EFFECTS OF DIFFERENT INSTRUCTIONAL METHODS AND TIME ON STUDENTS' COGNITIVE, AFFECTIVE, AND PSYCHOMOTOR BEHAVIORS OF FIRST AID

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ABSTRACT

EFFECTS OF DIFFERENT INSTRUCTIONAL METHODS AND TIME ON STUDENTS' COGNITIVE, AFFECTIVE, AND PSYCHOMOTOR BEHAVIORS OF FIRST AID

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Many research studies have shown that first aid education is important to save lives of individuals, but first aid skills are deficient in a society. A variety of instructional methods were introduced to increase the people who are equipped with first aid skills. However, it is still a debate over the best method of teaching first aid. Therefore, this dissertation aimed to analyze the effects of various instructional methods (traditional, case-based and web-based) on acquisition and retention of first aid cognitive, psychomotor and affective behaviors. Ninety participants (52 female, 48 male) included in the study were the second (n=3), the third (n=44), and the fourth (n=43) year students selecting first aid as an elective course at Middle East Technical University. As the course student list built up for those who would take the course, they were assigned to one of the three groups randomly before the treatment started: Group I-Traditional instruction (30 students), Group II-Case-based instruction (30 students), and Group III-Web-based instruction (30 students). Data were collected by using "First Aid Cognitive Behavior Test", First Aid Psychomotor

Behavior Tests (skill reporter manikin and skill checklist)", First Aid Affective Behavior Scale", and qualitative interviews. All students in each instruction group were tested three times Statistical analyses included the Mixed Factorial ANOVA to examine the effects of independent variables (instructional methods and time) on dependent variables (first aid cognitive, psychomotor and affective behaviors). Results showed that instructional method had similar effect on students' first aid cognitive behaviors. However, students' in traditional instruction group got higher scores compared to case-based and web-based instruction groups in retention test. In terms of first aid psychomotor behaviors, CPR performance, including chest compressions and ventilations, of web-based instruction group was poor compared to traditional and case-based instruction groups. Similarly, CPR and Recovery Position performance was deprived in web-based instruction group. Retention time negatively affected to psychomotor behaviors of students in most of the skills. In terms of first aid affective behaviors, students' scores were affected by characteristics of the casualty, characteristics of the first aider, characteristics of the event, and some other factors, however mean scores of students in three instruction groups were close to the "no effect" preference in the first aid affective behavior scale.

Keywords: Instructional Methods, First Aid, CPR, Recovery Position

ÖZ

FARKLI ÖGRETİM YÖNTEMLERİ VE ZAMANIN ÖGRENCİLERİN İLKYARDIM BİLİŞSEL, DUYUŞSAL, VE PSİKOMOTOR DAVRANIŞLARI ÜZERİNE ETKİSİ

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İlkyardım eğitiminin insan yaşamını kurtarmadaki önemi pek çok çalışmada vurgulanmasına rağmen, toplumda ilkyardım becerileri yetersizdir. İlkyardım becerilerine sahip kişi şayisini arttırmak için pek çok öğretim yöntemi önerilmiştir. Ancak, ilkyardım öğretimi konusunda en etkin yöntem hala tartışılmaktadır. Bu yüzden, bu tez çeşitli öğretim yöntemlerinin ilkyardım bilişsel, duyuşsal ve psikomotor davranışları kazanımı ve bu davranışların hatırlanması üzerine etkilerini incelemeyi amaçlamıştır. Çalışmaya katılan 90 kişi (52 bayan, 48 erkek) Ortadoğu Teknik Universitesi'nde ilkyardım dersini seçmeli olarak alan 2.nci (n=3), 3.üncü (n=44), ve 4.üncü (n=43) sınıf öğrencilerinden oluşmaktadır. Çalışmaya başlanmadan önce, dersi alacak öğrenci listesi oluşturulduktan sonra, öğrenciler farklı öğretim yöntemlerinin uygulanacağı 3 gruba; Grup I Geleneksel (30 öğrenci), Grup II-Vaka-destekli (30 öğrenci) ve Grup III-Web-tabanlı (30 öğrenci), rasgele yerleştirilmişlerdir: Veriler "ilkyardım bilişsel davranış testi", "ilkyardım psikomotor davranış testleri (beceri performans maketi ve beceri davranışı gözlem

formu" ve "ilkyardım duyuşsal davranış ölçeği ve nitel görüşmeler" kullanılarak toplanmıştır. Üç ayrı öğretim yöntemi grubundaki tüm öğrenciler, nitel görüşmeler dışında, aynı veri toplama araçları kullanılarak üç kez test edilmişlerdir. Bağımsız değişkenlerin (öğretim yöntemleri ve testler) bağımlı değişkenler (ilkyardım bilişsel, duyuşsal ve psikomotor davranışları) üzerindeki etkisini incelemek amacı ile veriler Karışık Faktöriyel Varyans Analizi kullanılarak yapılmıştır. Tez bulguları kullanılan 3 ayrı öğretim yönteminin öğrencilerin ilkyardım bilişsel davranışları benzer seviyede etkisi olduğunu ortaya koymuştur. Bununla birlikte, 18 haftalık zaman aralığının öğrencilerin ilkyardım bilgilerini hatırlama düzeyleri üzerine olumsuz etkisi bulunurken, özellikle geleneksel yöntemle eğitim alan gruptaki öğrencilerin vaka-destekli ve web-tabanlı eğitim alan gruptaki öğrencilerden anlamlı biçimde yüksek puan aldıkları görülmüştür. İlkyardım psikomotor davranışları acısından ele alındığında web-tabanlı eğitim alan öğrencilerin kalp masajı ve suni solunum becerilerinde geleneksel ve vaka-destekli eğitim alan grup öğrencilerine oranla daha başarısız olduğu ortaya çıkmıştır. Benzer şekilde, web-tabanlı eğitim alan öğrencilerin, geleneksel ve vaka-destekli eğitim alan öğrencilere oranla CPR ve koma pozisyonu konularındaki performansları da daha düşük çıkmıştır. Bunlara ek olarak, 18 haftalık zaman aralığı da tüm öğrencilerin hatırlama düzeylerine olumsuz yönde etki etmiştir. İlkyardım duyuşsal davranışları açısından bakıldığında, öğrencilerin yaralının, ilkyardımcının, ve kazanın özelliklerinden etkilendikleri istatistik analiz sonucunda ortaya çıkmasına rağmen, ortalama elde ettikleri değerlerin belirtilen bu faktörlerin aslında öğrencilerin yaralıya müdahale etme konusunda "etkisiz" oldukları sonucunu göstermektedir.

Anahtar Kelimeler: Öğretim Yöntemleri, İlkyardım, Temel Yaşam Desteği, Koma Pozisyonu

To Assoc. Prof. Dr. Ahmet Ok

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LIST OF ABBREVIATIONS

ABBREVIATION

AED:	Automated External Defibrillator
AHA:	American Heart Association
AIDS:	Acquired Immune Deficiency Syndrome
ANOVA:	Analysis of Variance
ARC:	American Red Cross
BCLS:	Basic Cardiac Life Support
CPR:	Cardiopulmonary Resuscitation
CumGPA:	Cumulative Grade Point Average
Df:	Degree of Freedom
ECC:	Emergency Cardiovascular Care
ERC:	European Resuscitation Center
F:	F Statistic
G:	Group
GDDS:	General Directorate of Disaster Affairs
GDH:	Turkish General Directorate of Highways
HIV:	Human Immunodeficiency Virus
HSD:	Tukey's Honestly Significant Difference
ILCOR:	International Liaison Committee on Resuscitation
KGM:	Turkish General Directorate of Highways
KR-21:	Kuder Richardson 21
M:	Mean
MD:	Mean Difference
METU:	Middle East Technical University
MMR:	Mouth to Mouth Resuscitation
MMV:	Mouth to Mouth Ventilation

MS:	Mean Square
N:	Sample Size
P:	Significance Level
S:	Student
SD:	Standard Deviation
SE:	Standard Error
SS:	Sum of Squares
T:	T Statistic
TRC:	Turkish Red Crescent
TURKSTAT:	Turkish Statistical Institute
USA:	United States of America
USGS:	United States Geological Survey Earthquake Hazards Program
WHO:	World Health Organization
η^2:	Eta Squared

CHAPTER I

INTRODUCTION

1.1 Background

Common causes of death include heart diseases, traffic accidents, occupational accidents, natural disasters, unintentional injuries, suicides, terrorist attacks, and war. Especially traffic accidents constitute a major public health problem that causes deaths and disabilities in the world. It was documented by the World Health Organization (WHO) (2008) that the road traffic accidents were a global public health problem causing 1.2 million deaths and 50 million injured worldwide each year. Similarly in Turkey, every year thousands of people experienced traffic accidents. According to the statistics of Turkish General Directorate of Highways (GDH) (2007), 4.633 deaths and 168.550 injuries occurred because of 728.756 accidents in 2006. As users of roads, all people whether a pedestrians or drivers are at risk of death or injury because of traffic accidents. In the case of traffic accidents people who are present at the accident area or those who arrive first play an important role for the survival of the casualties. Since accidents are unintentional, unexpected, and undesirable events, it would be better to equip as many people with essential life saving skills in the society in order to decrease the number of deaths and injuries.

Furthermore, cardiovascular diseases, particularly coronary heart diseases and stroke, are very critical life threatening conditions affecting about 17 million individuals a year throughout the world (Mackay & Mensah, 2004). According to the Turkish Statistical Institute (TURKSTAT) (2007), in Turkey, an estimated 99072 people (51689 males and 47383 females) died from cardiovascular diseases in 2006. Additionally, cardiovascular diseases caused 85% of total deaths (116923) in 2006.

During cardiac emergencies immediate first aid procedures were the most important life saving actions that should be provided as quickly as possible until emergency medical personnel's arrival.

Earthquakes are also one of the natural disasters that cause high mortality rate and injured people. According to the scientific data gathered by the U.S. Geological Survey Earthquake Hazards Program (USGS) (2008), the most recent destructive earthquake occurred in Indonesia causing 5.749 deaths and 38.568 injured in 2006. In Pakistan, an earthquake killed about 86.000 and injured 69.000 people in 2005. Additionally, the Sumatra earthquake in 2004 reported to be the 4th largest earthquake in the world since 1964. It caused approximately 227.898 deaths. In Southeastern Iran, about 31.000 people died and 30.000 were injured because of earthquake in 2003. Turkey, being in the most active earthquake region, experienced damaging earthquakes frequently. For example, Erzincan earthquake, in 1939, reported as the deadliest earthquake in Turkey's history, resulting in approximately 32.700 deaths (USGS, 2007). İzmit earthquake, on 17 August 1999, was resulted in approximately 17.118 deaths and more than 50.000 injured (USGS, 2007; Jalali, 2002; Kale-Kostuvali, 2007). Additionally, statistical reports by the Bağcı, Yatman, Özdemir, and Altın, (1991) (as cited in. General Directorate of Disaster Affairs (GDDA), 2007) revealed that 58.202 people died and 122.096 people were injured in last 58 years because of the earthquakes.

The above mentioned data demonstrated that health related disorders, accidents, emergencies and earthquakes as one of the most destructing natural disasters are unexpected, frightening and destructive events that cause many deaths and injured people. Additionally, thousands of people die and many more suffer from emergency conditions due to insufficient and timely first aid to intervene in emergency cases. When a person is injured with any of the life threatening emergency events, actions taken by the bystanders are often important to prevent the worsening of the situation because it is known that arrival of the professional help takes time. On the other hand, it takes very short time (only three to four minutes) for a blocked airway to kill

someone, but it can take more than eight minutes for an ambulance to arrive on the scene (Engeland, Roysamb, Smedslund, & Soogard, 2002). For example, in Turkey, emergency medical service was activated for 590.803 of the total emergency events in 2005 (Sofuoğlu, 2006). In 490.160 of these cases, emergency medical service arrived at the emergency area between 0-10 min, in 33.904 of events 11-20 min, in 8.686 of the cases 21-30 min, in 5.413 of the cases 31-60 min, and in 1.640 of the cases 61 min and over. The period between the time of emergency event and the arrival of the professional help is very important to discriminate between the life and death.

Simple first aid procedures such as opening airway, application of pressure on wound to stop bleeding, or conducting cardiopulmonary resuscitation (CPR) can save someone's life while one is waiting for medical help (Thoren, Axelsson, Herlitz, 2004). Thus, immediate action should be taken by bystanders at the site of the accident. This immediate help provided to sick or injured person is called as First Aid (Van De Velde et al., 2007). However, it was stated that, people should be trained in First Aid in order to be entitled as first aider. First Aid training consists of procedures and techniques, requiring minimal or no equipment, that can be taught to the general public in basic First Aid courses (Van De Velde et al., 2007). Although history of first aid extends to the prehistoric age, it has only 120 years as a profession (Pearn, 1994). It was developed to stop bleeding, to stabilize broken bones, cuts and abrasions which mostly occurred in battles. Over time, knowledge and skills related with first aid were developed and it grew to be the most important life saving procedures during emergency situations.

First aid focuses on active content rather than passive theoretical information. However, in order to apply these skills during emergency conditions, acquisition of theoretical knowledge is necessary. Acquisition of first aid knowledge and transfer into practical skills is a key to improve the survival of the casualties and prevent the worsening of life-threatening conditions. Even though it was crucial to gather knowledge in first aid, most of the studies revealed poor results. For example,

Larsson, Martelson, and Alexanderson (2002) examined 2800 randomly selected persons' first aid knowledge in Sweden. The results of the questionnaire showed that the greater portion of the individuals had not taken any first aid training during the previous five years. Another example of poor first aid knowledge among population was reported by Conrad and Beattie (1996). Their study revealed that pediatric first aid knowledge was deprived and only 13% of the participants correctly answered the questions. It was also documented that in the Australian population (n= 1489), people's knowledge related with cardiac emergencies insufficient. Gagliardi, Neighbors, Spears, Byrd and Snarr (1994) evaluated the first aid knowledge of public school teachers. Similarly, it was documented that low percentage of teachers had basic first aid knowledge. Research studies in Turkey also indicated low percentage of first aid knowledge among preschool educators (Dincer, Atakurt, & Simsek, 1998), primary school teachers (Başer, Çoban, Taşci, Sungur, & Bayat, 2007), physical education teachers (Korkusuz, Tüzün, & Saraç, 2005), and university sports team coaches (Tüzün & Saraç, 2005).

