-Basic course based on the requirements outlined by the U.S. Department of Transportation (USDOT) prior to taking the exam. Each state adds its own standards regarding the minimum number of hours and types of training, but they must still adhere to the minimum requirements outlined by the USDOT. Within each state, the EMT-B courses are typically offered through universities, colleges, and adult education centers. Though the states set their own minimum requirements based on the guidelines provided by the USDOT, educational institutions determine their own teaching methods, timeframe, and types of instructors required to teach the course. Unfortunately, the standardized minimum hours and requirement of the successful completion of an EMT-B course has resulted in only two-thirds of the students successfully passing the NREMT-B exam for the first time.

The poor performance on the NREMT-B exam by students taking the exam for the first time has led some EMT-B programs across the nation to review their success rates and implement changes in their programs in attempts to improve test performance. A review of several universities' and institutions' policies noted a particular approach

1
that has been implemented to improve success: the addition of prerequisites for the EMT-B course. For example, Phillips Community College of the University of Arkansas requires students to meet minimal skill levels in reading, math, and English that have been measured through standardized tests or through the completion of developmental courses before the students enroll in their EMT-B course. Merritt College in Oakland, California, requires additional training in the form of standard first aid or a health course prior to enrolling. In Ohio, Cuyahoga Community College in Cleveland requires students to complete a Cardiopulmonary Resuscitation Course and an Emergency Medical Technician-Ambulance course or be concurrently enrolled in these courses in order to take the EMT-B course. These additional requirements of prerequisite courses are designed to better prepare students for more advanced material, but the value of prerequisites is debated.

A commonly established practice in many universities and colleges is the use of a prerequisite policy that requires students to take lower division courses before entering advanced courses. The general belief behind this practice is that the prerequisite courses prepare students for the more advanced material. Instructors of the advanced courses generally expect the students to have developed an adequate knowledge base and retained a sufficient amount of information from these prerequisite courses. These expectations may result in material previously taught in the lower division courses to be excluded or only briefly reviewed in the advanced courses. Yet simply passing a prerequisite course does not necessarily characterize what a student knows or how well they can apply the information they have retained (Rovick, Michael, Modell, Bruce, Horwitz, Adamson, 1999).
Recent research has demonstrated that completing prerequisite courses does not ensure that students will outperform students who have not taken the prerequisites (Richardson, 2002; Hall & Stocks, 1995). In fact, a study by Richardson (2002) performed on allied health students taking an advanced human physiology course demonstrated that students who had never taken a lower level elementary physiology course performed as well as the students who had previously taken such a course. In this study, students were given pre- and post- course assessments as part of an advanced human physiology course for the purpose of comparing prior knowledge and academic performance. The students were divided into three groups based on their attendance in a lower level human physiology course: (a) students who had completed an elementary physiology course at the same university as the advanced course, (b) students who had completed an elementary physiology course at another university, and (c) students who have never taken an elementary physiology course. The scores on the pre- and post-course assessments revealed no significant differences between the groups. In fact, the group of students that had never taken an elementary physiology course outperformed the other groups on the post course assessment (81.1% versus 78.9 respectively), yet it was not statistically significant. Based on these findings, Richardson (2002) concluded that completion of a prerequisite course did not appear to offer an advantage in learning advanced material in as far as it applies to human physiology.

Though the students who had taken the prerequisite courses did not significantly outperform students without the prerequisites on the pre and post course assessments in the Richardson (2002) study, further inquiry into the potential benefits of prior knowledge is warranted. Other non-performance-based features of prerequisite courses
may involve characteristics of relearning the material versus learning the material for the first time. This may be manifested in a variety of ways: amount of time required to learn the material, students’ perception of difficulty, or students’ confidence levels associated with learning the material. Therefore, specific inquiries into how much time the students spent studying for the course, their perceived confidence levels, and their perceived difficulties with the course material may demonstrate advantages or disadvantages that are not identifiable simply by looking at the students’ performance on examinations.

Another component that may affect student performance in the classroom is their prior job experiences. Prior job experiences that are related to a particular course subject may play a significant role in the students’ ability to incorporate new information into useful models despite a students’ lack of prior academic experience or performance. This effect may be seen in students who have worked as apprentices or as part of on-the-job training. A common example of such experiences is that of the US Army combat medics. During the medics’ initial training in the military, the students are required to take an Emergency Medical Technician – Basic (EMT-B) course. Though all medics are required to pass the course prior to departing to their first duty station, they are not always able to pass the National Registry Examination. This results in these medics having to retake the course at their new duty station, often in conjunction with their on-the-job training. This on-the-job training may be a valuable adjunct to the students’ continued learning and understanding of the EMT-B function and can provide real-world models and experiences for the students to develop further knowledge and understanding. What may have been decontextualized medical terms and concepts during their initial training may develop into a more applicable understanding when taken in a more realistic context and
framework. This experience may affect the medics’ performance when they retake an EMT-B course.

Though the typical EMT-B courses across the nation rarely require any prerequisite courses beyond Cardiopulmonary Resuscitation (CPR) for the healthcare professional, the students that attend the local EMT-B courses at Tripler Army Medical Center in Hawai‘i offer the potential for a unique perspective: A number of the students may have previously taken and passed an EMT course. The primary difference among these students would be the passage of the National Registry Examination that is required for certification. Some of the students may have taken and passed an EMT-B course and the National Registry Examination years ago but subsequently let their certification expire. Others may have taken and passed an EMT-B course previously, but failed to pass the National Registry exam. Though prior attendance in an EMT-B course is not a prerequisite, the students’ previous completion of the course could essentially be construed as having a level of preparation that is similar or superior to that of many prerequisite courses.

A study comparing a group of students that have previously completed an EMT course to other students without EMT experience may identify other affects of previous knowledge and experience that may not be identifiable by simply looking at performance on course assessments. Student behaviors and perceptions may reveal additional advantages or disadvantages of prior course experience. Further investigations into these behaviors and perceptions may provide additional tools for student instruction and highlight overshadowed benefits of previous courses and experiences.
Theoretical Background

Modern constructivist learning theories view learning as a process of making connections between new material and prior knowledge. Prior knowledge is a common concept mentioned as a key component of learning by Piaget (1967), Bandura (1989), and Vygotsky (1978), though it is often referred to as prior experience. Regardless of the terminology, each of these constructivist theorists had a similar use of prior knowledge and experience as a foundation upon which to attach further knowledge. Vygotsky’s Zone of Proximal Development (ZPD) illustrates this necessity of prior knowledge when he describes the ZPD as “the distance between the actual development level as determined through independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky 1978, p. 86). This “actual development level” represents the prior knowledge and ability level currently held by the student and is the foundation upon which learning new material is built upon. Piaget (1967) identifies the need for prior knowledge when he suggests that the concrete operational stage of development is dependent on logical thinking that is restricted by a child’s previous experience. Though Piaget was referring to childhood development, his suggestion illustrates a need for prior knowledge as it would be a limiting factor to more advanced thinking and learning.

In the academic setting, the idea based on the constructivist theory that new knowledge is built upon prior knowledge is the theoretical foundation of prerequisites. During the development of many academic programs, courses are selected and often placed in an order that allows higher level courses to build upon the knowledge and understanding that students are expected to gain from the lower level courses. Once the
students start taking the higher level courses, a common assumption is that there should be little need to review material that students are expected to have already learned. This assumption is based on the theory that the material being taught in the advanced classes is expected to build upon the students’ knowledge gained from the lower level courses. From the constructivist standpoint of learning, the building upon the student’s prior knowledge is an essential step for students to learn more advanced material. Based on this belief, the idea of developing and requiring prerequisite courses would be an effective step in improving the education of students. Constructing new knowledge on existing knowledge is not the only characteristic of constructivist learning theories.

Another characteristic of learning believed to be essential in constructivist theory is known as self-efficacy. Bandura (1997) defined self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of action required to produce given attainments” (p.3). Self-efficacy is therefore a vital role in a student’s self-reported perception of preparedness for a course, perceived difficulty of the material, and confidence in their predicted performance. This reflects an essential aspect to take into consideration as “self efficacy beliefs determine how people feel, think, motivate themselves and behave” (Bandura, 1994, p. 71). Such behaviors such as amount of time spent studying or the student’s perceptions may reveal potential benefits or pitfalls that could be identified through research. Though the theoretical basis regarding the need for prior knowledge appears to support steps to better prepare students for higher level courses, the literature review revealed that the debate over prerequisite courses and experience is not resolved.
When examining literature that deals directly with the usefulness of prerequisites in many universities and academic programs, much debate still exists in the enforcement and need for prerequisite policies. McCoy and Pierce (2004) investigated the effects of strict enforcement of the prerequisite policy in regards to student performance in biology courses. The outcome of this study was that the student failure and withdrawal rates from the higher level courses decreased significantly with strict enforcement of the prerequisite policy. Though the findings in the McCoy and Pierce (2004) study illustrate some benefits of strict enforcement of prerequisite policies, the selection of which courses to prepare students for upper level courses poses another challenge.

The Academic Senate for California Community Colleges (1997) points out important considerations that community colleges should utilize when determining course prerequisites. They believe that the lack of prerequisites or weak enforcement of the prerequisite policy will result in students not being informed or taught the skills needed to succeed in higher level courses. At the same time, the Academic Senate (1997) states that overuse or improperly imposed prerequisites that go beyond needed skills and information will limit student access to courses and inhibit students’ ability to make normal progress toward fulfilling their educational potential. Even with the appropriate enforcement of prerequisite courses, recent research has began to shed light on potential problems associated with selecting courses or experiences intended to prepare students for higher level courses.
Recently, several authors have noted that there seems to be a significant discrepancy between what they expected their students to know and the students’ actual level of knowledge and understanding (Lujan & DiCarlo, 2006; Michael, 2001; Rovick, Michael, Modell, Bruce, Horwitz, & Adamson, 1999; Hall & Stocks, 1995). Often instructors’ assumptions about their students’ level of knowledge and understanding is based on their students’ completion of a prerequisite course. Yet a recent study reported that even highly experienced physiology instructors made significant miscalculations in their students’ expected performance on a pre-course assessment that covered material that was believed to have been learned by the students in the lower level physiology courses (Rovick et al., 1999). In this study, the instructors slightly underestimated the students’ performance on questions regarding the students’ knowledge base, yet the instructors significantly overestimated the students’ performance on application-based questions. This study appears to demonstrate that the students’ may have memorized factual information presented in the lower level courses but were unable to apply this information in an appropriate context.