The entire content of first aid involves assessments and interventions that can be performed by someone with minimal or no medical equipment (American Heart Associtation (AHA), 2005). These skills range from dealing with simple cuts or wounds to conducting CPR to the cardiac arrest patients. The survival of the casualty mainly depends on the application of life saving first aid skills at the scene of the accident. Eisenburger and Safar (1999) reviewed the life supporting first aid training of the public and they concluded that skill acquisition was poor in most people. One of the critical skills related with first aid is CPR which is accepted as a unique technique to provide cardiac arrest patients' circulation by performing chest compressions with or without ventilations (Jacobs et al., 2004). Many studies showed that, as well as lay person, medical personnel also had some CPR skill deficiencies. For example, researchers examined the CPR knowledge of newly-qualified doctors in New Zealand and found poor of resuscitation knowledge and confidence (Price, Bell, Janes, Ardagh, 2006). Similarly, Madden (2006) conducted a study in order to analyze the acquisition and retention of CPR skills of nurses. Although theoretical

knowledge and skill acquisition among nurses was seen to be average standards, the practice of CPR skills was seen to be poor. Additionally, the CPR skills of nurses deteriorated in a 10 week period. Parnell and Larsen (2007) evaluated the layperson CPR courses in New Zealand. According to the findings, it was revealed that the training programs were ineffective in preparing the sufficiently equipped first aiders with CPR. Ineffective instructional strategies were stated as one of the contributing factors for the poor skill acquisition and retention of CPR among laypersons. It was found that CPR skills declined quickly following instruction (Alspach, 2005).

Having first aid and CPR knowledge and skills are the two most important factors that lead bystanders to intervene in an emergency situation. Other influences that affect bystanders' willingness to get involved in emergency situations were stated as the feeling of responsibility, the number of bystanders attending the scene, personal awareness, the level of knowledge and skill, perceived level of competence to provide assistance compared with other bystanders, the perceived level of risk involved with the intervention, the perceived severity of a crash and associated injuries, interpretation of the crash event, and causal attribution (Rothe, Elgert & Deedo, 2002). Similarly, the reasons for the bystanders' actions and identified conditions influencing these actions were reported to be diffusion of responsibility, a helping norm, knowing what to do, sense of belonging, mood states, and beliefs and expectancies (Geller, 2004). In 1968, Latane and Darley introduced a model of bystander intervention. According to their model, four major factors affect bystanders' actions during emergency events: noticing the event, interpreting the event as an emergency, assuming responsibility, and attempting help. In the area of first aid, Axelsson, Herlitz, and Fridlund (2000) stated that the personal values of humanity, sense of responsibility and encouragement were the most important factors for bystander intervention during emergency conditions. However, in some conditions, people hesitate performing CPR, because of fear of contracting a disease while performing mouth-to-mouth ventilations, fear of performing the skills incorrectly, and fear of hurting the patient (Axelsson, Thoren, Holmberg, & Herlitz, 2000; Thoren, Axelsson, & Herlitz, 2005; Taniguchi, Omi, & Ineba, 2007).

Developing effective programs to inspire sense of personal responsibility and courage to increase the bystander intervention levels was recommended (Axelsson et al., 2000).

It was continuously mentioned in the literature that many people in society should have basic knowledge of and skills in first aid. Being trained first aid and motivated people play an important role in the survival of casualties. However, it is known that the percentage of individuals who are educated in first aid is inadequate (Pearn, Dawson, Leditschr, Petrie, & Nixon, 1980). It is crucial that people are trained in effective instructional methods in order to be equipped with necessary first aid knowledge and skills to intervene in emergency situations. A diversity of studies has been conducted to evaluate the effectiveness of various instructional methods to improve life supporting first aid knowledge and skill acquisition as well as retention. AHA (2005) reported that the studies related with the first aid skill learning, both skill acquisition and retention have been shown to be poor after traditional instruction among laypersons. The reasons were stated as complex and challenging psychomotor skills, inadequately adapted course content and instructor training, inappropriate materials, insufficient time for practice, and lack of supervision and feedback. These were not stated as a criticism of individual instructors, but rather of the methods that were developed as a response to a perceived need but without consideration or knowledge of educational principles, clear objectives, appropriate formats, or agreed methods of evaluation and audit (Meyer, 2004). As a consequence of the unsatisfying results of the conventional instructional methods in teaching life supporting first aid knowledge and skills, many investigators have introduced alternative instructional methods. One of the most popular of these instructional methods was video-self-instruction. Researchers suggested video-self-instruction method as a simple, quick, and inexpensive alternative to traditional CPR instruction (Batcheller, Brennan, Braslow, Urrutia, & Kaye, 2000; Braslow, et al., 1997; Todd et al., 1998). Additionally, advances in technology, increased availability and the functionality of the internet led to an emerging field in education. Internet usage for educational purposes was also suggested as an alternative way of first aid instruction. The

education of a limited number of people was one of the main weaknesses of traditional instruction. It was reported that web-based instruction has the potential to reach many people who use computers and the internet. Web-based instruction was stated to be more effective option than the conventional methods (Umlauf, 1990; Teauge & Riley, 2006). Interactive basic life support training was recommended as an alternative method by Monsieurs et al. (2004). However, they also reported to search for additional ways for CPR motor skill acquisition. When compared with traditional instruction, computer-assisted CPR instruction shows no difference in terms of knowledge or performance scores between the groups (Fabius, Grissom, & Fuentes, 1994). Video-self instruction was recommended as useful alternative for the conventional training strategies, because it offers manikin to practice first hand CPR skills in the area of first aid.

Case-based instruction has also been applied effectively as an alternative to the traditional instruction in many educational areas. It has been used successfully to provide students real life experiences without risk to blood-flesh patients in the area of medicine (Delpier, 2006). After reviewing numerous studies Hamilton (2005) end up with the suggestion that scenario-based instruction was effective for the teaching of emergency cases. In the area of first aid, cases have been prepared by an accident and/or illness scenarios to imitate the real emergency events. It was stated by the European Reference Center (ERC) (1999) that the scenario, make-up, and acting are main components of case-based teaching which provides a more practice-oriented teaching environment.

In order to improve the capacity to cope with emergency conditions, learning activities for training of first aiders must include recognition of the an emergency, ability to call an emergency care, competence in first aid skills, and emotional preparation for the capability to act in an emergency situations (International Liaison Committee on Resuscitation-ILCOR, 2001). A range of instructional strategies have been used to improve the first aid knowledge, skills and retention. The impact of these strategies on learners first aid knowledge and skills as well as emotional moods

will help to specify the most effective and useful instructional methods. The need was evident for the evaluation of applicability and effectiveness of these different types of instructional strategies. Therefore, this study aimed to evaluate the effects of different instructional strategies on students' cognitive, affective, and psychomotor behaviors of first aid skills; and retention of these behaviors.

1.2 Purpose

The purpose of this study was to investigate the effects of three different instructional methods (traditional, case-based, and web-based) on acquisition and retention of student's first aid cognitive, affective and psychomotor behaviors.

1.3 Significance of the Study

Universally there is an urgent need to promote more and better first aid skills. Skill acquisition and retention should be improved by using more effective training methods in order to save lives. This study will provide information about the selected university students' knowledge and skills of first aid and attitudes towards the application of these skills during emergency situations. The results derived from this study will help us to understand more innovative and effective teaching methods in order to enhance learning and psychomotor skills on first aid, as well as people's willingness to apply first aid skills. The findings of the study will also provide a practical framework for the effective first aid instructional strategies. Description of the characteristics and the possible effects of different instructional strategies on first aid will help program developers during the construction of effective first aid training programs.

1.4 Definition of Terms

ILCOR published the template in order to provide practical and succinct operational definitions in the case of cardiac arrest and resuscitation attempts. Following definitions were taken from ILCOR definition template (Jacobs et al., 2004).

Resuscitation: It is an act of attempting to maintain or restore life by establishing and/or maintaining airway, breathing, and circulation through CPR, defibrillation, and other related emergency care.

Ventilation (assisted ventilation): It is the act of inflating the patient's lungs by rescue breathing with or without a bag-mask device or any other mechanical device.

Chest Compressions: Chest compressions are performed by an individual or a mechanical device during CPR in an attempt to restore spontaneous circulation.

Cardiopulmonary Resuscitation (CPR): Cardiopulmonary Resuscitation is an attempt to restore spontaneous circulation by performing chest compressions with or without ventilations.

Bystander: Anyone attempts to apply first aid

Bystanders CPR: Bystanders CPR is cardiopulmonary resuscitation performed by a person who is not responding as part of an organized emergency response system to a cardiac arrest.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to evaluate the students' cognitive, affective, and psychomotor behaviors of first aid using three different instruction methods: traditional, case-based, and web-based instruction. In order to be aware of the previous studies related with the topic, it is essential to study the literature that examines the acquisition and retention of first aid knowledge following various instructional approaches. Additionally, it is also necessary to review the literature in order to find out possible barriers to apply first aid knowledge and skills during emergencies. With the intention of providing extensive analysis of the first aid issue, literature review part divided into 3 main parts: a) overview of the issue, b) learning behaviors (cognitive, affective, psychomotor), and c) instructional methods (traditional, case-based, web-based), and d) summary of literature review.

2.1 Overview of the Issue

First aid is one of the most important life saving procedures that people need to know. Emergency situations such as diseases, traffic accidents, occupational accidents, natural disasters, unintentional injuries, suicides, terrorist attacks, and war require bystanders to respond before emergency services' arrival. The most frequent causes of death were circulatory disorders in Turkey. Circulatory diseases generally result in acute episodes that require care in hospitals. However, it is very important to respond to the circulatory disorders in a few minutes to prevent further damages to brain and to other body tissues and to avoid death. The casualty with cardiac arrest is completely dependent on the bystander applying CPR as soon as the casualty collapses. For this reason large proportion of the population must be trained in life saving first aid skills.

It was reported by the AHA that 1.5 million heart attacks occur annually in USA, and 25% of these patients die out of the hospital (Cummins et al., 1991). Furthermore, it was documented by TURKSTAT (2006) that estimated 80.000 people die each year because of circulatory disorders in Turkey. The numbers of deaths due to circulatory disorders between 2001-2005 years in Turkey were given in Figure 1.

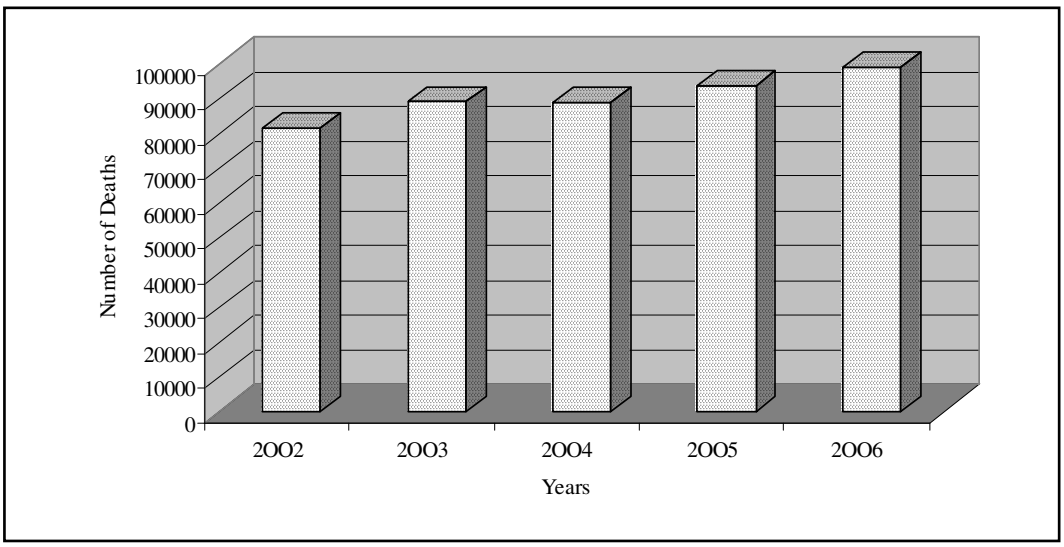

Figure 1. Number of deaths due to circulatory disorders between 2001-2005 years in Turkey

Source: TURKSTAT, 2006

A further main causes of death were reported as a number of natural disasters such as floods, fires, avalanches, earthquakes, landslides, which occur regularly across the Turkey by damaging both people and environment. Distributions of the damages caused by natural disasters in Turkey were given in Figure 2.

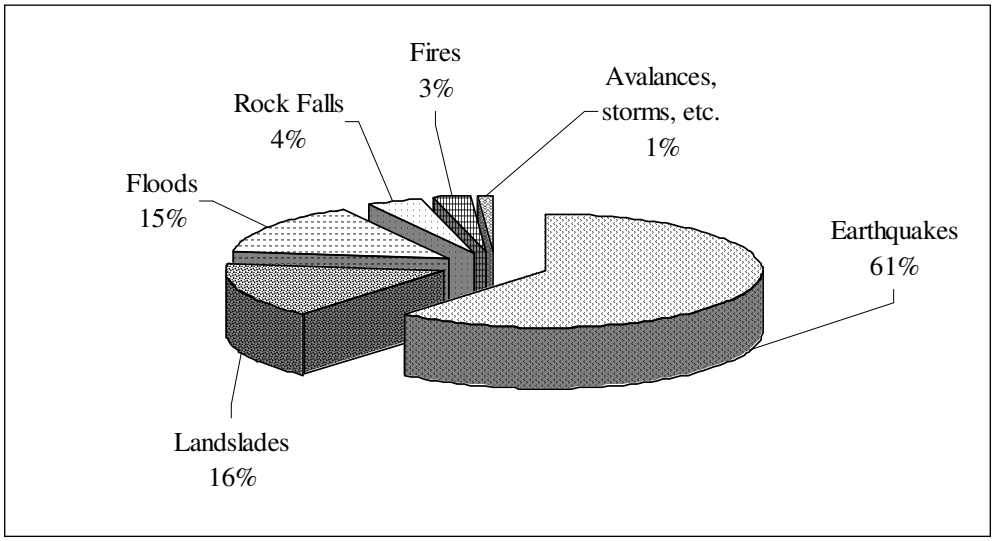

Figure 2. Percentage of damages caused by natural disasters in Turkey

Source: Ministry of Public Works and Settlement, 2004.

Due to being in the Eastern Mediterranean sector of the Alpine-Himalayan earthquake belt, which is the most active earthquake region, Turkey have been exposed to destructive earthquakes frequently. Ministry of Public Works and Settlement (2004) reported that, 93% of Turkey's lands were under the earthquake effect. It was also noted that, 182 hazardous earthquakes occurred among 1900-2003 years and approximately 100.000 people died (GDDA, 2004). Negative effects of natural disasters are crucial worldwide problems. Many large earthquakes, which caused deaths of huge amount of people, reported in the history. The most destructive 10 earthquakes in the world and number of deaths were presented in Figure 3 (USGS, 2007). The number of deaths in Figure 3 pointed out clearly the necessity of the rescue operations including immediate first aid applications in the case of earthquakes.

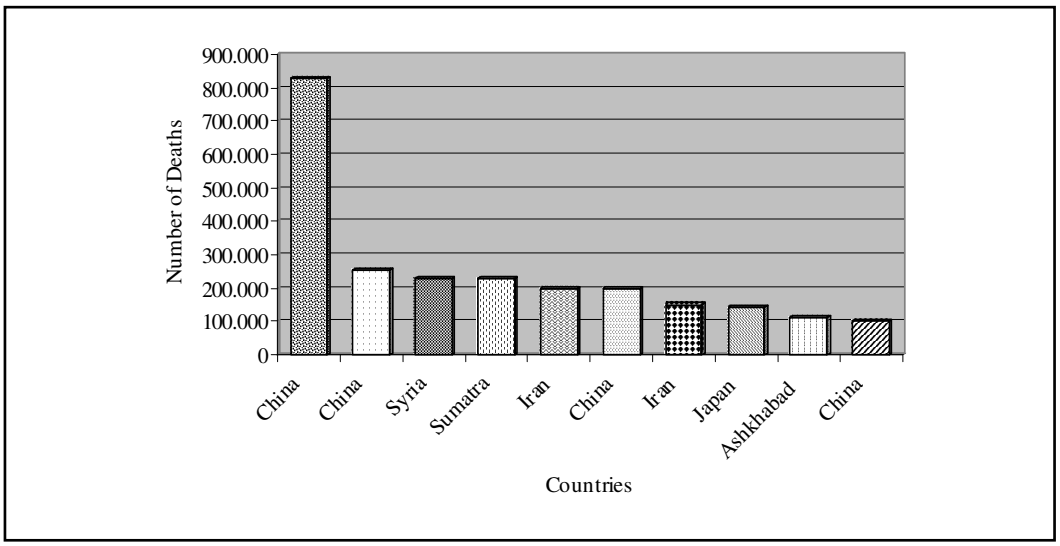

Figure 3. The most destructive 10 earthquakes and number of deaths worldwide

Source: USGS, 2007.

Traffic accidents are also one of the biggest problems of Turkey. It remained the leading cause of death for many years. According to the traffic accidents report of the GDH (2005), totally 3.161.692 accidents occurred between 2001-2006 years causing to 24.839 deaths and 775.062 injured in Turkey (Table 1). In most of the traffic accidents casualties die from or damaged by a loss of oxygen supply, which causes fatal brain damage occuring in about 4 minutes.

Table 1

Number of Deaths and Injured Between 2001-2006 Years Due To Traffic Accidents in Turkey

	Years						
# of	2001	2002	2003	2004	2005	2006	Total
accidents	442.960	439.958	455.667	537.384	621.183	664.540	3.161.692
deaths	4.386	4.169	3.966	4.428	4.525	3.365	24.839
casualties	116.202	116.045	117.268	136.229	154.094	135.224	775.062

Source: General Directorate of Highways (GDH),2005.

Many other emergency events threat life of individuals. Most of these events require medical care. One of the first medical personnels, that respond to the emergencies, is 112 emergency ambulance service. Statistical reports of the Ministry of Health

showed that, most of the 112 emergency calls conducted for medical problems. Traffic accidents were the second emergency events that require the 112 emergency services (Table 2).

Table 2

Means and Percentages of 112-Emergency Telephone Calls According to the Cases in Turkey.

	Years									
	2001		**2002**		**2003**		**2004**		**2005**	
	N	***%****	***N***	***%****	***N***	***%****	***N***	***%****	***N***	***%****
Medical	191.5	63.9	276.9	67.6	279.6	65.7	432.0	67.4	524.6	66.9
Traffic Accidents	46.8	15.6	58.8	14.3	63.3	14.9	92.4	14.4	116.6	14.9
Other Accidents	22.3	7.4	26.9	6.6	29.3	6.9	40.2	6.3	51.3	6.6
Others	39.9	13.1	47.0	11.5	53.4	12.5	76.0	11.9	91.0	11.6
Total	**300.7**	**100**	**409.8**	**100**	**425.7**	**100**	**640.7**	**100**	**783.7**	**100**

*Percentage of column.
Source: Ministry of Health, 2007

The number of emergency calls between 2001-2005 years were demonstrated in Figure 4. It was clearly seen in Figure 4 that emergency calls among people have been increased. Emergency services save lives of casualties; however, there is always need for someone who is most likely to be in an emergency area to initiate life-saving actions until the emergency medical service's arrival.

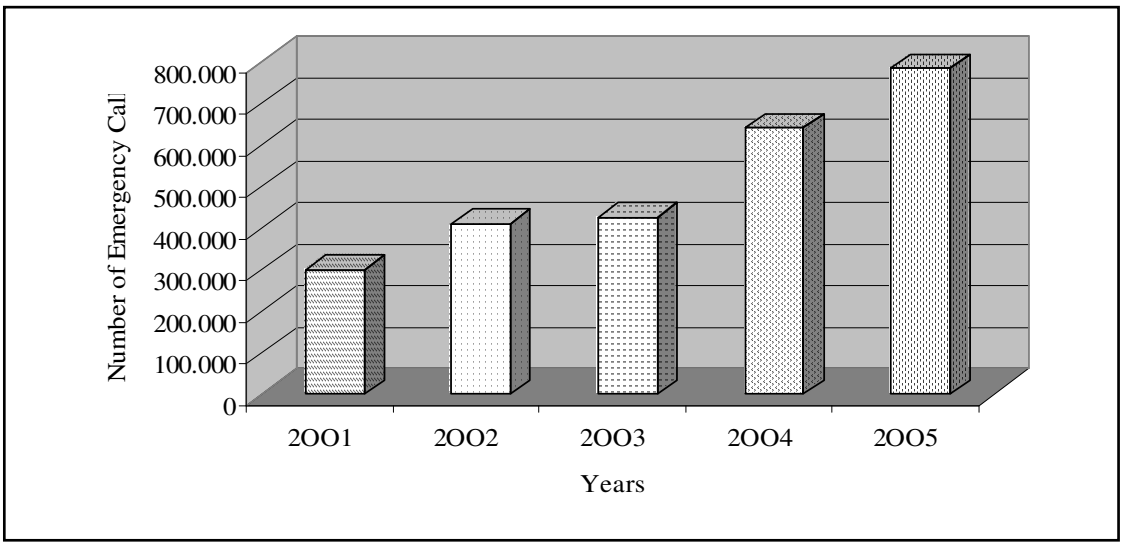

Figure 4. Number of 112 emergency calls among 2001-2005 years in Turkey.

It takes very short time for a fatal brain damage in the case of blocked airway or cardiac arrest, conversely, arrival of the emergency medical services takes longer times especially in urban areas due to several factors such as traffic jam, insufficient number of ambulance services. Figure 5 demonstrated the number of emergency calls and arrival time of emergency medical service to the accident area in Turkey (Sofuoğlu, 2006).

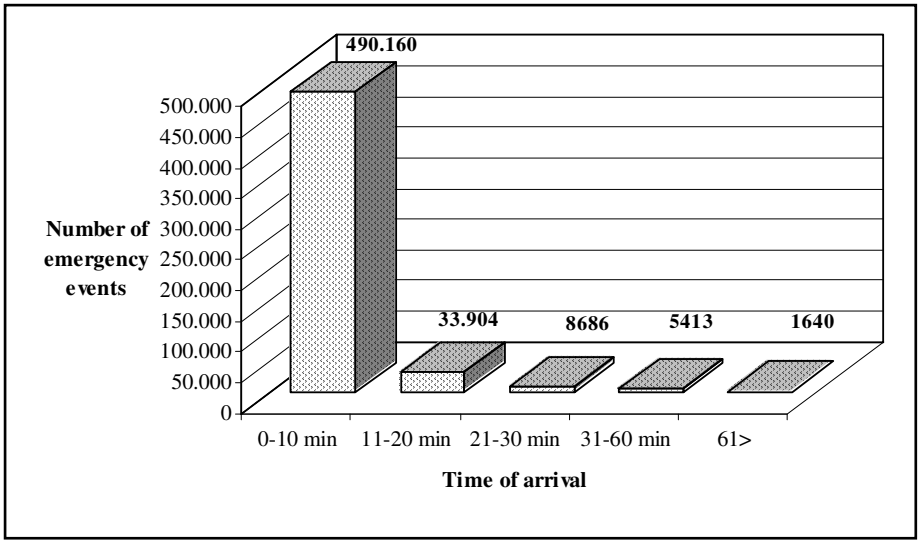

Figure 5. Number of emergency calls and arrival time of ambulance services

Source: Sofuoğlu, 2006.

It was known that the first aid is a part of an effective emergency response for the prevention of death and further injuries. Rather than waiting for an ambulance, it would be better to respond to casualties as bystanders. In order to act effectively, bystanders should know what to do in the case of emergencies. Sometimes, simple life saving procedures such as controlling bleeding or opening the airway can save millions of life.

First aid was defined as an assessments and interventions that can be performed by a bystander (or by the victim) with minimal or no medical equipment. Together with, a first aid provider was defined as someone with formal training in first aid, emergency care, or medicine who provides first aid (AHA, 2005). The early usage of first aid procedures started by Native Americans for the battle injuries such as fractures, bleeding, and arrow wounds. With the awareness of the practicability of first aid during war by the soldiers, it was thought in 1900's that these crucial life saving procedures could be learned by other working groups like industrial workers in a society. The modern and evidence-based first aid guidelines were developed by American Heart Association (AHA) in collaboration with the ILCOR.

The importance of bystander first aid and CPR knowledge and skills has been well documented in many studies (Van Hoeyweghen et al., 1993; Wik, Steen, & Bircher, 1994). Most of the research was conducted on the evaluation of the theoretical knowledge, skill practice, and the emotional state. Also, different methods of instruction examined through scientific methods to find out the most effective one which will provide the higher knowledge and skill mastery as well as the retention level (Braslow et al., 1997; Clark, et al., 2000; Done & Parr, 2002).

Although first aid procedures have been considered as the most important life saving skills for many years, studies related with the acquisition and retention of knowledge and skills generally resulted in poor outcomes. In Greece, for example, the vast majority of workers were unable to provide efficient first aid procedures including estimation of vital signs and provide satisfactory CPR (Hatzakis et al., 2005). It was

also proved that the competences in CPR were consistently poor even among the medical personnel such as nurses or doctors (Davies & Gould, 2000). Similar results on first aid were obtained in Turkey and it was mentioned that the first aid knowledge of university sports team coaches (Tüzün, & Saraç, 2005) and physical education teachers (Korkusuz, Tüzün, & Saraç, 2005) was insufficient.

Researchers have advocated their scientific efforts to development of alternative instructional methods for teaching first aid and especially CPR to the lay public. Effectiveness of instructional methods is very important for knowledge and skill acquisition; otherwise efforts will be waste of time and money. Many research studies resulted in rapid decrease in the cognitive and psychomotor skills following the first aid instruction (Wenzel, Lehmkuhl, Kubilis, Idris, & Pichlmayr, 1997; Madden, 2006). Furthermore, studies on instructional methods demonstrated that the traditional classroom-based CPR instruction failed to achieve desired rates of bystander CPR (Todd et al., 1998). However, alternative instructional methods such as video self-instruction, computer-based instruction, and web-based instruction were reported as developing greater skill competence than traditional classroom methods (Braslow et al., 1997, Todd et al., 1999).

Although people gathered necessary theoretical and practical skills on first aid following the training, there was always a possibility of people's reluctance for intervention to emergency events or to use their knowledge and skills in the need of help. The bystander literature of social psychology suggested several important factors affecting bystanders' interventions or noninterventions during emergencies. For example, Piliavin and Piliavin (1972) conducted a study on whether bystanders would respond more slowly to a bloody victim than to a bloodless one. They found that avoindance was observed in the bloody condition more frequently. Also, Latane and Darley (1968) indicated that the social responsibility and the diffusion of responsibility mainly affected the bystander's response in emergency events. The research on bystanders' apathy demonstrated that ambiguity and seriousness of consequences to the victim and/or bystanders might prove to be one of the central

determinants of bystander intervention (Clark & Word, 1972). In addition, the competency, dependency and visibility lead to increase aiding, and fatalism found as inversely related to helping behavior (Midlarsky and Denver, 1970). Similarly, Clark and Word (1974) reported that probability of a victim receiving help would be high when an individual was exposed to a situation which could be clearly interpreted as an emergency. Shotland and Heinhold (1985) also stated that the rate of nonresponding was affected by three main effects: sex, ambiguity, and the number of bystanders.