These findings seem to be further supported when the number of students’ lower level science courses was compared to the students’ performance in higher level courses. Hall and Stocks (1995) demonstrated that the number of undergraduate science courses was of no value in predicting student performance in higher level sciences courses found in medical school. Though the study did point out other predictors, such as the science grade-point average and scores on medical college admission tests, did correlate well with student performance in medical school, it clearly noted that previous attendance in a greater number of lower level courses did not ensure success in higher level courses.
In another study, Richardson (2002) compared students that had previously completed a lower level human physiology course to students without such experience. On a pre- and post-course assessment study, there was no significant difference between the inexperienced students’ performance and that of the students who had previously completed an elementary human physiology course. Though not statistically significant, the inexperienced students outperformed the experienced students on the post course assessment. These results suggest that the completion and passage of a lower level physiology course did not provide a significant advantage in student performance in the higher level course. One explanation that Richardson (2002) offered was that the students who had previously attended a physiology class likely “did not learn the subject well enough to form cognitive models that foster retention of information” (p.94). Whereas this explanation may account for the experienced students’ poor performance, he failed to suggest that this may be due to misconceptions learned in the lower level courses or that there may exist other benefits gained from the previous completion of a human physiology course. For example, students who had previously attended a lower level course may have an easier time recalling the material as they may be more familiar with the terms and information being presented in the higher level course. However, Richardson (2002) concluded that “the simple completion of an elementary physiology course does not, of itself, offer an advantage in an advanced course” (p.94).

These studies highlight the underlying problem with making assumptions about background knowledge based on a student’s previous academic courses. The approach students use to learn information in lower level courses can affect their ability to use information at a later date. Information that has simply been memorized without relation
to context or application is much more difficult to recall than if it was learned in its appropriate context or a well constructed model (Koriat & Pearlman-Avnion, 2003; Rovick et al., 1999; Cooke et al., 1986). Lujan and DiCarlo (2006) noted that many of their students appeared to be memorizing the content and passing exams without actually understanding the material when preparing for certain types of examinations, such as multiple-choice tests. One explanation of this event was that “memorization is what we resort to when what we are learning makes no sense” (Lujan & DiCarlo, 2006, p.18).

Therefore, the fact that a student has passed a previous course does not ensure that they understand or can accurately apply the information.

Additional explanations describing how students may be passing previous courses without adequate understanding may be the results of faulty models or misunderstandings. A study by Michael (1998) suggested that some of the problems may be related to the fact that students may have developed misconceptions in the lower level courses or from their personal experiences. These misconceptions can be hard to identify and even more difficult to dispel (Michael, 1998). Other reasons could be related to the fact that the information taught in the lower level courses may have been obsolete or inaccurate. Additionally, the instructors in the lower level courses may have simply failed to cover the material thoroughly enough or may have skipped the information all together (Rovick et al., 1999). Even when the material has been covered in the lower level courses, Modell (2000) suggested that students may have learned the material as blocks of unrelated information. These seemingly unrelated blocks of information may prevent the student from making connections between the new knowledge and their prior
knowledge. Despite the variety of potential causes of poor retention of information, completion of a prerequisite or lower level course may still offer some advantages.

Studying the effects of previous experience gained from lower level courses may uncover beneficial student behaviors and perceptions that have not adequately been noted in recent literature. Further inquiries should examine how prerequisite courses influence study behavior, or how previous performance in the lower level courses may influence student dispositions, such as confidence levels or perceived difficulties of the material. Clearly the mere attendance in a lower level course does not ensure that students will have retained adequate knowledge or developed a functional level of understanding that adequately prepares them for the higher level courses. Further studies focusing on the additional effects gained from previous courses and real-world experience may provide valuable insight for instructors.

**Purpose of Study**

The poor performance on the NREMT-B exam by students that have successfully completed an EMT-B course may provide a unique insight as to what may best prepare students for new or difficult material covered in the course. The disturbing characteristic of the NREMT-B results is the numbers of students taking the exam for first time are the students that made it through their EMT-B course successfully. This number does not reflect the number of students that may have dropped out of the course, failed to meet the course criteria, or failed the course. Therefore the number of students taking the exam for the first time represents only the successful percentage of students.

In an attempt to improve their EMT-B course results, Tripler Army Medical Center (TAMC) has considered requiring prerequisite courses to better prepare their
students for the demands of their course. In the EMT-B course taught at TAMC, the students are typically given time-off from their normal places of duty in order to take the EMT course. To minimize this time away from their daily jobs, the course, designed to meet the 110 hours of class time required by the U. S. Department of Transportation (USDOT), is given over a four week period. Their fast pace and long class days administered 5 days a week has resulted in 25% - 50% of the students failing out of the course over the last year. Therefore, the Department of Health Education and Training (DOHET) at TAMC was willing to offer their EMT-B course as the focus of a study.

Though most EMT-B courses taught nationwide do not have any specific course prerequisites, all require that the students be currently certified as healthcare providers in cardiopulmonary resuscitation (CPR) by the American Heart Association. Despite the USDOT’s lack of additional prerequisite courses, the addition of prerequisite courses designed to better prepare the EMT-B students has been a common topic for discussion, but there is no clear consensus on what courses or experience would best prepare the students. Therefore, the purpose of the study would be to identify prior courses or experience that would best prepare the students for an EMT-B course.

Though most of the students that take TAMC’s EMT-B course typically have little or no college, the study population is expected to provide unique perspectives: (a) a number of the students will have previously taken an EMT-B course, and (b) a number of the students will have significant level of medical experience. Current attendance in this course by a student that has previously taken an EMT-B course is generally the result of one-of-three actions: The student failed to take the NREMT-B Exam, the student failed the exam, or the student passed the exam but had since allowed their certification to
expire. The number of students with medical experience in the TAMC course may be the result of training in other branches of service for medical jobs that do not require EMT training. An example would include Navy Corpsmen, who provide basic medical care to sailors on ships and when deployed. Navy Corpsmen typically have training that is beyond that of the typical EMT-B, but may not necessarily have training specific to the pre-hospital training that is taught at the EMT-B level.

While there may exist a variety of reasons behind students dropping out or failing an EMT-B course, performance and study habits can be valuable characteristics that could be studied to potentially identify types of prior knowledge and experience that may improve the students’ success. Therefore, the focus of this study will be to investigate the following questions:

*Research Question #1:* Do students who have previously completed an EMT-B course, have prior medical experience, or previous science courses outperform students without such experience on a multiple-choice assessment given as part of a pre-course and post-course assessment?

*Research Question #2:* Does previous medical experience, prior science courses, or previous completion of an EMT-B course affect the amount of time spent studying for an EMT-B course when compared to students with no previous EMT-B or medical experience?

*Research Question #3:* Does previous completion of an EMT-B course, medical experience, or prior science courses positively affect the perceived level of preparedness, difficulty, and confidence perceived and reported by the students as compared to students without such experience?
CHAPTER 3
METHOD OF STUDY

Educational Setting

The educational setting of the study took place in an Emergency Medical Technicians-Basic (EMT-B) course at Tripler Army Medical Center (TAMC) from May 8th through June 1st, 2006. The course was given over a four-week period with students attending class daily from 7:30 a.m. till 4:00 p.m., Monday through Friday. The majority of the course information was presented as individual lectures covering chapters and material from the course EMT-B textbook. Upon the completion of each individual lecture, the students took a 20-30 question multiple-choice quiz, covering only the material presented in the preceding lecture. In addition to the quizzes, there were five larger examinations administered at varying points during the course covering the cumulative amounts of material and chapters that had been covered to that point. On the last class day, the students were administered a final examination that consisted of 150 multiple-choice questions followed by performance assessments of various skills.

At TAMC, the majority of the course instructors are Emergency Medical Technicians that are certified in at least the basic EMT level. Occasionally, a medical doctor, physician assistant, or registered nurse may teach one of the advanced materials covered in the course, but nearly all of the material is presented by the EMT’s. Rarely do any of the instructors have any formal training or experience in teaching, and many of these instructors are teaching to earn continuing education units (CEU) that can be utilized to maintain their own certification. For this study, the author is unaware of any instructors having any formal training or experience in education. Though these
instructors may include some of their personal experience into the lecture, the lectures were usually presented via a Power Point presentation that was provided by the textbook manufactures or other EMT references. For this study, the author was not aware of any instructors creating their own slides or original lecture material.

For the TAMC EMT-B course, the only prerequisite was that all students were required to be certified in Cardiopulmonary Resuscitation (CPR) at the health-care provider level. No other prerequisites were required, and enrollment into the course was based on occupational need. For instance, priority was given to Army Combat Medics, as they are required to have Nationally Registered EMT-B certification as part of their military occupation. The maximum number of students allowed to enroll in this course is 35, but there were well over 25 additional students standing by, on the first day of the course, for any seats that might have become available. As far as the actual format, the course was designed to meet the USDOT requirements of 110 classroom hours and required EMT-B skills.

Participants

The study involved 34 adult students attending an Emergency Medical Technician – Basic (EMT-B) course given at Tripler Army Medical Center (TAMC) on Oahu, Hawai‘i. The participants consisted of students ranging from 19 to 54 years of age, with a class mean of 28 years, and all the participants were male. Nearly all branches of the United States Military were represented in this course, with service members making up 30 of the 34 students. The remaining four participants were employees in the civil service as Department of Defense firemen. Though the majority of the students were service
members, there was significant diversity in the participants' educational and occupational backgrounds.

The educational backgrounds of the participant ranged from completion of high school to advanced graduate degrees. The 34 participants reported the following levels of educational attainment: 9 reported as only completing high school, 17 reported having taken some college courses, 6 reported completing a two-year degree or equivalent, 1 reported having a four-year degree, and 1 reported have a graduate degree. The students were asked to self report their grade point averages (GPA) based on their highest level of educational attainment. The overall class average for the self-reported GPA was 2.91 (on a four-point scale) and was based on the students' reported level of performance in school (see Appendix B).

The occupational makeup of the course was quite diverse. Occupations included naval food-service specialists, army combat medics, naval corpsmen, firemen, mechanics, technicians, naval divers, and a dentist. The need to gather the occupations was necessary to determine which students had medical experience.

Instruments

The instruments utilized in this study consisted of three components: a pre-course assessment, a daily self-report of study time, and a number of time-based surveys. Though each of the instruments was given at varying times during the course, the initial time-based survey was the foundation of the study.
Time-Based Surveys

The Intake Survey (see Appendix B) was the most vital instrument to the study. On the intake survey, the students' occupation, educational levels, and initial survey of perceptions were gathered for the purpose of identifying the independent variables among the students. The intake survey also consisted of a survey in which the students self-reported on a 5-point scale measurement of the students' perceptions regarding their level of preparedness, difficulty of the course, confidence that they will pass the course, and confidence they will pass the national registry. The survey of the students' perceptions given as part of the Intake Form (see Appendix B), was to be compared with the same measurements taken again on a mid-course survey (see Appendix E), and an end-of-course survey (see Appendix F). Therefore, the Intake survey was administered immediately after the students had volunteered to participate in the study by signing their Adult Consent Form.