The importance of people's reluctance to apply life supporting first aid skills during emergencies was very important issue which led many studies to be conducted by different researchers on different populations. For example, in Japan community, both lay persons and healthcare providers were reluctant to apply chest compressions and mouth-to-mouth resuscitation on a stranger and trauma victim (Taniguchi, Omi, & Ineba, 2007). Similarly, many physicians and future doctors were also found as unenthusiastic to apply mouth-to-mouth resuscitation on cardiac arrest casualties (Brenner, Van, Cheng, and Lazar, 1997).

Considering the influence of first aid skills in saving lives of individuals, it is necessary that people should be trained with effective methods in order to be equipped both theoretically and practically. It is also crucial to identify and clarify the possible factors that inhibit or foster the peoples' reactions to the emergency events.

2.2 Learner Behaviors

Learner behaviors, which are observable actions, include three basic categories in the present study. These behaviors were cognitive (included development of intellectual skills), affective (development of feelings or emotions) and psychomotor (development of physical skills). Following sections included the broader literature about the cognitive, affective and psychomotor behavior changes related with first aid.

2.2.1 Cognitive Behaviors

Cognitive behavior change in first aid includes acquisition of knowledge and development of mental skills including recalling facts, procedures, and concepts. First aid knowledge have been mostly regarded as an active content rather than the passive theoretical knowledge. It includes many topics such as disorders of skeletal system, muscular system, cardiovascular system, and nervous system. However, application of the theoretical knowledge in different emergency conditions was the most important part of the first aid issue. In order to transfer the theoretical knowledge into practical skills, effective knowledge acquisition is necessary.

Many studies have been conducted to investigate the first aid knowledge of people in different societies. For instance, Larsson, Martensson, and Alexanderson (2002) mentioned that in order to perform first aid skills when necessary, people should both have courage and knowledge. They administered questionnaire to 2.800 randomly selected persons aged 18-74 years in order to get information about their first aid related knowledge. According to the results 67.5% of the participants responded to questionannires and 39% of them received first aid training during the previous five years. Most of the trained individuals were younger participants with higher education degree. Additionally, 30% of the trained participants used their first aid skills, and 41% took fewer risks in traffic, particularly those who were older or had a lower level of education. Also, in 14% of the trained participants witnessed a traffic crash as a bystander, and 20 % of these crashes participants responded to the emergency condition and one-third of them applied their first aid skills. In order to report basic life support knowledge of Turkish population, Aypek and Kayhan (2003) conducted a study with the sample of laypersons (n= 179), medical students (n= 220), residents (n= 69), and clinical nurses (n= 26). Approximately, 42% of the participants had taken the CPR training before. Although, trained participants performed significantly better than the untrained group in terms of responses to the theoretical questions, researchers reported statistically no significant difference between the trained and untrained groups' responses to the practical questions.

It was proved that even experts had limited theoretical and practical skills concerning first aid, and they could respond ineffectively to the emergency situations (Bjorshol, 1996). The first aid related knowledge of health and rescue workers (45 police officers, 46 firemen, 57 nurses and 42 general practitioners) was investigated by using the simulations associated with the emergency conditions. Although 50% of the participants believed they were efficient in lifesaving first aid, only 1% was able to perform satisfactory basic CPR of a cardiac arrest regarding accepted guidelines.

Through its importance to save lives, many studies on first aid knowledge has been conducted in different countries. For example, Tan, Severien, Metz, Berden, and Biert (2006) conducted a study in Netherlands to investigate first aid and basic life support competencies of junior doctors (n= 54). By applying both theoretical and practical evaluation instruments, researchers found that 19% of the junior doctors could achieve the acceptable score to pass the theoretical test. Similar poor results were witnessed in practical evaluation part, and 11% of the doctors correctly performed general skills. Moreover, only 6% performed the CPR correctly. The study revealed that even in medical area, the first aid and basic life support training was not effective enough to meet the standards of medical education. Although first aid and CPR was a mandatory training for the medical staff, Hamilton (2005) stated that knowledge and skill gain, as well as retention were poor.

First aid techniques suggested to be simplified as much as possible to make it easy to be learned and retained (ILCOR, 2005). In Australia, Smith, Cameron, Meyer and McNeil (2003) conducted a study related with the peoples' knowledge of cardiac emergencies. According to cross sectional telephone survey (n= 1489), they concluded that the high percentage of people were unprepared for the cardiac emergencies. Similar study related with acquisition of CPR skills was conducted by Celenza et al. (2002) in Western Australian population (n= 803). Of 100 of the total sample volunteered to be evaluated for their CPR skills. Results showed that the airway, breathing and circulation maneuvers were poor in general. Also, breath volumes found as insufficient due to improperly opened airway. Participants were

also placed their hands onto incorrect location for the chest compression, and compressed insufficiently to be accepted as efficient.

It is a necessity that large number of people should know first aid procedures. As well as general public, people in work areas such as teachers, coaches, and workers should have these knowledge and skills, because they have responsibility of large numbers of individuals. Poor results were also derived from different populations on the topic of first aid. For instance, Gagliardi, Neighbors, Spears, Byrd, and Snarr (1994) investigated emergency knowledge level of public school teachers (n= 334). Comparable to other researches, teachers' basic first aid knowledge was low. Besides, eighteen percent of the teachers mentioned that, they have been responded more than 20 injured or ill students annually. Also, 17% of them indicated that they have been encountered at least one life-threatening emergency situation in their career. However, one-third (112 teachers) had no specific training in first-aid and 40% had never been trained in CPR. Parallel study was conducted by Brusick (1991) on school principals' (n= 127) first aid knowledge and skills. It was reported by 53% of school principals that more than one emergency condition, which were mostly bone injuries, epileptic seizures and asthma attacks, occurred in a year. Most of the school principals stated that their personal first aid abilities (74%) and their school personnel's first aid abilities were inadequate (71%). Considering the thousands of school children's' life, the necessity of the first aid knowledge for school staff became evident. In Turkey, first aid knowledge of the physical education teachers (n= 89) was evaluated during their in-service training (Korkusuz, Tüzün, & Saraç, 2005). It was reported that, physical education teachers had insufficient knowledge of basic life support (28% correct response), assessment of casualty (27.5% correct response), lifting and moving the casualty (37% correct response), first aid for some medical cases (39.8% correct response), and first aid for poisoning (34 % correct response). Similarly, Dinçer, Atakurt, and Şimşek, (1998) examined the first aid knowledge of 138 preschool teachers teaching in both public and private schools. According to the perceived first aid knowledge, participants reported that about 68% of the educators had encountered emergency situations in their work place. However, 62% of the

participants had no previous first aid training and, only 17% described themselves as having sufficient first aid knowledge.

In a workplace, many traumas would likely occur in accordance with the characteristics of the work. In the case of accidents, someone in the accident area should respond as quickly as possible before medical help arrives to the scene. This makes necessary that all workers should know appropriate first aid procedures. In order to gather information about the first aid knowledge of the industry workers in Greece, Hatzakis, Kritsotakis, Angelaki, Tzanoudaki and Androulaki (2005) conducted a comparative study between the trained and untrained workers. Trained workers got better results than the untrained workers in terms of first aid knowledge. However, in total their scores were still lower to be accepted as a proficient. Study also revealed that the only 5% from trained sample and 1% from untrained group correctly answered to the questions related with first aid. Researchers concluded that vast majority of workers were unable to provide efficient first aid as long as they can't estimate vital signs and provide satisfactory CPR.

Most of the injuries have also been occurring during sports activities. An Injured athletes needed to be responded immediately by qualified first aiders or emergency personnel in the case of injuries as they may need CPR. Considering the necessity of first aid during sports activities Cunningham (2002) evaluated first aid knowledge of youth football officials (n= 86) who were responsible to deal with injuries. He pointed out that 52% of the officials did not have the current first aid qualification and have no up-to-date knowledge. Moreover, only 20% of the officials responded correctly to the choking and unconscious player scenarios. A Similar study was also conducted in England to investigate the first aid qualifications and knowledge of 1065 youth sports clubs' coaches and officials (Whitaker, Cunningham, & Selfe, 2007). Although 80% of the participants had up to date certificate, only 57% and 41% respectively answered to the scenarios of collapsed player and choking player correctly. It was also pointed out that the participants had lack of confidence to respond some types of incidents like shoulder dislocations, epileptic attacks, and

diabetic attacks. Additionally, Ransone and Dunn-Bennett (1999) conducted a study on 104 athletic coaches from 17 metropolitan high schools. They reported that the athletic coaches did not adequately meet the first aid standards. Only 36% of the participants confirmed accepted level of knowledge. The standard level of first aid information among university coaches in Turkey was also inadequate (Tüzün & Saraç, 2005). Results derived from the 162 university sports team coaches revealed that majority of coaches (90.1 %) had received first aid training during their undergraduate education. However, only 9.9 % of the coaches had received standard first aid training and obtained certificate. Concerning the management of emergency first aid procedures, 73% of the participants answered inappropriately. Additionally, over 67.3% of the coaches suggested incorrect procedures for lifting and moving injured casualty. Similar research conducted by Cooney, Coleman, and Flynn (2000) to examine the knowledge level of school rugby coaches' knowledge about the management and prevention of neck injury. They found that coaches lacked crucial knowledge of prevention, recognition, and the management of the neck injuries.

Children also easily get hurt at home. Basic first aid procedures are necessary for families to save their children's lives against life threatening emergencies. However, parents were also reported as having limited knowledge of first aid. As an example, Singer, Gulla, Thode and Cronin (2004) investigated first aid knowledge of parents (n= 654). By using questionnaire as a data collection instrument, researchers revealed that none of the participants answered the questions correctly, and they were familiar with the 60% of the questions. Additionally, parents notified as having some misconceptions and incorrect applications of first aid. It was also revealed by the Conrad and Beattie (1996) that first aid knowledge among general population in Edinburgh was poor. Results also demonstrated high level of deficiencies on the treatment of pediatric emergencies.

First aid content includes management of the various emergency conditions such as asthma, epilepsy, neck injuries, bleeding. Asthma has been known as one of the life threatening conditions if not dealt with appropriately, and millions of people, mainly

children, have been affected by asthma. Especially teachers or school management staff should be equipped with the necessary first aid knowledge and skills to manage asthma attacks in their school. Considering the significance of the asthma related first aid, French and Carroll (1997) evaluated knowledge level and attitudes of 164 primary school teachers toward asthma in Western Australia. Although it was a common emergency condition among children, teachers (91%) lacked sufficient knowledge related with the management of asthma. Similar results found among teachers in Dublin (Hussey, Cahill, Henry, King, & Gormley, 1999). Researchers gathered poor results in understanding treatment and management of asthma. In addition, Brookes and Jones (1992) was also noted disappointing results with their study on 76 class teachers' knowledge on asthma. Teachers' knowledge was poor and the education about asthma was almost nonexistent.

Epilepsy is another common disorder that should be managed properly to prevent further damages to casualties. Studies related with the knowledge of epilepsy were resulted in low level of knowledge among different populations. In Nigeria, for instance, Alikor and Essien (2005) conducted a study on primary school teachers (n= 118) to find out knowledge level on management of epilepsy. According to the data derived from the questionnaire, researchers reported that, teachers had limited or low level of knowledge on management of epileptic emergencies. Parallel results acquired in population of primary and secondary school teachers in Greece (Kaleyias, Tzoufi, Kotsalis, Papavasiliou, & Diamantopoulos, 2005). Most of the teachers were unable to manage the epileptic situations. Researchers reported the results of their study as an alarming sign to construct better educational programs for teachers concerning the epilepsy and other practical first aid skills. It was also documented by the nationwide survey in USA that elementary and middle school teachers' (n= 512) knowledge was deficient (Bishop, & Boag, 2006). Furthermore, in Ireland, Abernethy, MacAuley, McNally, and McCann (2003) carried out a research on randomly selected sample of 450 schools to find out teachers' and coaches' knowledge about the management of the injuries. Three hundred thirty three schools replied the questionnaire. Results demonstrated that physical education teachers were short of up to date first aid

training in 37 % of the schools. Their study also revealed deficiencies in sport related first aid knowledge.

As evident in the literature, people may encounter with number of emergency situations in their daily life and to protect the casualty from further damages and even from death basic first aid knowledge should be gained. However, there is a lack of first aid knowledge and training in the society.

2.2.2 Affective Behaviors

Affective behavior change in the current study includes the growth in feelings and emotions about first aid related issues. It consists of the values, enthusiasms, appreciations and motivations to apply first aid knowledge and skills when necessary. It was also one of the important issues in first aid as people's motivation and psychological mood possibly will affect individuals' reactions and helping behavior during emergency conditions. People equipped with the sufficient first aid knowledge and skills should be enthusiastic to apply these skills when necessary. Potential barriers to people's willingness to intervene emergencies should be detected; otherwise it would be worthless to train people in first aid.

People's intervention or helping behavior has been one of the research areas of social psychology. It is described as a positive social behavior or prosocial behavior (Tedeschi, Lindskol, & Rosenfeld, 1985), which benefits other people (Staub, 1978). In the past decades, a large amount of research has been devoted to examining the issue of helping behavior (Latane & Darley, 1968; Piliavin, Rodin, & Piliavin, 1969; Lerner & Simmons, 1966). Many researchers tried to answer the question of "Why people in the need of assistance or help are sometimes helped and sometimes ignored?" (Clark & Word, 1974; Walstar & Wisconsin, 1972; Latane & Darley, 1968; Shotland & Huston, 1979). It was a crucial subject that should be studied in order to increase and promote helping behavior among people.