Pre-Course Assessment

As part of the first component of the study, the students were administered a pre-course assessment prior to the start of the EMT course that consisted of questions taken from Test 4 of the EMT-B course. Test 4 was selected for the study, as students in TAMC's EMT-B program have traditionally had the most difficulty with this material covered in this test. The pre-test consisted of 15 randomly selected multiple-choice questions from Test 4, a 125 question multiple-choice test administered as part of the course. The text used for this EMT-B course provided a bank of test questions that were utilized to create Test 4. From this bank of questions, the director of the course selected 125 questions from the chapters covered between the administration of Test 3 and Test 4.
To select the 15 questions needed for the pre-test, a random selection of the 125 questions was performed by taking every eighth question. These 15 randomly selected questions were then placed in a random order on the pre-test. Reliability was performed using Cronbach’s Alpha computation on the results on the 15-question pre-course assessment and was found to be 0.56, but this low coefficient of reliability could be related to the multi-dimensional character of the material covered on the pre-course assessment (See Appendix C).

The purpose of performing the pre-test was to determine the students’ knowledge of the course material prior to the start of the EMT-B course. The students’ performance on the 15 multiple-choice questions was compared when they again answered the same 15 questions in Test 4 and the students’ overall score on Test 4. This would provide additional information in order to measure knowledge gained from the start of the course until the point of Test 4. The students’ individual quiz scores and additional exams were not utilized for the purpose of this study.

**Daily Study Report**

On the Daily Study Report, students were asked to report the number of hours and minutes spent studying outside of class on a daily basis. The study report was collected twice; first at the beginning of the third week of the course, and on the last class day. It was imperative to reassure the students that the EMT instructors did not have access to the Daily Study Report throughout the course, nor would the time reported by the students have any influence in their grades. All the surveys remained confidential throughout the course, and all steps to maintain confidentiality between the researcher and the students was taken.
Procedures

The EMT-B course for this study had an enrollment of 35 students, but only 34 students volunteered to participate in the study. All students were provided the Adult Consent Form (see Appendix A) and had the study thoroughly explained. Though student identifiers were to be utilized to measure student performance and gather survey responses for repeated measures, the information gathered had no bearing on the students' grades in the EMT course nor placed the students' at any risk of criminal or civil liability, or affected the students' financial standing, employability, or reputation. The students were assured that once all the data has been gathered, specific student identifiers would not be retained and any personal student information would be destroyed. In addition, it was clearly stated that no student would be identified by anything that comes from the research project (See Appendix A). Once all the participants had volunteered to participate in the study by signing the Adult Consent Form and turning it in for record, the students were provided an additional copy of the form for their own records.

The next step was to identify independent variables among the students and determine groups by having the participants complete the Intake Survey (see Appendix B). For the first group, identified as with medical experience, 12 of the 34 students were determined to have a significant degree of medical experience. The determination of a significant degree of medical experience was extrapolated from the participant’s occupation reported on the intake survey. To meet the criteria of having medical experience for this study, the participant’s occupation must be one in the medical field,
and the participant must have been in that occupation for a minimum of six months. The other 22 students were placed in the \textit{without medical experience} group.

The second group, \textit{previous EMT-B course}, consisted of 7 of the 34 participants reporting as having previously completing an EMT-B course. All seven of these participants had previously passed the NREMT-B exam, and reported that they were retaking the course because they allowed their EMT-B certification to expire. It is important to note that these seven participants are also included in the \textit{with medical experience} group, as they all work in the medical field. The remaining 27 participants represent the \textit{without EMT-B course} group.

The third group represents the participants \textit{with previous science courses}. Of the 34 participants, 14 reported having previously taken science courses. Though there are a significant variety of science courses taught in secondary and post-secondary institutions, the students were only asked if they had previously taken a biology, chemistry, anatomy and physiology, or nursing course. As the limited number of participants would preclude any accurate determination of which science courses may be of the greatest value in preparing for an EMT-B course, the study intends only to consider the generalized knowledge gained from these science courses. (Again it is important to note that seven of these participants are also included in one or more of the other groups.) The remaining 20 participants represent the \textit{without previous science courses} group.

The participants will have comparisons made between the \textit{with} and the \textit{without} groups that represent three independent variables of interest: previous medical experience, previous EMT-B course completion, and previous science courses. In each of these comparisons, the EMT-B course will serve as the dependent variable. As each
group consists of the same 34 participants, comparisons will be limited to between-group comparisons of the with and without aspects of the independent variables. For the purposes of the study, the measurements taken from each study instrument will be utilized to make the comparisons.

Once the students had completed the Intake Survey, they were required to take the 15 question multiple-choice exam, given as part of a pre-course assessment. It is important to note that the Intake Survey needed to be administered before the pre-course assessment, as the students' perceived performance on the assessment would likely affect the 'Intake Survey' responses. The results of the pre-course assessment will not be provided to the students or the EMT course instructors during the course.

Upon completion of the pre-course assessment, the Daily Study Report was explained and distributed to the participants. It was thoroughly explained that the students were to record the amount of time they spent studying on a daily basis and were to record this amount in hours and minutes. Instead of collecting the report daily, it was collected at the mid-point of the course and then again on the last class day.

The total amount of time spent on the first day of the study was 35 minutes and took place before the official start of the EMT-B course. Though the instructors were asked to remind the students to fill out the study report on a daily basis, the instructors were instructed not to collect this paperwork nor were they to ask for this information. At this point, researcher involvement in the course did not occur until the beginning of the third week of classes.

The 11th class day of the course, which was the beginning of the third week, was when Test 4 was scheduled to be administered. By this point in the course, the students
had previously taken three large exams and numerous quizzes, but Test 4 represented the largest bulk of information given on any one test. Prior to the students taking Test 4, the Daily Study Reports were collected and new forms were distributed for week three and four. Then the students were given the Mid-Course Survey (see Appendix E) for them to fill out and return prior to taking the exam. After the surveys had been collected, the students then proceeded to take Test 4.

Once the students completed the exam and the tests had been scored by the EMT-B course instructors, the overall scores on Test 4 were recorded for each student. Then, utilizing the student’s answer sheets, scores for the same 15 questions that had been given on the pre-course assessment were gathered for each student. This data was analyzed using a repeated-measures ANOVA to evaluate the students’ gain in knowledge in regards to their previous EMT course experience, medical experience, and previous history of science courses.

The final Daily Study Report and the End-of-Course Survey was collected on the last class day, prior to the students’ start of the final examination. This was necessary to ensure that the results reported on the End-of-Course Survey do not reflect the students’ actual performance on the final exam, as the results were given to the students shortly after the completion of the final written examination. The students were debriefed concerning the purposes and were provided information for them to request the final copy of the study. If requested, each participant and the EMT course instructors will be provided an electronic copy of the final report. Unfortunately, the final report will not include the results of the National Registry Examination, as the results will be unavailable by the deadline of this thesis.
CHAPTER 4
RESULTS

All 34 participants were grouped by independent variables that were determined from the Intake Survey: medical experience, prior EMT-B course experience, and previous science courses. Within each group of independent variables, the participants fell into one of two categories, with or without. As participants could be representative of each of the three independent variables, comparisons were made using univariate comparisons of the independent variables. The cumulative effect of two or more of the independent variables was not a focus of this study, as the number of participants with cumulative independent variables was very small.

As the study included three separate instruments, the results will be presented for each instrument. From the Intake Survey, the 34 participants were separated into groups for the purpose of making the comparisons. The first comparison looked at medical experience, and the 34 participants were identified as 12 students with and 22 students without. The second comparison looked at prior EMT-B course experience, and the 34 participants were identified as 7 students with and 27 students without. The third comparison looked at prior science courses, and the 34 participants were identified as 14 with and 20 without. Though it is worth pointing out that all seven of the participants with prior EMT-B course experience were represented in the with medical experience group and four of these participants had experience in all three groups, the cumulative effect of these independent variables was not a focus of the study.
Pre-Course Assessment and Test 4 Results

The pre-course assessment was administered to all 34 participants. The overall class average on the pre-course assessment was a 45% with scores ranging from 7% to 87%. Table 1 represents the mean scores on the pre-course assessment for each of the three study groups. The analyses were performed using a one-way ANOVA with comparisons being made between the with and without groups (See Table 1).

Table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>With</th>
<th></th>
<th>Without</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Score</td>
<td>n</td>
<td>Score</td>
</tr>
<tr>
<td>Medical Experience</td>
<td>12</td>
<td>56.8%</td>
<td>22</td>
<td>38.6%</td>
</tr>
<tr>
<td>Prior EMT-B Course</td>
<td>7</td>
<td>62.1%</td>
<td>27</td>
<td>40.5%</td>
</tr>
<tr>
<td>Prior Science Courses</td>
<td>14</td>
<td>43.9%</td>
<td>20</td>
<td>45.7%</td>
</tr>
</tbody>
</table>

Note: The average group scores represent the percent of correct responses on the 15 questions.

Table 1 results indicate that the students with medical experience significantly outperformed the students without based on the mean pre-test scores, $F(1,32) = 12.45$, $p<0.01$. Nearly the same statistical significance was noted between students with previous EMT-B course experience and students without, $F(1,32) = 12.62$, $p < 0.01$, as again the experienced students outperformed the inexperienced students. Surprisingly, there was not a statistically significant difference between the students with previous science
courses and students *without, F*(1,32) = 0.09, *ns*. In other words, whereas students *with*
medical experience or previous EMT-B course completion significantly outperformed
students *without* such experience on the pre-course assessment, the same did not hold true
for students *with* previous science courses.

For Test 4, 78 multiple-choice questions were on the assessment which included
the same 15 questions presented on the pre-course assessment. Table 2 presents these
results with the first score representing the mean group score from the overall 78
questions, and the second score representing the mean group score for the same 15
questions presented in the pre-course assessment. Comparisons were made using a one-
way ANOVA between the *with* and *without* groups.

Table 2.

| Mean Scores on Test 4 and Scores of the 15 Questions from the Pre-Course Assessment |
|-------------------------------|------------------|-----------------|------------------|------------------|
|                               |                 |                 |                 |                 |
| Variables                     | With            | With            | Without          | Without          |
|                               | n               | Overall         | 15               | Overall         | 15               |
| Medical Experience            | 12              | 70%             | 75%              | 22              | 63%             | 64%              |
| Prior EMT-B Course            | 7               | 70%             | 73%              | 27              | 64%             | 67%              |
| Prior Science Courses         | 14              | 70%             | 72%              | 20              | 63%             | 65%              |

Note. The first set of scores represents the percent of correct responses on Test #4. The second score
represents the mean scores on the same 15 questions from the pre-course assessment.
As expected, all the groups performed significantly higher on the Test 4 questions that were repeated from the pre-course assessment. However, there were some unexpected findings in the comparisons of Test 4 average scores. The analysis indicates that there remained a statistically significant difference on the average group scores on Test 4 for students with medical experience and students without medical experience, $F(1,32) = 4.21, p < 0.05$. The participants with medical experience outperformed the ones without, but same did not hold true for the students with previous EMT-B experience. When comparing to the pre-course assessment results, an unexpected finding was that the results demonstrated that there was not a statistically significant difference on Test 4’s mean scores between the students with previous EMT-B course experience and students without, $F(1,32) = 1.80, ns$. Another unexpected finding was the statistically significant difference on the mean group scores on Test 4 between the students with previous science courses (70%) and students without (63%), $F(1,32) = 5.61, p < 0.03$. In other words, whereas students with medical experience continued to significantly outperform students without such experience on the pre-course assessment, the pre-course assessment findings did not hold true for students with previous science courses and EMT-B courses.

**Daily Study Reports**

The results of the daily study reports are presented by the average amount of self-reported time spent studying over the complete four-week course. There was variability from day-to-day in the average amount of time spent studying, and this average tended to decrease throughout the course. The only exception tended to be a slight increase in study time prior to major examinations. Due to these factors, the study intended to look only at
the average number of minutes spent studying per day and make comparisons between
the with and without groups identified in the study.

Table 3.
Mean Self-Reported Time Spent Studying Outside of Class on a Daily Basis

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>With</th>
<th>n</th>
<th>Without</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Experience</td>
<td>12</td>
<td>55 minutes</td>
<td>22</td>
<td>81 minutes</td>
</tr>
<tr>
<td>Prior EMT-B Course</td>
<td>7</td>
<td>41 minutes</td>
<td>27</td>
<td>80 minutes</td>
</tr>
<tr>
<td>Prior Science Courses</td>
<td>14</td>
<td>74 minutes</td>
<td>20</td>
<td>71 minutes</td>
</tr>
</tbody>
</table>

Table 3 reports the average number of minutes spent studying based on the three comparisons. In the study, participants with prior EMT-B experience spent significantly less time studying than the students without such experiences, t(19) = 2.50, p = 0.02. This appeared to be even more significant when taken into account that the participants with prior EMT-B course experience spent approximately half the amount of time studying as compared to the students without (M=41 vs. M=80 minutes, respectively). Even the medically experienced group spent less time studying than the medically inexperienced (55 minutes to 81 minutes), though this was not determined to be significant, t(19) = 1.26, ns. On the other hand, the students that had previous science courses spent slightly more time studying compared to the students without science backgrounds (74 vs. 71 minutes, respectively), yet this difference was not found to be significant, t(26) = -0.14, ns. These findings suggest that students with previous medical experience, which
includes all the students with prior EMT-B experience, require less time to study as compared to the students without.

These results are only characteristic of the participants' study behavior in relation to the independent variables identified in this study. As the overall course performance on all the quizzes and major examination was not collected, an accurate comparison between the students' study habits and their performance cannot be made. Still, simple observations between the students' study behaviors and their performance on the pre and post course assessments may be of some value. In addition, the participants' perceptions of preparedness, difficulty of the course, and confidence may also relate to the students study behaviors and performance.

**Time-Based Survey Results**

The results from the Self-Efficacy Surveys will be presented individually for each rating that was provided by the participants. In each of the tables, the results will show the average rating given for each perception at three stages during the course of the study: (a) on the first day prior to the start of the EMT-B course, (b) midway through the course, and (c) at the end of the course. It is important to note that each of the surveyed responses was recorded prior to the students taking an examination: the pre-course assessment, Test 4, and the final exam. The survey used a scale of 1 to 5 for the participants to rate their perceptions of preparedness, difficulty of the course, and confidence they would pass the course and the National Registry (See Appendices B, D, and F for examples).

The initial comparisons of the ratings provided by the participants were performed using a one-way ANOVA between the groups. In each analysis, the ratings were compared between the with and without groups at three different points in the
course to determine whether or not the differences between the ratings were significant. The significant $F$ values for these individual comparisons were set at $\alpha < 0.05$.

Further comparisons using a repeated measures ANOVA were performed to test the between-subjects effects and the within-subjects effects in relation to the main effect of time on the measurements and the interaction effects between time and groups. As these involved comparing the three repeated measures, the significant $F$ value was set at $p < 0.017$ in accordance with the Bonferroni corrections. The results from each of the questions on the survey will be presented individually.

Table 4.

**Mean Preparedness Ratings Provided on the Self-Efficacy Survey**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Pre</th>
<th>Mid</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>12</td>
<td>3.17</td>
<td>2.50</td>
<td>2.83</td>
</tr>
<tr>
<td>Without</td>
<td>22</td>
<td>2.77</td>
<td>1.86</td>
<td>1.95</td>
</tr>
<tr>
<td>Prior EMT-B Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>7</td>
<td>3.00</td>
<td>2.14</td>
<td>2.57</td>
</tr>
<tr>
<td>Without</td>
<td>27</td>
<td>2.89</td>
<td>2.07</td>
<td>2.19</td>
</tr>
<tr>
<td>Prior Science Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>14</td>
<td>2.93</td>
<td>2.29</td>
<td>2.43</td>
</tr>
<tr>
<td>Without</td>
<td>20</td>
<td>2.90</td>
<td>1.95</td>
<td>2.15</td>
</tr>
</tbody>
</table>

Note. Survey responses are based on a scale from 1 to 5. Please refer to Appendices B, D, and F.
Preparedness

On the first day of the EMT-B course, the students were asked to report how prepared they feel they are for the course. In each comparison, the group of participants with medical experience, prior EMT-B course completion, and prior science courses all rated their level of preparedness higher than the participants without such experience, but this difference was not found to be significant in any of the three comparisons, $F(1,32) = 1.22, ns$; $F(1,32) = 0.07, ns$; $F(1,32) = 0.01, ns$, respectively.

Two weeks later at the mid-point of the course, the same survey questions were administered to the participants, but by this point in the course the average reported level of preparedness had dropped for all groups. The ratings for the experienced students continued to remain higher than the students without, but there was more variability in the results. The comparison between the group of participants with and without medical experience noted that the difference between the reported level of preparedness was now significant, $F(1,32) = 4.27, p < 0.05$. The students without medical experience reported a level of preparedness that was significantly lower than the students with the experience. In the other two comparisons, the difference between the average ratings of the students with and without EMT-B course completion and prior science courses were not found to be significant, $F(1,32) = 0.03, ns$; $F(1,32) = 1.15, ns$, respectively. Yet both groups of the inexperienced students' preparedness ratings were lower than the experienced students.

Prior to the administration of the final examination, the participants were again asked to rate their perceived level of preparedness. On this final rating, all groups reported an average level of preparedness that was higher than what they reported on the mid-course survey, but all ratings remained lower than the ratings they provided on the
pre-course survey. There was still a significant difference between the participants with and without medical experience, $F(1,32) = 8.48, p < 0.01$, but the differences between those with and without prior EMT-B course completion and previous science courses continued to be non-significant, $F(1,32) = 0.95, ns; F(1,32) = 0.73, ns$, respectively.

A repeated measures ANOVA performing univariate tests for within-subject effects determined that the decrease in the ratings over the weeks of the EMT-B course was significant for all groups: (a) Medical experience $F(2,64) = 12.89, p < 0.01$, (b) EMT-B course experience $F(2,64) = 9.88, p < 0.01$, and (c) prior science courses $F(2,64) = 14.19, p < 0.01$. Yet there was not a significant interaction effect, $F(2,64) = 1.14, ns; F(2,64) = 0.40, ns; F(2,64) = 0.54, ns$, respectively. This was not surprising as the preparedness ratings for all groups were significantly lower than their initial ratings. The repeated measures ANOVA for between-subject effects was not significant for any group: (a) medical experience, $F(1,32) = 5.79, ns$, (b) EMT-B course experience, $F(1,32) = 0.31, ns$, and (c) prior science courses, $F(1,32) = 0.60, ns$. 

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Table 5.
Mean Difficulty of Course Ratings Provided on the Self-Efficacy Survey

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Pre</th>
<th>Mid</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>12</td>
<td>3.08</td>
<td>3.25</td>
<td>3.25</td>
</tr>
<tr>
<td>Without</td>
<td>22</td>
<td>3.73</td>
<td>3.91</td>
<td>4.09</td>
</tr>
<tr>
<td>Prior EMT-B Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>7</td>
<td>3.00</td>
<td>3.14</td>
<td>3.57</td>
</tr>
<tr>
<td>Without</td>
<td>27</td>
<td>3.63</td>
<td>3.81</td>
<td>3.85</td>
</tr>
<tr>
<td>Prior Science Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>14</td>
<td>3.21</td>
<td>3.29</td>
<td>3.57</td>
</tr>
<tr>
<td>Without</td>
<td>20</td>
<td>3.70</td>
<td>3.95</td>
<td>3.95</td>
</tr>
</tbody>
</table>

Note. Survey responses are based on a scale from 1 to 5. Please refer to Appendices B, D, and F.

**Difficulty**

The pre-course rating of the expected difficulty level of the course was higher for all of the groups of inexperienced students, but only the differences among the medical experience comparison were found to be significant, $F(1,32) = 4.43, p = 0.04$, as the inexperienced students rated the expected level of difficulty significantly higher than the experienced. Though the students without a previous EMT-B course had a average rated difficulty 3.63 versus the 3.00 the students with prior EMT-B course experience and the students with previous science courses rated difficulty at 3.21 versus the 3.70 reported by
those without, these differences were not found to be significant, $F(1,32) = 2.90, ns$; $F(1,32) = 2.53, ns$, respectively).

The ratings reported on the mid-course survey revealed an across the board increase in the perceived level of difficulty for all groups. Though all groups appeared to feel that the course was more difficult than previously reported, the inexperienced students’ perceptions were now significantly different than the experienced participants’ perceptions. The most significant disparity was between the students with previous science courses and those without, $F(1,32) = 6.53, p < 0.02$. Still, even the disparity between the students with the previous completion of an EMT-B course and those without was significant, $F(1,32) = 4.24, p < 0.05$, along with the participants with and without previous medical experience, $F(1,32) = 5.97, p = 0.02$.