Studies on helping behavior started in late 1960s to answer the question of "why people fail to help when we think they should" (Hogg & Cooper, 2003). The murder of Kitty Genovese in 1964 was the most famous cases in the history of social psychology. She was raped and murdered in New York City, and it was reported that at least 38 neighbors heard her cries for help. However, none of them intervened on her, only one person called the police after her death. A short time after the murder, two social psychologists, Bibb Latane and John Darley (1968), conducted a series of studies in order to discuss the social and psychological factors that caused people's nonintervention when someone was in need. Along with results from these studies they structured a "Bystander Intervention Model". It was a four step model that started with the notice of the unusual event by the bystander and continued with the interpretation of event as an emergency, determination for personal responsibility to act, and intervention to event. Latane and Darley (1970, cited in Baron, Bryne, Branscombe, 2006) extended their model into five steps (Figure 6). In the first step of new model, the bystander notices the unusual. After deciding that something is unusual, bystander then decides whether the event is wrong or emergency and there is a need of help. Once the event was defined as an emergency and recognized as requiring help, then bystander determines whether he/she has the responsibility to help. If the bystander decides he/she has the responsibility, then decides whether to have necessary skills or abilities to intervene. If he/she decides that he/she have necessary skills, bystander finally intervenes to the event. According to model, before the intervention occurs, all of the five steps must be sequentially followed and completed. It was also stated that if the bystander blocked at one of these stages, there will be no intervention (Figure 6).

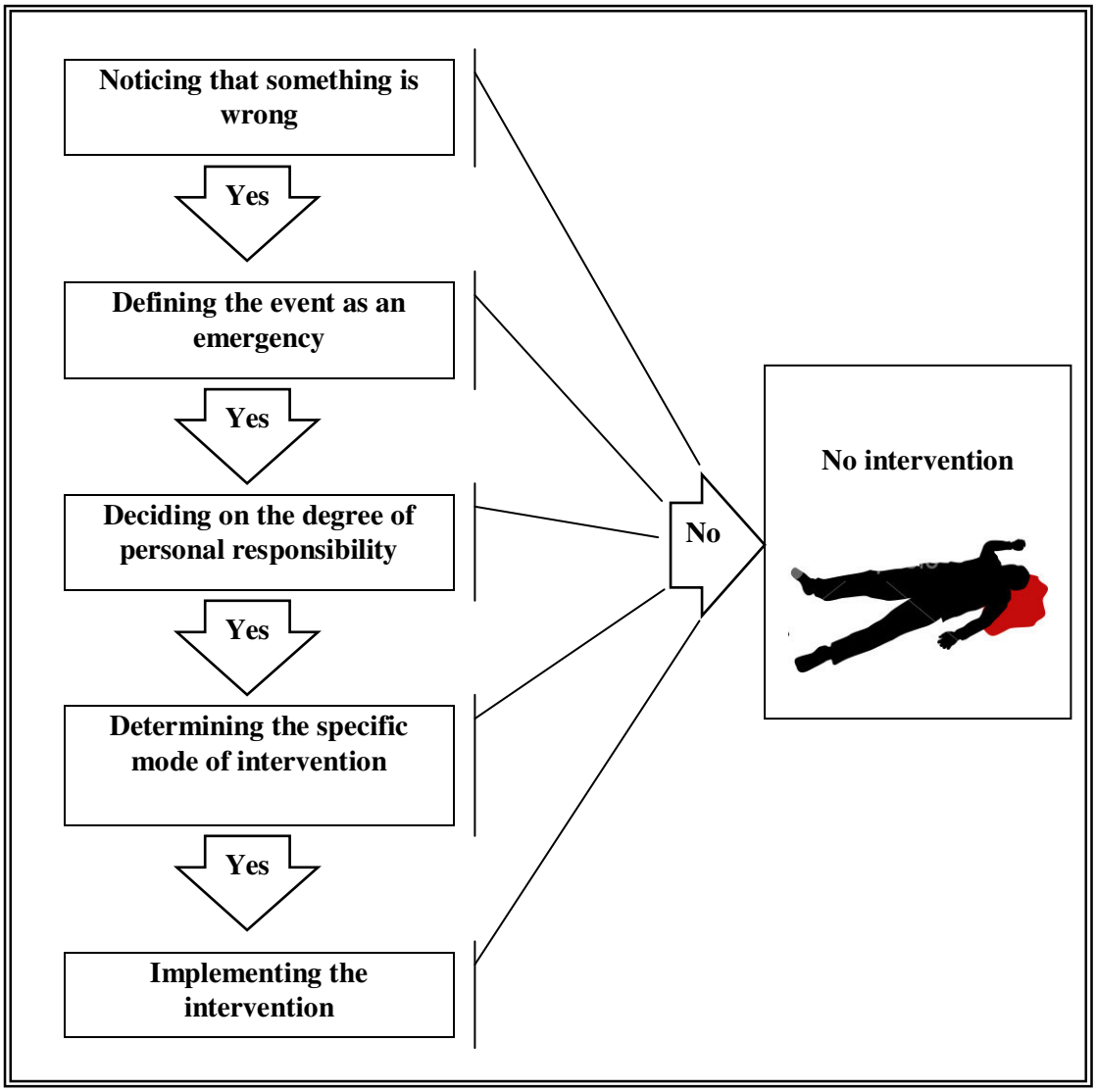

Figure 6. The Bystander Intervention Model

Source: Latane & Darley, 1970; cited in Baron, Bryne, Branscombe, 2006.

Piliavin, Rodin and Piliavin (1969) were also conducted series of experimental studies to investigate the possible effects of several variables on helping behavior. In relation to results from experiments they generated a model. Their model mentioned that: the state of arousal was higher (i) the more one could empathize with the victim; (ii) the closer one was to the emergency, and (iii) the longer the state of emergency continued without the intervention of a helper. Since the arousal is an unpleasant feeling, the bystanders act differently in order to reduce or eliminate the negative

emotions. Possible responses to emergencies described as; (a) helping, directly, (b) going to get help, (c) leaving the scene of the emergency, and (d) rejecting the victim as undeserving of help (Piliavin, Rodin, & Piliavin, 1969).

Researchers also explained the actions of the bystanders according to cost-reward matrix. According to matrix, costs associated with helping includes effort, embarrassment, possible disgusting or distasteful experiences, and possible physical harm; costs related with not helping include mainly self-blame and perceived censure from others, rewards associated with helping include mainly praise from self, victim, and others, and rewards associated with not helping include mainly those stemming from continuation of other activities. Peoples' decisions whether to help or not to help were emphasized to be made by considering these factors (Piliavin, & Rodin, Piliavin, 1969).

Furthermore, Shotland and Stebbins (1983) were conducted two field experiments on cost of helping behavior to bystanders and the need of victims. Researchers expected to test the hypothesis that the greatest amount of help would occur in the high need, low cost condition, while the smallest amount of help would occur in the low need, high cost condition. Corresponding to this hypotheses, low need, and low cost condition expected to provide higher helping rate than the high need high cost condition. According to the results of their first experiment (participants were 160 male and 160 female) subjects who were in the high cost condition and female subjects helped less. In the second experiment (participants were 248 males and 238 females), more help was given to people in a high rather than a low state of emergency, and additionally, more help was received when the cost for helping is low rather than high. Fritzsche, Finkelstein, and Penner (2000) were also carried out a study to measure arousal in emergency conditions by using cost-reward model which includes 50 emergency scenarios. Results from 449 university students demonstrated that least helping in the one where the cost of helping were the lowest and the costs of not helping were the highest.

The psychological processes underlying helping behavior were investigated by analyzing the associations among emergency-related danger, bystander presence, emergency awareness, and accepted costs of intervention (Fischer, Tobias, Fabian, & Dieter, 2006). Researchers assumed that bystander effect would not occur in more dangerous situations because: a) they were faster and more clearly recognized as emergency situations; and b) higher costs for refusing help increased the accepted costs for helping. In their experimental study on 54 females and 32 males, bystander effect did not occur in the context of highly dangerous emergencies. Dangerous situations faced in the presence of bystanders were recognized faster and less ambiguously as real emergency situations than harmless situations. Additionally, dangerous situations increased the costs for not helping the victim, so participants were ready to accept more costs of helping than those in the bystander condition with low potential danger. Furthermore, the results suggested the effect of danger on helping rate was mediated by accepted costs for helping. Their research results were supporting the Piliavin et al.'s cost-reward model, which postulates that increased danger in emergencies increases the bystander's empathic arousal alters cost-reward considerations, and thus finally increases helping responses. In their study, the relation among the emergency-related danger, empathic arousal, emergency awareness, and helping response demonstrated that the participants in the high danger condition reacted faster than participants in the low danger condition.

Many other factors, such as diffusion of responsibility, ambiguity of the situation, perceived cost, and mood of the bystander, gender, and social norms, have been affected people's willingness to respond during emergencies. Latane and Darley (1969) analyzed a range of factors that would possibly influence the bystander intervention during emergency conditions. One of the most important theory derived from their researches was "diffusion of responsibility", which supported the idea that people would act differently when in groups than when alone. Their experiments revealed that presence of others reduced the costs associated with nonintervention and caused to failure of bystanders' intervention. The main reason was suggested as bystanders' assumption of someone else would respond and they preferred not to

respond. It was also reported that in ambiguous emergency situations people are less likely to respond than in clear emergency situations (Shotland & Heinold, 1985). They also investigated the interaction among the training, number of confederate bystanders, ambiguity, and sex in the case of an emergency situation. Ambiguity condition separated into two levels as low ambiguity (the victim screamed for help) and high ambiguity (there was only the sound of the accident that produced the arterial bleeding. Researchers also manipulated the perceived number of bystanders (the subjects were either alone or in a group). They categorized the behaviors of the participants as: nonhelpers (who either never explored the situation or explored but offered no help), ineffective helpers (who tried to help directly and touched the victim without offering appropriate first aid, indirect helpers (who offered no appropriate first aid but sought outside intervention), and direct interveners (who offered appropriate first aid consisting of direct pressure). At the end of their study, concluded that the approximately 40% of the subjects did not respond to the emergency, and level of ambiguity was noted as an important determinant for the rate of intervention. Eight percent of the participants approached and touched victim, but could not apply correct first aid procedures and did not seek for any other help. Approximately 30% of the participants either yielded for help or searched for outside intervention without providing adequate first aid. Besides, twenty-two percent of the participants responded with a prescribed method to stop arterial bleeding. Researchers also indicated that decision to help or not were affected by ambiguity, sex, and the presence or absence of other bystanders. Their study was revealed that greater ambiguity led to less help, women helped less than men, fewer people helped when other bystanders were present, and ineffective direct help occurred most frequently when the bystanders were alone. Researchers also pointed out the effect of training as an important practical variable to save lives. Similar study was carried out by Clark and Word (1974) to investigate the effects of ambiguity of emergency event and potential costs of intervention for bystander helping behavior. Their study focused on the group size (alone and two person group) and the magnitude of ambiguity (non ambiguous, moderate ambiguity, high ambiguity) in emergency situation. In their first experiment 108 and in the second experiment 72 male undergraduate university

students were grouped into alone and pairs. After administration of accident simulations, potential cues related with the emergency conditions were found as crucial for the bystanders' interpretation of the event. Researchers concluded that, possibility of the occurrence of helping behavior would be higher if the event (a) could clearly be interpreted as an emergency (b) presented serious consequences for another, and (c) allowed bystander to help in a manner that is safe for him/her.

Helping behavior have been used connectedly by the emergency conditions since help is needed during unusual events. To discriminate the occurrence of helping behavior in emergencies and nonemergencies, and to characterize the emergency events by bystanders, Shotland and Houston (1979) conducted four studies. In the first attempt they asked to the 39 male and 19 female university students to list the emergency events. In their second study, they identified defining qualities of emergencies which distinguished them from other problem situations. Third study conducted on the 522 university students to find out major determinants of problem situation. Lastly, researchers designed and conducted a study on 208 male and 78 female university students to explain how people behaved in emergency versus nonemergency situations. Findings of the research supported that: (a) emergencies were a subclass of problem situation that usually resulted from accidents; (b) there was a high degree of agreement concerning what problem situations were definitely an emergency; (c) emergency situations were differentiated from other problem situations by threat of harm or actual harm worsening with time, unavailability of an easy solution to the problem, and necessity of obtaining outside help to solve the problem; (d) disagreement on whether a problem situation was an emergency or not resulted from differing perceptions of the degree to which threat of harm or actual harm worsens with time; (e) bystanders were more likely to help in emergency than in non emergency problem situations. Together with above factors, studies also revealed that the need of the victim was one of the signs that bystanders used in determining whether or not to help.

Some other situational factors affecting helping behavior were mentioned by Baron, Byrne and Branscombe (2006). They stated that, people most likely to help their family members and friends, to people those they like, those with similar mimic, and those who were not responsible for their problem. Additionally, researchers mentioned that people would less likely to help a person who drunk and lost his/her consciousness, rather than a well suited businessman lost his consciousness in the street. It was also noted that presence of a helpful bystander as a social model would increase the number of other bystanders to help. Furthermore, emotional state and empathy, which was a complex affective and cognitive response to another person's emotional distress, was also important determinants of whether to help or not. Empathy was described as being able to feel another person's emotional state, feeling sympathetic and attempting to solve the problem, and taking the perspective of others. Baron et al. (2006) figured out four major explanations for the question of "why do people help" (Table 3). Empathy-altruism model suggested that the prosocial behavior was motivated solely by the desire to help someone in need and by the fact that it feels good to help. Negative-state relief model explained as, prosocial behavior was motivated by the bystander's desire to reduce his or her own uncomfortable negative emotions. Emphatic joy hypothesis proposed that the prosocial behavior was motivated by the positive emotion that a helper anticipated experiencing as the result of having a beneficial impact on the life of someone in need. Genetic determinism model pointed out that behavior was derived by generic attributes that evolved because they enhanced the probability of transmitting one's genes to subsequent generations.