The end of course survey of ratings of the perceived level of difficulty saw either sustained or increased perceptions. While the students with previous medical experience maintained their previous average rating of 3.25 level of difficulty, the students without medical experience further increased their average rating of difficulty from 3.91 to 4.09, $F(1,32) = 9.72, p < 0.01$. On the other hand, the difference that was noted as significant on the mid-course survey between the students with previous EMT-B course experience and those without was no longer significant on the end-of-course rating, $F(1,32) = 0.60, ns$. Even the group of participant with previous science course perceptions of difficulty was no longer significantly different from the participants without, $F(1,32) = 1.69, ns$.

A repeated measures ANOVA for within-subject effects determined that the increase in the difficulty ratings over the weeks of the EMT-B course was not significant for any groups: (a) medical experience $F(2,64) = 1.53, ns$, (b) EMT-B course experience
$F(2,64) = 2.43, \, ns$, and (c) prior science courses $F(2,64) = 2.07, \, ns$. Neither was there a significant interaction effect between the groups and time ($F(2,64) = 0.25, \, ns; \, F(2,64) = 0.70, \, ns; \, F(2,64) = 0.47, \, ns$, respectively). This was not surprising as the difficulty ratings for all groups increased only slightly from their initial ratings by the end of the course. On the other hand, the repeated measures ANOVA for between-subject effects noted a significance between the groups with and without medical experience ($F(1,32) = 10.65, \, p < 0.02$), but was not found to be significant for the EMT-B experienced or previous science course groups ($F(1,32) = 3.45, \, ns; \, F(1,32) = 4.98, \, ns$, respectively).

Table 6.

Mean Confidence Ratings of Passing the Course on the Self-Efficacy Survey

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Pre</th>
<th>Mid</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>12</td>
<td>3.83</td>
<td>3.75</td>
<td>3.17</td>
</tr>
<tr>
<td>Without</td>
<td>22</td>
<td>4.05</td>
<td>3.41</td>
<td>3.45</td>
</tr>
<tr>
<td>Prior EMT-B Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>7</td>
<td>3.86</td>
<td>3.57</td>
<td>3.14</td>
</tr>
<tr>
<td>Without</td>
<td>27</td>
<td>4.00</td>
<td>3.52</td>
<td>3.41</td>
</tr>
<tr>
<td>Prior Science Course</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With</td>
<td>14</td>
<td>3.93</td>
<td>3.71</td>
<td>3.64</td>
</tr>
<tr>
<td>Without</td>
<td>20</td>
<td>4.00</td>
<td>3.40</td>
<td>3.15</td>
</tr>
</tbody>
</table>

Note. Survey responses are based on a scale from 1 to 5. Please refer to Appendices B, D, and F.
Confidence in Passing the Course

In the confidence ratings collected on the pre-course survey, all groups reported high levels of confidence in their ability to pass the course, but most notably was the fact that the inexperienced student-groups all reported higher levels of confidence than the experienced groups. For all of the groups, there was no significant difference among the confidence ratings provided by the students with previous medical experience, EMT-B course completion, and science courses compared to those without ($F(1,32) = 0.42, ns$; $F(1,32) = 0.14, ns$; $F(1,32) = 0.05, ns$, respectively).

By the mid-course survey, the confidence rating for all groups had declined from their previous ratings, but the inexperienced students that had rated their confidence levels higher than the experienced students on the pre-course survey now reported confidence ratings that were less than the rating provided by the experienced students (see Table 6). Still even with the dramatic declines, there were no significant differences between the groups of participants with previous medical experience, EMT-B course completion, and science courses compared to those without ($F(1,32) = 0.91, ns$; $F(1,32) = 0.02, ns$; $F(1,32) = 0.82, ns$, respectively).

The end-of-course survey continued to see confidence ratings continue to decline for all of the experienced groups of students, but the participants in the groups without medical experience or previous EMT-B experience now had higher ratings than the experienced students (see Table 6). In fact, the group of participants without medical experience actually reported an average confidence rating that was higher than what they reported previously, from a 3.41 rating at mid-course to a 3.45 rating. Still, there remained no significant difference among the confidence ratings provided by the groups...
with previous medical experience, EMT-B course completion, and science courses compared to those without \(F(1,32) = 0.55, \text{ns}; F(1,32) = 0.33, \text{ns}; F(1,32) = 1.79, \text{ns},\) respectively).

A repeated measures ANOVA for within-subject effects determined that the decrease in the ratings over the weeks of the EMT-B course was significant for all groups: (a) Medical experience, \(F(2,64) = 6.60, p < 0.01,\) (b) EMT-B course experience, \(F(2,64) = 4.87, p = 0.01,\) and (c) prior science courses, \(F(2,64) = 5.94, p < 0.01.\) Yet there was not a significant interaction effect between the groups and time \(F(2,64) = 1.95, \text{ns}; F(2,64) = 0.29, \text{ns}; F(2,64) = 1.44, \text{ns},\) respectively). This was not surprising as the confidence ratings for all groups were significantly lower than their initial ratings by the end of the course. On the other hand, the repeated measures ANOVA for between-subject effects was not significant for any of the groups: (a) medical experience, \(F(1,32) = 0.03, \text{ns},\) (b) EMT-B course experience, \(F(1,32) = 0.11, \text{ns},\) and (c) prior science courses, \(F(1,32) = 0.74, \text{ns}.\)
Table 7.

Mean Confidence Ratings of Passing the NREMT-B Exam on the Self-Efficacy Survey

<table>
<thead>
<tr>
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Note. Survey responses are based on a scale from 1 to 5. Please refer to Appendices B, D, and F.

Confidence in Passing the NREMT-B Exam

The initially inflated confidence ratings by the inexperienced students that were reported as their confidence in their ability to pass the course did not appear to carry over to their confidence they would pass the NREMT-B exam. In fact, all the ratings reporting confidence in the ability to pass the NREMT-B exam by each of the groups was notably lower than their confidence rating reported in passing the course (see Tables 6 and 7). Though all groups initially reported being more than moderately confident that they would pass the National Registry, only the participants without previous EMT-B course
experience actually rated their level of confidence higher than the ones with this experience (3.67 vs. 3.57, respectively), but this difference was not found to be significant (\(F(1,32) = 0.05, ns\)). The groups with medical experience or previous science courses rated their confidence higher than the ones without, but again neither of these was significant. (\(F(1,32) = 0.01, ns; F(1,32) = 0.12, ns\), respectively).

By the mid-point of the course, all of the groups' confidence ratings had decreased from their initial level, but now all of the experienced groups reported a higher level of confidence than the inexperienced groups (see Table 7). The comparisons noted that there was no significant difference between the group of participants with previous medical experience or EMT-B course completion when compared to the participants without such experience (\(F(1,32) = 3.39, ns; F(1,32) = 0.08, ns\), respectively). The only significant difference was between the group of participants with previous science courses and the ones without (\(F(1,32) = 4.47, p < 0.05\)).

On the end-of course survey, all groups continued to report lower confidence ratings from what they had previously reported initially and at the mid-point of the course. One unexpected turn around was that the group of participants without previous EMT-B course experience now provided a higher average confidence rating than the students with EMT-B course experience (See Table 7). Though this was not found to be significant (\(F(1,32) = 0.24, ns\)), it was surprising that the participants that had previously taken and passed the NREMT examination were continuing to lose confidence in their ability to pass the test again. While the other groups also continued to lose confidence, the groups with medical experience and with previous science courses continued to rate their confidence higher than the inexperienced students. There was still a significant
difference between the group of participants with previous science courses and the ones without \( F(1,32) = 4.18, p < 0.05 \), but the difference between the medical experience groups remained not significant \( F(1,32) = 0.24, ns \).

A repeated measures ANOVA for within-subject effects determined that the decrease in the ratings over the weeks of the EMT-B course was significant for all groups: (a) Medical experience \( F(2,64) = 12.79, p < 0.01 \), (b) prior EMT-B course \( F(2,64) = 10.28, p < 0.01 \), and (c) prior science courses \( F(2,64) = 13.98, p < 0.01 \). Yet there was not a significant interaction effect between the groups and time \( F(2,64) = 2.83, \; ns; \; F(2,64) = 0.50, \; ns; \; F(2,64) = 3.35, \; ns \), respectively. This was not surprising as the confidence ratings for all groups were significantly lower than their initial ratings by the end of the course. The repeated measures ANOVA for between-subject effects was not significant for any of the groups: (a) medical experience, \( F(1,32) = 1.18, \; ns \), (b) prior EMT-B course, \( F(1,32) = 0.02, \; ns \), and (c) prior science courses, \( F(1,32) = 2.97, \; ns \).
Summary of Findings

This portion of the study was intended to investigate whether students with previous medical experience, prior EMT-B course completion, or previous science courses would have a greater knowledge level of EMT-B material prior to the start of the course. It also intended to look at whether or not students with these experiences would outperform students without such experiences during the course. While the results of the pre-course assessment did suggest that medical experience and prior completion of an EMT-B course appears to provide students with a higher degree of knowledge related to the course material, the same association was not seen in relation to the previous completion of general science courses. This suggests that previous medical experience and EMT-B course experience could be superior in preparing students for an EMT-B course, but the results on Test 4 did not support this suggestion.

On Test 4, all students scored higher than their previous scores on the pre-course assessment. In fact, what was previously found on the pre-course assessment to be a significant difference between the average scores for the participants with and without prior EMT-B course completion was found to be no longer significant on Test 4. On the other hand, the participants with previous science courses that failed to outperform the students without on the pre-course assessment significantly outperformed the students without previous science courses on Test 4. The only consistent observation was that the
students with previous medical experience continued to significantly outperform the students without on both assessments.

Taken independently, it appears that medical experience does provide students with adequate prior knowledge and the ability to significantly outperform the students without such experience. While previous completion of an EMT-B course did appear to provide a higher degree of knowledge of the course material prior to the start of the course, it did not appear to provide a significant advantage once the course had begun. The findings that the students with previous science courses failed to outperform the students without on the pre-course assessment tends to illustrate that student performance on the pre-course assessment does not necessarily predict student performance later on during the course.

Discussion of Findings

The initial comparison was made in an attempt to compare the students’ prior knowledge via a pre-course assessment. The results of the study were not necessarily surprising as I expected the students with previous EMT-B course completion and medical experience to outperform the students without such experience. This is likely the result of these students being familiar with the medical terms, personal experiences from working in the medical field, and generally being more familiar with the material. These expectations were supported by the results of the pre-course assessment, as the students with medical experience and prior EMT-B course completion significantly outperformed the students without such experience. The unexpected finding was that the students with prior science courses did not significantly outperform the students without such courses. In fact, the students without prior science courses outperformed the students with science
courses (46% versus 44%, respectively), yet this was not found to be statistically significant. One possible explanation of this finding could simply be the lack of familiarity with the medical terms and material presented on the pre-course assessment, but 7 of the 14 students with previous science courses had previous medical experience and 4 of these 7 had also previously completed an EMT-B course. Therefore, half of this group should have had some familiarity with the medical terms and material presented on the pre-course assessment.

While the higher level of performance on the pre-course assessment by the students with previous medical experience and prior EMT-B completion does suggest that these experiences provide students with a greater EMT-B knowledge level than students without such experience, the findings are certainly not conclusive. The results of the group with previous science courses tend to contradict this suggestion when taking into account that half of the participants with previous science courses also had previous medical experience. In a larger study, specific courses could be the focus of study versus simply a generic consideration of previous science courses. This may more accurately predict the value of which science courses may best prepare students for an EMT-B course.

With the inclusion of the same 15 questions from the pre-course assessment in Test 4, it was expected that the students would perform significantly higher on these questions. In fact, all the groups scored higher on these same questions when compared to their performance on the pre-course assessment. Therefore, the true value of this portion of the study was the comparison of the groups’ overall scores on Test 4. The expectation was that the students with previous medical experience and prior EMT-B course
completion would continue to outperform the students without such experience in the same manner as they did on the pre-course assessment, but the results did not support such expectations.

As with the results from the pre-course assessment, the students with medical experience continued to outperform other students without medical experience, but the students with previous EMT-B course completion did not significantly outperform the students without EMT-B experience. The effects of such a change in performance from the pre-course assessment results may be related to the third study group, the students with and without previous science courses. On the pre-course assessment, the students with previous science courses did not outperform the students without science courses, but on Test 4 the students with previous science courses significantly outperformed the ones without.

When taking a closer look at the participants from the with and without previous science course groups, a possible explanation for why the students with previous science courses significantly improved and outperformed the ones without may be found by examining the students self-reported academic history (see Appendix G, Comparison 3). Appendix G notes that out of the students that represent the with prior science courses, 93% report having some college or higher level of college attainment, whereas only 60% of the students without prior science courses report the same. Additionally, the reported mean group-GPA of the students with science courses was 3.21 as compared to the 2.70 GPA reported by the students without. The significantly improved performance by the students with previous science courses on Test 4 may be the result of these participants being better students and having more experience with self-study and preparation than
others with only a high school education. These characteristics may also reflect that the students with science courses are higher performers, which is reflected in their higher GPA. These suggestions tend to support Hall’s and Stock’s (1995) findings that the quantity of undergraduate science courses was of no value in predicting student performance in higher level sciences courses.

While the higher performance on the pre-course assessment by the students with previous medical experience and prior EMT-B completion did suggest that these experiences provide more EMT-B level knowledge prior to the start of the course, they were not associated with higher performance during the course. The fact that the students with prior science courses significantly outperformed the other students on Test 4 suggests that academic performance and attainment may be associated with higher student performance in an EMT-B course than previous experience. On the other hand, the students with previous EMT-B course experience or medical experience may have simply not studied as hard for this one test.

These suggestive findings represent both similarities and differences from the Richardson (2000) study. The most striking difference concerns the effects of prior knowledge and experiences. In this study, students with medical experience and previous EMT-B course completion appeared to have a significant advantage over the students without such experiences on the pre-course assessment. This sharply contrasts with Richardson’s (2000) study conclusion that lower level courses did not provide an advantage. On the other hand, the findings in this study that the inexperienced students overcame poor performance on the pre-course assessment are similar to Richardson’s (2000) findings in his study. In fact, the students without previous completion of an
EMT-B course not only overcame their poor performance on the pre-course assessment, their scores on Test 4 were not significantly lower than the students with such experience. Therefore, while some of this study’s findings were similar to Richardson’s (2000) study, it did suggest that experiences that may enhance familiarity of terminology and content knowledge does provide appear to provide an advantage.

**Daily Study Reports**

**Summary of Findings**

The second research question intended to determine whether previous medical experience, prior science courses, or previous completion of an EMT-B course would affect the amount of time spent studying for an EMT-B course when compared to students without such experiences. The only significant finding in the amount of time spent studying outside of class was reflected between the students with and without the previous completion of an EMT-B course. The differences in the amount of time reported studying outside of class by the students with and without medical experience and previous science courses were not found to be significant and therefore did not appear to provide any significant advantages.

**Discussion of Findings**

In this portion of the study, I expected that students with previous medical experience, prior EMT-B course completion, and previous science courses to spend less time studying than those without. In regards to the students with previous medical and EMT-B course experience, I expected that familiarity with the medical terms and topics would provide these students with enough background knowledge that it would require less time to learn the material and prepare for the tests. In addition, I expected that the
students with previous science classes would have more familiarity with some of the medical terms, but more so, they would be more proficient at studying and therefore spend less time engaged in this activity. Yet the results of the study did not completely support these expectations.

Though the students with previous medical and EMT-B experience did spend less time studying, this was only found to be significant for the students with previous EMT-B experience. Despite the fact that the students with medical experience reported studying an average of 55 minutes per day compared to the 81 minutes spent studying by the students' without, this difference was not found to be significant. This lack of significance may have been due to the relatively small sample size and the variability of responses provided on the Daily Study Report. In regards to the previous science courses, the participants with previous science courses actually spent more time studying than the participants without, but the difference was not significant. This finding is somewhat surprising as 7 of the 14 students with previous science courses also had medical experience. Unfortunately, a study of the cumulative effect of these experiences was not performed due to the small number of participants with cumulative independent variables.

The fact that the students with previous EMT-B experience spent significantly less time studying highlights a comment I made regarding the Richardson (2000) study. In the Richardson (2000) study, the conclusion was made that the completion of a prerequisite course did not appear to offer an advantage in learning advanced material in as far as it applies to human physiology. Yet I felt as though additional non-performance based features of previous medical and prior course experience may affect behavioral
characteristics of relearning versus learning the material for the first time. In my
evaluation of the Richardson (2000) study, I suggested that students with prerequisite
courses would require less time to relearn the material than ones without. The results of
my study supported this suggestion, as the students with previous EMT-B course
experience spent significantly less time studying. Though prior EMT-B course
completion was not a prerequisite to take the EMT-B course, this does suggest that prior
knowledge and experience can affect study behaviors, as the EMT-B experienced
participants spent significantly less time studying the material.

A further observation reviewing the pre-test and post-test scores and the students’
amount of time spent studying does appear to reflect the need for studying outside of
class. In each of the three comparisons, the students who had the lowest pre-test scores
also reported the greater amount of time spent studying outside of class. The general
effect of this time spent studying appears to have a positive influence based on the
proportional increase of the average scores from the pre-test to the post test. For example,
the students without prior EMT-B course completion averaged a 41% on the pre-course
assessment, yet they increased their scores on Test 4 to 64% (see Tables 1 and 2) which
represents a 58% increase from their pre-test scores. Whereas, the students with prior
EMT-B course experience scored a 62% on the pre-course assessment but only increased
their score to a 69% on Test 4 (see Tables 1 and 2), which represents a 12% increase
from their pre-test scores. When compared to the fact that the students without prior
EMT-B course experience spent nearly double the amount of time studying on a daily
basis as compared to the students with EMT-B experience, questions arise as to the actual
benefits of prior EMT-B experience. Though the students with prior EMT-B experience
did not significantly outperform the students *without* (69% versus 64%, respectively) on Test 4, the fact that they spent nearly half the study time does appear to suggest an advantage of prior knowledge and experience that is not apparent by looking only at the performance on Test 4. These suggestive findings counter the conclusion that Richardson (2000) made implying that the previous completion of an lower level Human Anatomy and Physiology course provides no advantage. Certainly if a student who has completed a lower level course requires only half the study-time to score the same as other students without a lower level course that less time spent is arguably an advantage.

This study only partially supports the suggestion that study behavior is an important characteristic to consider when determining possible prerequisites for more advanced courses. Though the larger amount of study time reported by the inexperienced students could be responsible for their improved performances on Test 4, the differences reported by the groups was only found to be significant for the students *without* prior EMT-B course experience. Other factors that may have affected the results of the comparison may be related to the students’ time management skills or obligations outside of class, and may not be directly related to the students’ previous experiences. Though the study does suggest that even students *without* medical and EMT-B backgrounds can learn the material, these students appeared to require larger amounts of time to learn the material as compared to the students *with* these experiences.
Time Based Survey Results

Summary of Findings

This portion of the study intended to investigate whether previous completion of an EMT-B course, medical experience, or prior science courses would positively affect the participants’ self-efficacy in regards to preparedness, expected difficulty of the course, and confidence perceived and reported by the students as compared to students without such experience. Though all groups of students reported a significant decrease in the perceived levels of preparedness and confidence in their ability to pass the course and the NREMT-B exam, there was not a significant change in the students perceived level of difficulty. In addition, none of the comparisons noted a significant interaction effect between the groups and their perceptions over time. These findings tend to suggest that regardless of the previous experiences, all students tended to significantly overestimate their level of preparedness, and all initially provided inflated confidence ratings.

When looking at the differences between the individual ratings provided by the different groups, the study noted a number of significant findings. In regards to the perceived level of preparedness, there was not a significant difference between the groups on the pre-course survey in any of the comparisons, but on the mid- and end-of-course surveys the differences between the students with and without medical experience were determined to be significant. In both instances, the students with medical experience reported a significantly higher level of preparedness as compared to the students without. When examining the perceived level of difficulty, the students without medical experience reported the course being significantly more difficult on each of the surveys when compared to the students with medical experience. Also worth mentioning was that
there was a significant difference among all the comparisons for the levels of difficulty reported on the mid-course survey. In each comparison, the inexperienced students rated the perceived level of difficulty significantly higher than the experienced students, but by the end-of-course survey, only the comparison concerning medical experience was still significant.

The majority of the confidence ratings provided by the students were not found to be significantly different among the comparisons. The only exception noted was in the level of confidence reported in the comparison regarding previous science courses. Though the pre-course ratings of confidence in the ability to pass the National Registry were not significantly different between the students with and without previous science courses, the students with previous science courses did rate their level of confidence higher than the students without (3.71 vs. 3.60 respectively). The difference in the comparison of this group becomes significant by the mid-course survey (3.50 vs. 2.70, respectively) and remains significant on the end-of-course survey (3.29 vs. 2.60).