Table 3

Possible Motives for Prosocial Behavior

	Motivation for Helping	Reason That Helping Occurs
Empathy-Altruism Hypothesis		
Person observes emergency	Empathy is aroused	Person provides help simply because victim needs help and because it feels good for provide help
Negative-State Relief Model		
Person observes emergency	Negative affect is aroused by the emergency situation, or person is experiencing negative affect based on something else	Person provides help in order to reduce own negative affect and make the helper feel better
Emphatic Joy Hypothesis		
Person observes emergency	Situation leads to desire to act and to have a positive effect on the victim	Person provides helps in order to engage in an activity that has a successful outcome, making the helper feel good
Genetic Determinism Model		
Person observes emergency	Unconscious desire to help occurs if the person perceives the victim to be genetically similar to himself or herself	Person provides help in order to maximize the chances of survival of genes that are like those of the observer

Source: Social Psychology: Understanding Human Interaction (11th Ed.)" by Baron, R., Byrne, D., & Branscombe, N., 2006, Pearson Education Inc.

Possible effects of gender on helping behavior were analyzed by Eagly and Crowley (1986). According to their meta-analytic review (172 studies reviewed) on gender and helping behavior, researchers concluded that men should help more than women, and women should receive more help than men. This implication was mainly caused by the reason that male gender role fostered courteous acts and nonroutine acts of rescuing, both which were often directed toward strangers. However, it was mentioned that female gender role fostered acts of caring for others and attention to their needs, primarily in close relationships. Researchers clarified reasons for the

women's tendency to respond less might be related to their perception of the emergency event. It was noted that women perceived helping more dangerous than men. Men were also affected by the other bystanders witnessing the helping act that motivates them to provide help. Researchers were also notified the sex differences in helping behavior in relation to the sex differences in skills. Their review revealed that, men helped more than women to extent that male respondents believed themselves more competent and more comfortable in helping than female respondents believed themselves to be. However, if the bystander was alone, all these sex related limitations were ignored and possible help was given.

Laner, Benin, and Ventrone (2001) examined the differences in respondents' willingness to give aid to three types of victims: a woman, a child, and a dog. They hypothesized that people would be most willing to intervene on behalf of children since they are less able than adult women to defend themselves against an adult male attacker. Additionally, they assumed that the dog would have the least support due to greater value being placed on human than in animal life. According to the data collected from over 700 college students, no significant difference found in intention to intervene by the type of the victim. Additionally, men and women were equally intended to help, however women were most likely to help children and men were most likely to help women in their study.

As well as the social psychological research, helping behavior is also one of the important issues in the other research areas. For example first aid, to some extent, considered as a sort of helping behavior. It includes both cognitive knowledge and psychomotor skills to be applied in the need of help. However, the most critically, people must be prepared affectively and emotionally in order to use these skills, otherwise it will be loss of time and effort to learn or teach first aid skills. It is necessary to understand the decision making process that governs individuals' reactions to the emergency conditions. Although first aid skills are known as effective lifesaving procedures, people sometimes reluctant to apply their skills to the victims of the emergency events. In the area of first aid the question of "Why bystanders at

emergency situations sometimes help and sometimes do not?" should be answered in order to increase the helping behavior in the society and to save more lives. It was also stressed that research studies should be focused on the rescuer's ability to overcome the trauma of the event and prepared to apply his/her skills to the victims (Axelsson, 2001).

First aid directly related with the bystanders' intervention rather than the medical professionals. Interventions by people who were present at the site of the accident sometimes mean the difference between life and death. Even if training were targeted to the right group in a most effective way, bystanders at emergency situations sometimes help and sometimes do not. Many research interests have conducted to gather information on bystanders' reluctance to apply first aid procedures. For instance, Crider (1996) conducted a study to answer the question of whether a layperson will act, and how they will act in emergency situations. He investigated individual's attitudes towards and behaviors about their willingness to perform first aid and CPR skills in emergency situations. Sample of their study was 110 students who completed the Health Education course. Results showed that the confidence was found as the most apparent factor related to action of the students during emergency conditions.

In order to use their first aid knowledge during emergency cases, people should have an enthusiastic attitude toward first aid. The training that was taken involuntarily was not work. The research related with the attitudes towards first aid was conducted by Al-Khames (2006) on university students in Kuwait. He found positive attitudes by students toward first aid and younger group in his study had more positive attitude about the importance of first aid than the older group.

Larsson et al. (2002) examined first aid related issues by administering questionnaire to the 2.800 randomly selected persons aged 18-74 years. Approximately, sixty seven percent of the sample responded to their questionnaire. Results showed that 39% of the selected population had received first-aid training during the previous five years,

30% used their skills following the training, and 41% took fewer risks in traffic. Additionally, fourteen percent of the participants those with training (significantly more men) were experienced with an accident as bystanders. At 20% of these crashes, a bystander had administered first aid, and one-third of those who provided such assistance used of their training.

Due to various factors, people hesitate reacting emergency events and using their knowledge and skills. It is crucial to find out possible barriers that affect negatively people's responses when the help was needed. Rowe et al. (1998) conducted a study in order to find out people's opinions about reacting if they witness someone collapsing and associated emotions and barriers to implement actions. According to results, which was derived from 811 people over 44 years, 311 (72%) people stated their willingness to respond to casualty witnessed at home, and 166 (44%) on the street. People who would respond to casualties in the street mentioned that they would call 911, police or an ambulance. Moreover, 120 (28%) of the participants were stated they would respond at home and they would check for breathing. Likewise, 91 (21%) of them would check for pulse and 34 (8%) would administer CPR. Additionally, these actions were less commonly selected in response to a strangers and when respondents were not prompted. They reported that they would more likely to perform CPR on a friend than on a stranger. Results revealed the most important barriers to performing CPR as legalities and disease transmission.

Cardiopulmonary resuscitation (CPR) was one of the crucial parts of the first aid training and has been accepted as one of the most important life saving methods. Despite the importance of CPR in saving lives, sometimes it was not performed even by the medical personnel during emergency conditions. It was known as improving survival rate of victims in the case of cardiac arrest. ILCOR (2005) reported some reasons for peoples' hesitancy or unwillingness to perform CPR as a fear of contracting a disease while performing mouth to mouth ventilations, fear of performing skills incorrectly, and fear of hurting the patient. Mouth to mouth resuscitation, which was one of the components of CPR, was stated as a significant

barrier to more frequent bystander CPR (AHA, 1997). Additionally, Axelsson (2001) mentioned that although millions of people learned CPR, the frequency of bystander CPR was very low. He also suggested that the motivational and the psychological inhibitors should be integrated into the education programs. To investigate motivational factors and psychosocial barriers that affect individual readiness to perform CPR, Nolan et al. (1999) was conducted a study. A sample of 786 subjects ($\geq$45 years of age) were interviewed via telephone to gather data on motivational readiness, emotional state, perceived psychosocial barriers, and perceived efficacy in performing CPR. Subjects with greater motivational readiness were experienced significantly fewer symptoms of emotional distress during a cardiac emergency and they encountered fewer psychosocial barriers. Also, they demonstrated greater efficacy in their ability to perform CPR. In the study Donohoe, Haefeli, and Moore (2006), people who recently had some form of CPR and first aid training, mentioned feeling more confident to take action during emergency situations. Additionally, they were less reluctant and less concerned about getting things wrong when an incident occurs. Participants who were not trained recently in CPR and first aid reluctant to apply their skills because of the fear of doing more harm than good.

Similar study on reluctance to apply CPR was conducted by Swor et al. (2006) on individuals who called 911 at the time of an out-of-hospital cardiac arrest. Researchers used a structured telephone interview to collect data from bystanders who performed CPR to adult cardiac arrest patients. They reported overall predictors of CPR performance as the witnessed arrest, bystander with CPR training, bystander with more than a high-school education, or location of the arrest. Moreover, common reasons, which were mentioned by CPR-trained bystanders, for not performing CPR were noted as; panicking (37.5%), having thoughts of not being able to do CPR correctly (9.1%), having thoughts of hurting the patient (1.1%). However, only 1.1% of the participants objected to performing mouth-to-mouth resuscitation.

By considering the critical issue of being role model by physicians and nurses on application of CPR, Brenner and Kauffman (1993) was conducted a study on medical

staff. They investigated whether physicians and nurses had a fear of infectious diseases during mouth to mouth resuscitation or not. Researchers used cardiac arrest scenarios to collect data from 433 internists and 152 medical nurses. Forty-five percent of the physicians and 80% of the nurses would stated to refuse mouth to mouth resuscitation on a stranger and 18% and 25% of nurses and attending internists would not do mouth to mouth resuscitation on a child. Only 15% of the respondents would do mouth to mouth resuscitation on a stranger. Additionally, all respondents had a fear of contracting communicable diseases, especially acquired immunodeficiency syndrome. It was revealed that even medical staff reluctant to perform mouth to mouth resuscitation.

Contrary to the many studies which revealed the people's reluctance to apply mouth-to-mouth resuscitation, Brenner, Van, Cheng and Lazar (1997) found promising results. Researchers surveyed 280 participants from different emergency medicine departments. Direct relationship was noted between training level and the willingness to perform mouth-to-mouth resuscitation for all 5 scenario based questions. It was hypothesized that the reduced helping behavior increases gradually as experience increases throughout the training period.

Furthermore, Brenner, Kauffman, and Sachter (1996) conducted a study to compare attitudes of residents in house staff of metropolitan (58 residents) and suburban hospitals (82 residents) in terms of performing mouth to mouth resuscitation. Researchers prepared a hypothetical cardiac arrest scenarios in both inpatient and outpatient settings. They compared the results with the previously obtained results from the house staf*F(*82 residents) of hospital in a large metropolitan area with a high incidence of HIV positive patients. In relation to results, males were found more likely to perform mouth-to-mouth resuscitation than females. Additionally, suburban residents under 30 years of age were more reluctant to perform mouth-to-mouth resuscitation scenarios than over 30 years of age. Participants who were reluctant to perform mouth-to-mouth resuscitation mentioned that their unwillingness was caused by a fear of HIV or other infectious diseases. Similarly, to analyze the health care

professionals' reluctance to perform mouth-to-mouth resuscitation (MMR), and to identify the determinants of the unwillingness, Brenner, Van, Lazar, and Camargo (2000) conducted a survey on physicians. Many physicians were reluctant to perform MMR, however, results varied in relation to situation and characteristics of victim. For example, 70-80% of physicians would perform MMR on a newborn or child, 40-50% on an unknown man, and 20-30% on a trauma victim or potentially gay man. Additionally, the independent determinants of the physicians' reluctance were female gender, resident physician, and concern about transmission of HIV. Likewise, attitudes of laypersons, as a medical assistant team (n= 500), towards performing a mouth-to-mouth ventilation (MMV) during CPR were investigated by Lin and Wang (2004). In their study, most of the participants (98%) were reluctant to perform CPR with MMV because of possible unpleasant lawsuits. Small percent of the participants (4.3 %) lacked self-confidence, and 35 % worried about possible disease transmission. Related study examined the knowledge and attitudes of New Zealand community (n= 400) towards CPR (Larsen, Pearson, and Gallety, 2004). According to the telephone survey, 72% of the subjects stated that they would eager to perform MMV on a member of their family, and 63% would eager to perform on a stranger. Similarly, in Western Australian community (n= 803), approximately 91 % of the participants stated that they would give mouth-to-mouth ventilation to a friend or relative, however 47.2 % of them stated that they would do mouth-to-mouth ventilations to a stranger (Jelinek et al., 2001). Most of their concerns were related with health and safety, particularly HIV infection. Moreover, most of the participants stated that they would definitely provide cardiac massage for a friend and relative (91.4%) or a stranger (78.1%). Additionally, people were more likely to give mouth-to-mouth and cardiac massage if they had been trained in CPR, trained several times, trained recently, and used their CPR skills in real life. No significant differences found between city and country people on willingness to provide CPR, however older people were less eager to provide mouth-to-mouth or cardiac massage.

It was reported that over 50% of adult Queenslanders have been trained in CPR at some time in the past. Johnston, Clark, Dingle, and FitzGerald (2003) investigated

factors that affect Queenslanders' (n= 4480) willingness to perform CPR. It was reported that the most common barriers to perform CPR were a fear of disease, existence of visible blood and perceived danger. Moreover, respondents indicated that they were more likely to administer CPR if the respondent knew the victim; and the condition of the victim was serious. Additionally, respondents believed that they possessed the necessary skills to perform CPR. A majority of respondents (84%) also indicated that they were at least likely to administer CPR. Moreover, males those who were married or in a actual relationship, those in paid employment, were smokers, those recently trained in CPR, were prospective organ donors, those who cited no barriers to CPR, and those who cited one or more factors that would facilitate CPR most likely to perform CPR. Icelanders attitudes towards pre-hospital CPR were also investigated with the sample of 1200 randomly selected people (age 16-75 years) (Arnar, Gizurarson, & Baldursson, 2001). Sixty-five percent of the participants indicated that they would likely volunteer to perform chest compressions on a stranger, while 24% would not and 11% were undecided. Additionally, 64% of the participants mentioned that they would likely volunteer to perform mouth to mouth ventilation on a stranger, 24% would not and 12% were unsure.

Another study on bystanders' willingness to perform CPR was conducted by McCormack, Damon, and Eisenberg (1989). Their study focused on the frequency of certain disagreeable physical characteristics (presence of vomits, dentures, blood and/or alcohol on the breath) of a cardiac arrest patient and the effect these characteristics have on a bystander's willingness to perform CPR. Researchers analyzed the 121 non-traumatic cardiac arrest patients. Thirty five of these patients received bystanders CPR involving a total of 42 bystanders. Fifty-six percent of the patients had one or more disagreeable characteristics (33% vomited; 33% wore dentures; 4% had alcohol on their breath; and 7% had visible blood). Of the 42 bystanders involved, 14 were exposed to one or more of the disagreeable characteristics. No bystanders indicated hesitancy in performing CPR. Seven of the participants mentioned their unpreparedness in the case of vomiting patient.