Taking the results of this portion of the study independently, it appears that medical experience is useful in helping students more accurately predict their perceived level of preparedness and the level of difficulty in an EMT-B course. Surprisingly, this insight did not appear to apply to the students that had previously taken an EMT-B course despite the fact that these same seven students also belonged to the group having medical experience. In regards to confidence ratings, the experience gained from previous science course appears to lend confidence to students when predicting their performance on the NREMT-B exam.
Discussion of Findings

In this portion of the study, I expected the experienced students to be more consistent with their self-efficacy ratings regarding their level of preparedness, perceived difficulty of the course, and their confidence ratings. I especially expected this of the students that had previously taken an EMT-B course, but even these students reported confidence levels lower than their initial ratings. A likely explanation of the significant variance among the rating over time for preparedness and confidence ratings may be related to their performance in the course. On Table 2, the reported averages for all of the groups were 70% or less, and since the minimum score to pass the course is 70%, this likely resulted in many students’ subsequent decrease in self-efficacy. Unfortunately, the students’ overall averages in the course were not recorded for this study and the scores on Test 4 may not represent the students’ actual averages. This lack of data concerning the students’ overall course performance excludes such comparisons.

The lack of significant difference in the confidence ratings among the comparison groups was somewhat surprising. I had expected the inexperienced students to initially provide inflated confidence ratings in their ability to pass the course and the National Registry, but the initial differences between the experienced and inexperienced groups were not significant, and in fact all the groups’ ratings were initially inflated. The only significant differences on the confidence ratings were found between the students with and without previous science courses regarding their confidence in their ability to pass the NREMT-B exam. This is possibly related to the students’ previous academic performance.
As mentioned in Appendix G, the students with previous science courses averaged a 3.21 GPA compared to the 2.70 GPA of the students without. Taken by itself, the higher GPA may give these students more confidence in their ability to pass and take challenging courses. The additional level of academic attainment reported by the students with science courses may also reflect more confidence in high-stakes testing, as many colleges and universities require SAT or ACT scores for admission. These prior experiences may be responsible for why the students with prior science courses reported higher and more consistent confidence ratings regarding their expected performance on the NREMT-B exam.

The fact that all the groups tended to overestimate their level of preparedness tended to support McCoy’s and Pierce’s (2004) findings that strict enforcement of prerequisite policies was associated with a decrease in the number of student failures and withdrawals. As even the experienced students initially overestimated their level of preparedness for the EMT-B course, the study suggests that students are not accurate predictors of their levels of preparedness. In programs that have prerequisite courses, allowing students to decide whether or not they are prepared enough for a higher level course could result in students enrolling without having adequate skills or prior knowledge vital to the completion of the course. The students without a necessary prerequisite course may overestimate their level of preparedness and enroll in a class that they may experience significant difficulty with or eventually drop. In programs where the availability of seats in the higher level courses is limited, strict enforcement of prerequisites may be a necessary means.
The problem of limited seat availability was noted at the beginning of this study as there were over 25 additional students waiting for a seat in the EMT-B course to open up. Filling these seats with the most prepared students or students with the greatest likeliness of success could decrease failure rates and possibly improve overall performances in this course. My study tends to suggest that simply allowing these students to enroll based on their perceived levels of preparedness and confidence may contribute to poor performances in this course.

**General Limitations**

Clearly the greatest limitation with this study is related to the sample size of the participants. The small number of participants certainly increases the probability of making a Type II error from the results. The small sample size also precluded any possible study of the cumulative effects of the independent variables as the number of participants in each cumulative group would be very small. A multivariate multiple linear regression analysis could be an effective way to evaluate these cumulative effects, but the small number of participants in this study precluded such analysis. Therefore, the findings from this study are only suggestive of certain relationships, but they can still be useful in identifying future avenues of research.

Another notable limitation to this study was that the independent variables were very encompassing. Clearly there is broad range of occupations that would fall under the independent variable of medical experience. Medical experience represents various medical occupations from nursing assistants to neurosurgeons, and clearly the degree of knowledge and experience gained from such occupations can vary significantly. Therefore, taking a closer look at specific medical occupations could be much more
effective at identifying beneficial medical experience. This same limitation would apply to the science courses the participants reported, as science courses include a broad range of topics from a simple introductory biology course to advanced courses in human genetics or embryology. Unfortunately, the small sample size of this study precluded the investigation of individual science courses.

In regards to the composition of the sample, the fact that there were no female participants in the study lessens the value of the suggestive findings and prevents them from being universally applicable to all students. Clearly the results of this study are only representative of adult males between the ages of 19 and 54 years of age. A different study encompassing a more equivalent gender ratio may reveal significantly different findings and identify additional avenues of research.

Future Directions

This study only intended to make suggestions as to the value of two general types of occupational experience (medical or non-medical) and the general effects of science courses in preparing students for an EMT-B course. As this study's findings are only suggestive and did not identify one specific independent variable as being significantly superior in preparing students for an EMT-B course, future research taking a look at the cumulative effect of these independent variables may reveal more significant and conclusive findings. Additionally, a larger study examining specific science courses or individual occupations may be lead to valuable insights as to which ones may best prepare students for success in an EMT-B course. Particular science courses, such as Anatomy and Physiology, may be demonstrated as being very valuable in preparing students for an EMT-B course. Another course worth studying that my better prepare
EMT-B students could be a medical terminology course, as it is intended to familiarize students with the medical terms and teach medical shorthand skills. As medical experience appeared to provide a significant advantage prior to the start of the course and continued to provide these students with a higher level of self-reported preparedness, courses that develop familiarity of medical terms and basic medical concepts could be very effective at better preparing students for an EMT-B course.
APPENDIX A

Adult Consent Form for Study Participation:
Study of Prior Course Experience and Academic Achievement

You are being asked to participate in an educational research project called, "Prior Course Experience and Academic Achievement." The purpose of this project is to learn about the advantages and disadvantages of previous course experience and how it affects students study behaviors and dispositions. The goal of this study is to identify behavioral characteristics that may be associated with prerequisite type courses or prior course experience. Your participation in the study will serve to provide instructors with more accurate expectations of student behavior in relation to previous course experience.

If you agree to participate in this study, you will be asked to fill out a few surveys, record study habits, and take a short 15 question multiple-choice test. The 15 question multiple-choice test will be from material that will be covered in the EMT course. The purpose of this test is to establish your knowledge of this material before the course starts. Your individual performance on this test will not influence your grade in any way, and will be kept confidential. This test is expected to take less than 10 minutes. You will also be asked to complete an initial survey regarding your experience, educational level, and prior educational performance. This initial survey will also gather information about your confidence level, perceived difficulty levels, and expectations. This portion of the survey will be redistributed to you weekly to identify any changes in your perceptions. The final aspect of this study will be a requirement for you to record the amount of time you spend outside of class studying for this course on a daily basis. This information will be gathered weekly. Again, this personal information will be kept confidential and will not be shared with the course instructors.

Your responses on all surveys and tests will be confidential to the extent allowed by the law and the survey information is to be used for data analysis purposes only and will be destroyed after this project is completed. You will not be identified in anything that comes from this research project.

Your participation is voluntary and you will not be compensated in any way. There are no foreseeable risks associated with your participation. You are free to decide to not answer any questions that you do not choose to answer, and you may withdraw from this study at any time.

If you have any questions about this research project, please contact CPT Brian Burk, Graduate Student in Educational Psychology Department at the University of Hawaii at Manoa, at 277-2027 or email, brian.e.burk@us.army.mil. You may also contact Dr. Marie Iding, Associate Professor in Educational Psychology, University of Hawaii, at 956-7507 or by email, miding@hawaii.edu. If you have any questions about your rights as a participant in this project, you may contact the University of Hawaii, Committee on Human Studies, 2540 Maile Way, Spalding 253, Honolulu, HI 96822. Phone: (808) 956-5007

Please sign and date the bottom of this form if you agree to participate in this study. If you elect to participate in this study, you will be provided a copy of this form for future reference.

Printed Name: ___________________________ Date: _________________
Signature: ___________________________ Student No# ____________
APPENDIX B

Intake Survey
The information provided will be kept confidential and is for research purposes only.
Upon completion of this research, all information will be destroyed.

Student # ___________ (This is identifier used by the EMT program)

1. Age (on last birthday) ______ → → Gender: (please circle one) Male or Female

2. Active Duty Military? No__ Yes__ → → If yes, branch of service______________
   ↓
   ↓
   Military Job Specialty__________
   ↓
   ↓
   (please describe “medic”, not just “91W”)
   ↓
   ↓
   Pay Grade__________________

   What is your current occupation? ____________________________________________

3. How long have you been working in your current occupation? ____ Years ____ Months

4. Have you previously taken and completed an EMT-Basic course (This includes AIT training at Fort Sam Houston for combat medic)? No_____ (if no, go to question #2)
   Yes_____ (if yes, proceed to next question)
   a. If yes, did you pass the course? Yes_____ No____
   b. How long has it been since you completed the EMT-B course? ____ Years ____ Months
   c. Did you take the National Registry? Yes_____ No____
   d. If so, did you pass the National Registry Exam? Yes_____ No_____ N/A____
   e. Are you taking this course because your certification expired? Yes_____ No____

2. What is the highest level of education that you have completed?
   ______ High school graduate/GED
   ______ some college
   ______ two year degree or equivalent
   ______ 4 year degree or equivalent
   ______ graduate degree

3. What was your average level of performance in school (please mark only one)?
   ______A’s ______A/B’s ______B’s ______B/C’s ______C’s ______C/D’s ______D’s

4. Have you taken any of the following college-level courses (Put an X by classes taken)?
   ______ Human Anatomy and Physiology GPA____
   ______ Nursing courses GPA____
   ______ Biology courses GPA____
   ______ Chemistry courses GPA____
   ______ NONE OF THE ABOVE/NOT APPLICABLE
Please circle one of the following numbers that best corresponds to your answer:

5. On a scale of 1-5, how prepared do you feel you are for this course?

   Not at all  Somewhat  Moderately  Mostly  Extremely
   1           2          3          4          5

6. On a scale of 1-5, how difficult do you feel this course is going to be?

   Not at all  Somewhat  Moderately  Mostly  Extremely
   1           2          3          4          5

7. On a scale of 1-5, how confident do you feel that you are going to pass this course?

   Not at all  Somewhat  Moderately  Mostly  Extremely
   1           2          3          4          5

8. On a scale of 1-5, how confident do you feel that you are going to pass the National Registry?

   Not at all  Somewhat  Moderately  Mostly  Extremely
   1           2          3          4          5
APPENDIX C

Correct answers are identified by bold print and italicized for the purposes of the thesis report.

PRE-COURSE ASSESSMENT

Please circle the best answer to the following questions. If you change a response, please make sure that your actual answer to the question is clearly identified.

***The answers to these questions will not be discussed at the completion of this test. Your answers will remain confidential and completely separate from this course. The results of this pre-course assessment will not be provided until the EMT-B course is over.

STUDENT #________

1. Hyperventilation could be associated with all of the following, EXCEPT:
   A) a narcotic overdose.
   B) a respiratory infection.
   C) an overdose of aspirin.
   D) high blood glucose levels.

2. You are transporting a 33-year-old male who was involved in a motor-vehicle crash. You have addressed all immediate and potentially life-threatening conditions and have stabilized his condition with the appropriate treatment. With an estimated time of arrival at the hospital of 20 minutes, you should:
   A) reassess your interventions.
   B) arrange for an ALS rendezvous.
   C) perform a detailed physical exam.
   D) reassess his condition in 15 minutes.

3. A 75-year-old male with a history of insulin-dependent diabetes presents with chest pain and a general feeling of weakness. He tells you that he took his insulin today and ate a regular meal approximately 2 hours ago. You should treat this patient as though he is experiencing:
   A) hypoglycemia.
   B) an acute stroke.
   C) hyperglycemia.
   D) a heart attack.

4. A 19-year-old male was stung multiple times by fire ants. He is experiencing obvious signs and symptoms of anaphylactic shock. You administer 100% oxygen and give him epinephrine via subcutaneous injection. Upon reassessment, you determine that his condition has not improved. You should:
   A) transport him immediately and provide supportive care while en route.
   B) consider that he may actually be experiencing an acute asthma attack.
   C) repeat the epinephrine injection after consulting with medical control.
   D) request a paramedic unit that is stationed approximately 15 miles away.
5. You are assessing a 30-year-old woman who is 35 weeks’ pregnant. She tells you that her amniotic sac has not ruptured, but she is experiencing irregular contractions that “come and go.” Upon visual inspection, you note a small amount of brown mucus draining from her vagina. You should:
   A) allow her to drive to the hospital.
   B) **administer oxygen and transport.**
   C) prepare for an emergency delivery.
   D) perform a rapid medical assessment.

6. You and your partner arrive at the scene of a house fire where fire fighters have rescued a 50-year-old male from his burning house. The patient has superficial and partial-thickness burns to his face and chest. His nasal hairs are singed and he is coughing up sooty sputum. You should be most concerned with:
   A) treating him for hypothermia.
   B) preventing the risk of infection.
   C) estimating the extent of his burns.
   D) **the potential for airway swelling.**

7. You have administered one dose of epinephrine to a 40-year-old female to treat an allergic reaction that she developed after being stung by a scorpion. Your reassessment reveals that she is still having difficulty breathing, has a decreased mental status, and has a blood pressure of 80/50 mm Hg. You should:
   A) monitor her en route to the hospital and call medical control if she worsens.
   B) crush up an antihistamine tablet and place it in between her cheek and gum.
   C) **request permission from medical control to give another dose of epinephrine.**
   D) administer a nebulized bronchodilator to improve the status of her breathing.

8. Angina pectoris occurs when:
   A) a coronary artery is totally occluded by plaque.
   B) **myocardial oxygen demand exceeds the supply.**
   C) one or more coronary arteries suddenly spasm.
   D) myocardial oxygen supply exceeds the demand.

9. Risk factors for a myocardial infarction that CANNOT be controlled include:
   A) excess stress.
   B) hyperglycemia.
   C) **family history.**
   D) lack of exercise.

10. Common signs and symptoms of acute hyperventilation syndrome include:
    A) altered mental status and bradycardia.
    B) unilateral paralysis and slurred speech.
    C) anxiety, dizziness, and severe bradypnea.
    D) **tachypnea and tingling in the extremities.**
11. Your patient is a 55-year-old female with a history of emphysema and congestive heart failure. As you assess her, you notice that she is cyanotic and has severely labored respirations. In between her broken sentences, she states that she has a prescribed inhaler. You should:
   A) begin ventilatory assistance and contact medical control.
   B) administer the medication and obtain a set of vitals.
   C) apply a nonrebreathing mask and administer her inhaler.
   D) ask the patient when she last used her prescribed inhaler.

12. You are transporting a 49-year-old male with “tearing” abdominal pain. You are approximately 30 minutes away from the closest hospital. During your ongoing assessment, you determine that the patient’s condition has deteriorated significantly. You should:
   A) begin ventilatory assistance with a BVM device.
   B) immediately perform a detailed physical examination.
   C) continue transporting and alert the receiving hospital.
   D) Consider requesting a rendezvous with an ALS unit.

13. Albuterol is a generic name for:
   A) Alupent.
   B) Atrovent.
   C) Proventil.
   D) Singulair.

14. During the initial assessment of a semiconscious 70-year-old female, you should:
   A) insert a nasopharyngeal airway and assist ventilations.
   B) immediately determine the patient’s blood glucose level.
   C) ask family members if the patient has a history of stroke.
   D) ensure a patent airway and support ventilation as needed.

15. Following the delivery of a full-term baby, you have properly cared for the baby and have clamped and cut the umbilical cord. During transport, you note that the mother is experiencing moderate vaginal bleeding. You should:
   A) elevate her legs 6” to 8” and cover her with a blanket.
   B) firmly massage the uterine fundus with a circular motion.
   C) carefully insert a sterile trauma dressing into her vagina.
   D) place her legs together and position her on her left side.

Thank you again for participating in this educational research. Your information and answers you have provided will hopefully improve future educational approaches.
APPENDIX D

Daily Study Report

Report of Study Time (Please report via hours and minutes, please be specific)

Student # __________

Week # 1

How much time did you spend studying on Monday (5/8)?  Hours__  Minutes__
How much time did you spend studying on Tuesday (5/9)?  Hours__  Minutes__
How much time did you spend studying on Wednesday (5/10)?  Hours__  Minutes__
How much time did you spend studying on Thursday (5/11)?  Hours__  Minutes__
How much time did you spend studying on Friday (5/12)?  Hours__  Minutes__
How much time did you spend studying on Saturday (5/13)?  Hours__  Minutes__
How much time did you spend studying on Sunday (5/14)?  Hours__  Minutes__

Please be as accurate as possible with your reported study time. Your response will
not benefit or harm your grade regardless of the amount of time reported.

Week #2

How much time did you spend studying on Monday (5/15)?  Hours__  Minutes__
How much time did you spend studying on Tuesday (5/16)?  Hours__  Minutes__
How much time did you spend studying on Wednesday (5/17)?  Hours__  Minutes__
How much time did you spend studying on Thursday (5/18)?  Hours__  Minutes__
How much time did you spend studying on Friday (5/19)?  Hours__  Minutes__
How much time did you spend studying on Saturday (5/20)?  Hours__  Minutes__
How much time did you spend studying on Sunday (5/21)?  Hours__  Minutes__

This form will be collected on Monday, May 22nd. Keep this form confidential.
Please do not share your information with other students or instructors.
Daily Study Report

Report of Study Time (Please report via hours and minutes, please be specific)
Student # ____________

Week # 3

How much time did you spend studying on Monday (5/22)? Hours___ Minutes___
How much time did you spend studying on Tuesday (5/23)? Hours___ Minutes___
How much time did you spend studying on Wednesday (5/24)? Hours___ Minutes___
How much time did you spend studying on Thursday (5/25)? Hours___ Minutes___
How much time did you spend studying on Friday (5/26)? Hours___ Minutes___
How much time did you spend studying on Saturday (5/27)? Hours___ Minutes___
How much time did you spend studying on Sunday (5/28)? Hours___ Minutes___

Please be as accurate as possible with your reported study time. Your response will not benefit or harm your grade regardless of the amount of time reported.

Week #4

How much time did you spend studying on Monday (5/29)? Hours___ Minutes___
How much time did you spend studying on Tuesday (5/30)? Hours___ Minutes___
How much time did you spend studying on Wednesday (5/31)? Hours___ Minutes___

This form will be collected on Thursday, June 1st. Keep this form confidential. Please do not share your information with other students or instructors.
APPENDIX E

Mid-Course Survey

Student #__________

Please circle one of the following numbers that best corresponds to your answer:

On a scale of 1-5, how prepared do you feel you were for this course?

Not at all  Somewhat  Moderately  Mostly  Extremely
1          2            3         4         5

On a scale of 1-5, how difficult is this course?

Not at all  Somewhat  Moderately  Mostly  Extremely
1          2            3         4         5

On a scale of 1-5, how confident do you feel that you are going to pass this course?

Not at all  Somewhat  Moderately  Mostly  Extremely
1          2            3         4         5

On a scale of 1-5, how confident do you feel that you are going to pass the National Registry?

Not at all  Somewhat  Moderately  Mostly  Extremely
1          2            3         4         5
APPENDIX F

End-of-Course Survey

Student #__________

Please circle one of the following numbers that best corresponds to your answer:

On a scale of 1-5, how prepared do you feel you were for this course?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>Mostly</th>
<th>Extremely</th>
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<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
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</table>

On a scale of 1-5, how difficult is this course?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>Mostly</th>
<th>Extremely</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</tbody>
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On a scale of 1-5, how confident do you feel that you are going to pass this course?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>Mostly</th>
<th>Extremely</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</tbody>
</table>

On a scale of 1-5, how confident do you feel that you are going to pass the National Registry?

<table>
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<tr>
<th>Not at all</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>Mostly</th>
<th>Extremely</th>
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</thead>
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<td>3</td>
<td>4</td>
<td>5</td>
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# APPENDIX G

**ACADEMIC ATTAINMENT**

## Levels of Academic Attainment for Participants in Comparison #1

<table>
<thead>
<tr>
<th>Self-reported level</th>
<th>With</th>
<th>Without (Medical Experience)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School or equivalent</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Some college</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>2-year degree or equivalent</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4-year degree or equivalent</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>1</td>
<td>0</td>
</tr>
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- n=12
- n=22
- N=34

Self-reported GPA (group average): 2.88 (On a 4-Point Scale)

## Levels of Academic Attainment for Participants in Comparison #2

<table>
<thead>
<tr>
<th>Self-reported level</th>
<th>With</th>
<th>Without (prior EMT-B Course)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School or equivalent</td>
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<td>6</td>
</tr>
<tr>
<td>Some college</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>2-year degree or equivalent</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4-year degree or equivalent</td>
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<td>1</td>
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<tr>
<td>Graduate degree</td>
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<td>1</td>
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- n=7
- n=27
- N=34

Self-reported GPA (group average): 2.86 (On a 4-Point Scale)

## Levels of Academic Attainment for Participants in Comparison #3

<table>
<thead>
<tr>
<th>Self-reported level</th>
<th>With</th>
<th>Without (prior Science courses)</th>
</tr>
</thead>
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<tr>
<td>Some college</td>
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<td>10</td>
</tr>
<tr>
<td>2-year degree or equivalent</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4-year degree or equivalent</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

- n=14
- n=20
- N=34

Self-reported GPA (group average): 3.21 (On a 4-Point Scale)

Science GPA: 3.28 (N/A)
REFERENCES