The experiences and reactions of bystanders on CPR were also investigated by Axelsson, Herlitz, Ekström and Holmberg (1996). Researchers analyzed all bystanders, who reported their resuscitation attempts between 1990 and 1994 in Sweden by using a phone interview and a postal questionnaire. According to findings, which were derived from 742 questionnaires, the most frequent problems were seen in mouth-to-mouth ventilation (20%) and vomited casualty (18%). Fifty three percent of the participants experienced CPR without any problem. Ninety-two percent of the bystanders had no hesitation of contracting the acquired immunodeficiency syndrome (AIDS) virus. Additionally, 93% of the rescuers regarded their reaction as a mainly positive experience. Of 425 interviewed rescuers, 99.5% were prepared to start CPR again.

To determine the potential obstacles for bystander CPR Locke et al. (1995) conducted a study on 975 people. They asked participants about their eagerness to perform CPR under four different conditions, with varying relationships (stranger vs. relative or friend) and CPR techniques (chest compressions plus mouth-to-mouth ventilation vs. chest compressions alone). Participants were asked to rate their willingness to perform CPR and their concerns about disease transmission. Both relationship and CPR technique affected willingness to respond. Only 15% would "definitely" provide compressions plus mouth-to-mouth ventilation on strangers compared with 68% who would "definitely" perform chest compressions alone. Additionally, only 74% would "definitely" provide chest compressions plus mouth-to-mouth ventilation compared with 88% who would "definitely" provide chest compressions alone to the relatives or friends. Moreover, Eighty-two percent of participants were at least "moderately" concerned about disease transmission. Their results revealed that mouth-to-mouth ventilation appeared to create substantial barriers to performance of bystander CPR.

One of the most important factors that negatively affect people's reluctance to apply first aid skills, mostly CPR, was reported as fear of contracting a cross reference viruses, like HIV. Ornato, Hallagan, McHagan, Peeples and Rostafinski (1990) conducted a survey on 5.823 basic cardiac life support (BCLS) instructors to assess

the impact of AIDS on their attitudes, beliefs, and behaviors with respect to the training and performance of mouth-to-mouth ventilation. Forty nine percent had performed CPR within the past three years. Of these, 40% reported reluctance to provide mouth-to-mouth ventilation at least once. Of those who were reluctant more than one half identified fear of exposure to disease. Additionally, 40% of all respondents had witnessed another provider hesitated to provide mouth-to-mouth ventilation. When presented with mock rescue scenarios, the majority of respondents indicated that they would not perform or would hesitate to perform mouth-to-mouth ventilation on most adult strangers. More than half mentioned that there was some risk of contracting AIDS from ventilating a manikin, and 71% indicated that AIDS affected negatively on their attitudes to provide CPR on strangers. It was concluded by the researchers that AIDS negatively affected even to the basic cardiac life support instructors' attitudes, beliefs, and self-reported behaviors regarding the use of mouth-to-mouth ventilation on strangers.

Having knowledge and skills related with first aid is crucial to save lives of people during emergency conditions. However, related literature revealed some factors that affect bystanders' actions even in life threatening emergency situations. Most of these research findings demonstrated that bystanders hesitate to intervene the situations due to lack of confidence (Crider, 1996), legalities and disease transmission (Rowe at al, 1998; ILCOR, 2005), fear of performing skills incorrectly, and fear of hurting the patient (ILCOR, 2005; Donohoe, 2006). In order to increase number of enthusiastic and motivated first aiders and to save more lives, it is important to find out possible barriers that affect bystanders to act. Awareness of these barriers will help to prepare effective first aid training programs including psychological support to overcome these barriers or negative feelings.

2.2.3 Psychomotor Behaviors

Psychomotor behavior change in the current study indicates the change in physical skills related with the first aid. There are many psychomotor behaviors in first aid. In

fact, whole content of first aid requires physical skills such as CPR, coma-shock position, bandaging, and transferring the casualty. Cardiopulmonary resuscitation, for example, has known as the most important life saving technique since 1960s and includes various steps to be achieved correctly. These steps are; ensuring safety of the rescuer and the victim, assessment of consciousness, opening airway and checking for breathing, obtaining help and activating emergency services, mouth-to-mouth ventilation, and chest compression (Hoke & Handley, 2006). Because of being one of the most important life saving techniques of first aid, CPR is mostly studied psychomotor skill. It was defined as an attempt to restore spontaneous circulation through any of a broad range of maneuvers and techniques (ECC Guidelines, 2000). In other words, CPR was implemented to maintain blood flow to brain, heart, and other vital organs until medical help arrives. It was strictly recommended to be applied by only trained person. Considering the inability of the medical personnel to reach the emergency area in a short time, training of the bystanders on CPR became very critical to save lives. However, people's capability to learn and apply these CPR skills correctly was generally resulted in poor outcomes both in out-of and in-hospital settings. Alspach (2005) analyzed and compared 2 research studies to reveal the quality of CPR applications (Table 4). He pointed out that the chest compression rate was too slow to be effective, chest compression too shallow to be effective and, ventilation rate was also too fast for optimal ventilation. Additionally, Wik et al. (2005) also stated that chest compressions were not delivered half of the time during out-of-hospital cardiac arrest.

Table 4

Quality of CPR Provided In Hospital and Prehospital Settings

Parameter (mean/average)	**CPR guideline target values**	**In-hospital CPR***	**Prehospital CPR****
Chest compression rate (per minute)	100-120/min	<90/min in 28%	121/min during 52% of arrest time Not provided for 48% of arrest time
Chest compression depth (per minute)	38-51 mm	<38 mm in 37%	34 mm
Ventilation rate (per minute)	12-16/min	<20/min in 61%	11/min
No-flow fraction	<0.17***	0.24	0.48

*Abella, Alvarado, Myklebust, et al. (2005).
** Wik, Kramer-Johansen, Myklebust, et al. (2005).
***Maximum of approximately 10 seconds out of each time
Source: Alspach, 2005.

Most of the time, application of CPR makes the difference between life and death. It has been the main issue for many years to train more and more people on life saving skills. Effectiveness of the training programs gained attention to increase the survival rate of the patients. Many studies conducted to assess CPR knowledge and skills, and deterioration of these skills over time. For instance, Brennan and Braslow (1995) evaluated competency of 48 trainees, who were taught CPR, by using the 12 steps skill checklist. Their study revealed that only 1 in 10 of the trainees could correctly perform all 12 CPR skills. Additionally, fewer than 12% of all compressions and fewer than 25% of the ventilations met specified standards. In spite of these findings, all trainees stated that they feel confident and 64% very confident to use their CPR skills in an actual emergency event.

Similar study on effectiveness of CPR performance was conducted by the Brennan and Braslow (1998). In their study, 226 subjects, trained by the courses offered by the American Red Cross (ARC) and the AHA for the public, were evaluated immediately after CPR training. Results demonstrated that 50% of subjects performed 2% or fewer compressions correctly (the most common error being insufficient depth), and 50% performed 10% or fewer ventilations correctly (the most common error being

insufficient volume). Additionally, 65% failed to achieve compression rate of 80 to 100/min. Moreover, forty-five percent of subjects failed to open airway prior to breathing check, 50% failed to assess breathing adequately, and 53% did not perform an adequate pulse check.

Similary, Van Hoeyweghen et al. (1993) analyzed the outcomes of 3.306 out-of-hospital cardiac arrest cases and 885 of these patients who were received bystander CPR. It was reported that 52% of the CPR attempts performed correctly, 11% performed incorrectly, 31% performed only external chest compressions and 6% only mouth-to-mouth ventilation. Additionally, the long term survival (defined as being awake 14 days after CPR) of patients was observed. Long term survival was 16% in patients who were applied correct CPR, 10% and 2% correspondingly when only external chest compression and mouth-to-mouth ventilation was executed, 7% when no bystanders was involved, and 4% when bystander CPR was performed incorrectly. It was suggested at the end of the study that there was no negative effect of badly performed CPR when compared to no CPR condition.

The effects of CPR on casualties were also analyzed by Herlitz, Svensson, Holmberg, Angquist, and Young (2005). They evaluated the impact of no bystander CPR, lay bystander CPR and professional bystander CPR. They reported that 36% of the 29.711 patients received bystander CPR. Seventy-two percent of these patients received CPR from lay people and 28% from professionals. The survival to 1 month was found as 2.2% among those who received no bystander CPR, 4.9% among those who received bystander CPR from lay people, and 9.2% among those who received bystander CPR from professionals. Researchers concluded that lay person CPR associated with improved survival compared to no bystander CPR, and professional bystander CPR was associated with the improved survival compared to lay people CPR. By analyzing various factors on survival of the cardiac arrest patients, Holmberg, Holmberg, and Herlitz (2000) conducted a study on 9.877 patients 36% of whom applied bystander CPR. Researchers reported that the survival of these patients to 1 month was 8.2% and survival of the patients who did not receive CPR was 2.5%.

Researchers also stated many factors affecting survival rate such as; the interval between collapse and the start of bystander cardiopulmonary resuscitation, the quality of bystander cardiopulmonary resuscitation, category of bystander (trained or non-trained), interval between collapse and arrival of the ambulance, age of the patient, and the location of the arrest (inside or outside the home).

The great deficiency in application of the CPR skills was generally revealed by many studies. The retention and effective application of the CPR skillsby medical staff remained unchanged. As an example, Curry and Gass (1987) conducted a study to determine rate of CPR knowledge and skill deterioration among physicians (n= 31) and nurses (n= 54). Following the 6 months training no difference was found between physicians and nurses in terms of CPR knowledge and skills. However, in both groups CPR skills deteriorated significantly over 6 months. Madden (2006) also investigated acquisition and retention of CPR knowledge and psychomotor skills of nursing students in Ireland. Following the CPR training, nurses acquired knowledge of and psychomotor skills of CPR. However, none of the nurses did pass the CPR skills assessment. Additionally, skill deterioration was observed after 10 weeks period. As well as nurses and physicians, study on the junior doctors confirmed that CPR skills decayed rapidly following the instruction. Tan, Severien, Metz, Berden, and Biert (2006) evaluated junior doctors' (n= 54) theoretical knowledge and performance on CPR. Participants were submitted a multiple choice type of theoretical test and practical test including two scenarios of first aid and CPR. At the end of the study, 19% of junior doctors passed the theoretical test. Moreover, the first scenario was performed correctly by 11% of the participants, and CPR scenario was correctly performed by 30% of the students. In another study, researchers evaluated knowledge, skill and confidence level related with CPR and Automated External Defibrillators (AED) of airline cabin crew (n= 35) (Mahony, Griffiths, Larsen, & Powell, 2007). Considering the survival of the passengers in the case of emergencies during flight, similar poor and disappointing results realted with the first aid and CPR were found by the study on airline crew. Of the 35 participants, 33 subjects failed to use bag-mask correctly and 18 located hands on incorrect site for the chest

compressions. Additionally, 13 performed proper compression depth, and 20 placed the AED pads appropriately. Researchers stated that the theoretical first aid knowledge was high, whereas practical skill to manage the cardiac arrest was insufficient among airline cabin crew.

As evident in the summarized literature review, in the case of emergencies, unless emergency medical care is very rapid, the survival of the casualty depends on the on-site individuals including bystanders, friends, and family members. These individuals have to be equipped with first aid knowledge and skills in order to perform life supporting actions correctly and effectively. However, most of the studies have found that CPR is poorly performed by bystanders and medical personnel (Parnell & Larsen, 2007).

2.3 Instructional Methods

Instructional methods are various ways to transfer information to students. Different instructional methods have been developed and used for many years in order to find out the most effective one for maximum student learning. In the present study three instructional methods; traditional, case-based and web-based, were selected to evaluate their effects on first aid knowledge, skills, and attitudes. The following sections intended to review the related literature on traditional, case-based and web-based instructional methods in first aid training.

2.3.1 Traditional Instruction

Traditional instruction was described as a one of the instructional delivery methods which typically includes a one way communication by the teacher with no feedback from students (Reece & Walker, 1997). Besides that traditional instruction consists of a high degree of lecture with a minimum interaction between the instructor and students causing to simple memorization of knowledge without long-term retention (Heck, Poindexter, & Garcia, 2000). Various titles have been used for the traditional

instruction like direct teaching, lecture-based instruction. The lecture method of instruction is characterized by the one person, the lecturer, talking to many students to transmit the information. It was criticized that students were passive receivers of the information in the classroom environment and there was generally a one way interaction, from lecturer to students (Critical Review Series, 2007). Many types of lecture methods were described in the literature such as oral essay, the expository lecture, the problem-centered lecture, the challenge, the lecture-discussion, and the lecture demonstration (Curzon, 2004). Additionally, the physical environment of the lecture was usually mentioned as classrooms in which the arrangement was done for students to take notes without difficulty.

Although it was used effectively and successfully for many years, development of new instructional methods, which were mainly affected by advances in technology, led to criticisms towards lecture method (Huxham, 2005). One of the criticisms related with lecture method was being mainly based on textbook readings which generally necessitate the office hours or additional sessions for students to get help or for clarification of the lectures (Heck et al., 2000). It was also added that lecture method leads for student's memorization of facts without long time retention. However, despite criticisms of lecture for being ineffective, Curzon (2004) noted the success of the lecture was mostly depend on the lecturer's ability to decide on the proper ways to convey the subject matter to students for maximum learning. Similarly, Kam-Fai, (1973) also mentioned that the effectiveness of lecture method of instruction depend largely upon the lecturer, the type of the information, and the way that the lecturer transfers the information. It was also suggested that the lecturer knows the needs of students, and ensure that the students learned the information. Huxham (2005) also recommended to use some interaction sessions such as discussions and problem-solving exercises for improvement of learning.

Despite criticisms on lecturing some advantages were reported in the literature. Following statements clearly summarized the advantages of the lecture method of instruction (Kam-Fai, 1973):

- It gives students the information not elsewhere available. This is especially true when the lectures are based on the unpublished research projects and on the crystallized wisdom out of the life-long academic pursuits of the instructor.
- It summarizes, synthesizes and organizes for the students the content of numerous articles and books, which represents years of laborious work on the part of the instructor
- It points out relationships and salient points that even abler students might not sense or not fully comprehend until amplified by the instructor. Thus, the student's learning progress will be accelerated and their level of understanding will be elevated. It widens the intellectual horizons of the student, making it possible for the learner to gradually move toward acquisition of self-discovery and self-understanding.
- It enables the instructor to correct error in literature and articles read by the student.
- It affords opportunities for an instructor to explain a particularly equivocal ambiguous point of idea, or a complicated, difficult, abstract process or operation; thus unnecessary obstacles to learning are removed.
- It resolves conflicting points of view and clarifies misunderstanding of different schools of thought
- It enlivens the learning situation by adding the voice, gesture and the personality of instructor. Student finds it exciting and inspiring to attend lectures delivered by renowned scholars, for instance, Nobel Prize winners and world famous authoritative professors.

The disadvantages of the lecture method of instruction were also described in following statements (Kam-Fai, 1973):

- It wastes the student's time if the lectures are repetitive of what is found in the assigned reading or textbooks, or if the lectures contain obsolete materials. This is most likely when the instructor is overburdened with a multitude of

administrative responsibilities and community commitments or is too preoccupied with his own research to bring his lecture-notes up-to-date.

- It gives the students no opportunity to express their reactions and is therefore less "democratic" than other procedures in teaching. This lack of class participation dampens the learner's motivation to learn and impedes learning progress
- It promotes the authoritarian role of instruction and. minimizes the importance of student's spirit of curiosity and scientific inquisitiveness. It discourages critical thinking and initiative. The result might turn the learner into a passive, apathetic individual; being satisfied to do minimal work necessary for passing the course.
- It tends to widen the gap between the instructor and' the students by setting them apart and on different levels in the classroom
- It bores the students, especially when the instructor has a hypnotic, monotonous voice which lulls the class into sleep. This may result in distaste for learning on the part of the students.

Many studies were conducted to compare lecturing and other teaching methods. One of these studies was conducted by McCarthy and Anderson (2000) to compare active learning strategies and traditional instruction for teaching history and political science course. Their research results suggested that role-playing history students participated more in class and did better on the exam by nearly a whole better grade than their peers engaged in the teacher centered discussions. Their results also suggested that in addition to being more engaging for the students, active learning techniques can sometimes more effectively impart information than traditional formats. The role playing history students participated more in class and did better on the exam by nearly a whole letter grade than their peers engaged in the teacher centered discussions. Their results suggested that, in addition to being more engaging for the students active learning techniques can sometimes more effectively impart information than traditional formats

Another study, compared the effectiveness of the online versus traditional classes (Witta, 2005). Researcher assigned students into a 4 types of master's level research classes: traditional 15-week class, two eight week intensive summer classes, and an eight week online summer class. The following table demonstrates the results of the study (Table 5). Researcher found statistically no significant difference among groups in terms of mid-term and final grades.

Table 5

Means and Standard Deviations on Evaluation Measures for Each Type of Course Presentation

Class Condition	*M*	*SD*	*N*
Midterm			
15-week	79.74	7.82	23
8-week Summer	80.50	8.67	28
8-week Summer	76.00	10.00	31
8-week Online	79.22	17.61	18
Final			
15-week	84.27	11.14	22
8-week Summer	85.54	7.71	26
8-week Summer	86.81	9.02	31
8-week Online	90.53	10.01	17

Source: Achiement in Online vs. Traditional Classes, by E. Lea Witta, 2005, Encyclopedia of Distance Learnig, vol. 1, p. 387. Copyright 2001 by the Hershey, PA: IDEA Group Inc.

In their study comparing effects of online and traditional lecture on student's knowledge and anxiety, researchers analyzed the graduate level research methods and statistics course which were offered via online and traditional lecture (Frederickson, Reed and Clifford, 2005). Student's responses on knowledge of research methods and statistics, anxiety level related with mathematics, perceived confidence and competence with research methods and statistics, and also student's perceptions of aspects on their learning experiences were evaluated. Following table summarized the results of their study (Table 6):

Table 6

Means And Standard Deviations on Evaluation Measures for Each Type of Course Presentation

	Web-based				Lecture-Based			
	Before		After		After		Before	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Knowledge quiz	13.14	3.94	17.24	5.04	13.19	4.00	16.63	4.27
Anxiety test	2.56	0.75	2.28	0.50	2.40	0.76	2.10	0.62
Perceived confidence/ competence	-	-	2.07	0.56	-	-	2.36	0.58
Satisfaction	-	-	1.75	0.74	-	-	2.05	0.60

Source: Evaluating web-supported learning versus lecture-based teaching: quantitative and qualitative perspectives, by Frederickson, N., Reed, P. ve Clifford, V., 2005, *Higher Education, 50(4)*, 645-664.

Results of their study demonstrated significant main effect of time for the knowledge test and anxiety test, but no effect of type of instruction on the variables. Additionally, results showed no significant effect of time and instruction groups were observed following the analysis of the data on perceived confidence/competence scale and satisfaction scale. Furthermore, their results revealed similar level of increase in knowledge and decrease in anxiety. Additionally, student's perceived confidence/competence and satisfaction level were also similar following the instruction.

In another study Dracup et al. (1998) examined the traditional lecture method of teaching and videotape instruction and suggested that the videotape instruction may not be a alternative for the traditional instruction for teaching CPR knowledge and skills. Similar research, which compared the traditional and computer-based instruction, was conducted by Fabius et al. (1994). According to the results derived from their study, no significant difference was found between the instructional methods in terms of CPR knowledge and skill acquisition and also retention. In 1993, Messmer et al. (1993) also evaluated the effectiveness of the lecture method and computer-based instruction to teach CPR and found no significant difference in skill

acquisition. However, researchers mentioned that the lecture method was better for the acquisition of cognitive knowledge.

Although there are many supporting and opposing studies on various instructional methods in first aid and CPR instruction, none of these methods were suggested as the best one. Researchers continuously search for the effective method that improves learning.

2.3.2 Case-Based Instruction

Case is simply defined as a story of real events or problems so that students experience the complexities, ambiguities, and uncertainties confronted by the original participants in the case (Golich, Boyer, Franko, Lamy, 2000). In other words, a case is stated as a descriptive document, often presented in a narrative form that is based on a real-life situation or event attempting to convey a balanced multidimensional representation of the context, participants, and reality of the situation (Merseth, 1997). This definition reaffirmed three essential elements of cases: (a) they are real, (b) they rely on careful research and study, and (c) they foster the development of multiple perspectives by users.

Different case methods described in the literature including large and small group discussions, role playing, written analysis, or team based discussions (Merseth, 1994). Also, many values of cases explained in the literature as engaging stories, being challenging, developing decision making-and problem-solving skills, raising the level of critical thinking, developing the higher order cognitive thinking, fostering reflection, enhancing listening and teaching how to work cooperatively (Lundeberg, Levin and Harrington, 1999). Additionally, Abell (1997) summarized characteristics of good cases:

- the case is not just a story
- the case tackles a relevant, important issue
- the case provides a voyage of discovery-and even some interesting surprises

- the case is controversial
- case contains contrasts and comparisons
- the case provides currently useful generalizations
- the case has data required to tackle the problem- not too many and not too few
- the case has a personal touch
- the case is well structured and easy to read
- the case is short

Case-based teaching has been used in a variety of areas, such as medicine, psychology, sociology, and law, as a pedagogical tool since the 1800s. It was documented that cases were first used for the teaching of managerial decision making at the Harward Business School in the early years of the 1900s. Then the case method was spread to the other fields including agriculture, education, political science, nursing, and others (Naumes & Naumes, 1999). However, before the 1800s it was reported that the case method was introduced by Socrates as an active teaching strategy. Socrates, as a one of the great teachers of all time, introduced the knowledge as living and interactive thing. He fostered discovery learning, critical thinking, experiential learning and problem centered teaching (Gutek, 1988). Additionally, as a pragmatic philosopher in 20th century, John Dewey (1859-1952) was also accepted the education as a life itself. He focused on learning by doing and interaction with the environment as it was been in case-based instruction. He was also accepted as father of experimentalism and child centered rather than subject or teacher centered education (Gutek, 1988, Miles, 2003).

Case-Based Teaching has been accepted as an excellent instructional strategy that provides students a realistic look at into their world and applies their ideas into a practical experience rather than simple memorization (Delpier, 2006). The features of case method teaching were summarized in Table 7 (Lundeberg, Levin, & Harrington, 1999).

Table 7

Discoveries of Teaching and Learning through Cases

Theoretical and Practical Understandings	**Beliefs**
Transfer, strengthen, clarify formal knowledge	Explore tacit knowledge
Use performance (procedural) knowledge	Clarify and question personal beliefs/values through agreement and disagreement
Develop conditional knowledge	Alter previously held beliefs
Develop practical knowledge	Formulate and strengthen beliefs
Metacognition	**Social, Ethical, and Epistemological Growth**
Develop self-knowledge	Value learning communities, shared inquiry
Recognize own assumptions	Open-mindedness and responsibility
Awareness of problem-finding	Compare and evaluate perspectives
Consider personal/professional goals	Acknowledge limitations of experience
Plan for future situations and relationships	Understand that knowledge is transformable
Realize how personal perspectives affect decisions	Consider the contextual, uncertain nature of teaching
	Become critically reflective and concerned for social justice
Reasoning	
Critically analyze complex situations	
Identify issues and problems	
Use cognitive flexibility	
Recognize assumptions	
Consider consequences	
Practice reflective, ethical decision making	

Source: Who learns what from cases and how: The research base for teaching and learning with cases, by Harrington, H.L., Lundeberg, M.A., & Levin, B.B., 1999, Introduction and overview of chapters. Copyright 1999, Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Case method of teaching provided students to actively participate in the learning process (Naumes & Naumes, 1999). Case teaching is a new phenomenon in education. Its effectiveness derived from learned-centered teaching and intense interaction among instructor to student and students to student. In the case method of teaching, instructors are often behave as a leader that organizes and directs the discussions forums by probing, giving feedback, observing, and contributing the opinion exchange among students (Merseth, 1994). Additionally, instructors direct learners to engage with characters and circumstances; to try work to understand the facts , values, contexts, options, consequences; and connect specifics of the single story to a larger framework of understanding, and to the learner's own life

circumstances (Waterman, McErlain, Rasinski, & Styslinger, 1997). It diminishes the disadvantages of the traditional teaching methods in which students sit passively and receive the content under the directions of instructor. Rather, case-based teaching foster students to discover or construct knowledge (Golich, Boyer, Franko, & Lamy, 2000).

For many years, case method teaching worked as a very powerful teaching tool (Burgoyne & Mumford, 2001; Golich, 2000). Due to its effectiveness in the area of teacher education, case methods have been growing and gaining popularity. The quality of the case-based instruction was proved in many studies; for example, Levin (1995) evaluated the effects of case based instruction on teacher thinking. Additionally, case-based teaching stated as developing students' perceptions, as well as their appreciation of the complex situations (Richards & Inglehart, 2006). In their study, which compared different case-based teaching methods, researchers mentioned that in spite of some differences among case-based teaching methods, all types of case-based teaching methods contributed student learning. Case-based teaching reported as promoting critical thinking and constructing the link between theory and actual occurrences. Additionally, Mayo (2004) reported that case-based instruction fostered students' comprehension and their ability to apply psychology course principles. In addition, he stated that case-based instruction was noted as useful tool in undergraduate curriculum. Similarly, in the area of science education, case-based instruction found as being a bridge between the theory of the subject matter and the practical applications (Yoon et al., 2006). Butler, Lee, and Tippins (2006) studied the effectiveness of a case-based instructional method on pre-service teachers' perceptions of case-based pedagogy for understanding diversity. Based on the responses from the pre-service teachers, researchers reported that case-based teaching helped pre-service teachers' reflections and meaning making to solve educational dilemmas.

Most of the research regarding the effectiveness of the case-based instruction demonstrated that the students taught with the case-based methods outperformed than

students of the traditional class in terms of comprehension and the application of principles of related area (Lundeberg et al., 2002). It was revealed by Hayward and Cairns (1998) that case-based instruction stimulated critical thinking, motivation and organization skills during problem solving situations. In the area of teacher education use of cases were effective in building multiple strategies for a given context through experience (Merseth, 1996). Additionally, the use of stories by the skillful teachers encouraged learners to explore the situation and think about possible actions to be taken by the characters and their own possible decisions (Waterman et al., 1997).

Students' views on case method of teaching stated as being effective in bridging the theory-practice gap (Smith, Malkoni, & Yun Dai, 2005). In other words, case-based instruction was accepted as a useful instructional approach that helps students to apply theories and concepts into teaching-learning experiences. Dori, Tall, & Tsaushi (2003) examined the effectiveness of case studies in biotechnology teaching. The study was focused on the improvement of the higher order thinking skills of the nonscience majors (n= 200). Their study indicated case based instruction as improving participants' knowledge, understanding and higher order thinking skills.

Naumes and Naumes (1999) mentioned case studies as providing a means by which readers learn through discussion of actual situations and circumstances, by following actions and analyzing the thoughts and decision process of real people, and by facing with real problems in real settings. It was also affirmed as an active pedagogical process, as opposed to the passive process that ensues from lectures. Students therefore learn by performing all the various analyses and activities themselves, instead of being told how it is done. For most students, learning by doing provides far better and more lasting results than learning through lectures. Harrington (1995) suggested usage of case method of teaching to overcome the limitations of field practices and clinical experiences of the teacher candidates during their professional development. He also reported that case-based pedagogy improved at least half of the participants' argument skills. Additionally, participants in his study identified multiple sources of evidence to support their solutions.

In the area of medicine, case method teaching contains a human story of illness and a medical story of disease fostering medical students to be actively involved in the learning by applying their knowledge, analyzing the situation, making decisions in an safe learning environment (Cox, 2001). Studies have shown that in area of nursing teaching with cases provided nursing students to be able to think like a nurse by providing real life experiences during teaching (Delpier, 2006). The most importantly, case-based teaching allowed students to experience with real patient assessments without risk to flesh-blood patients. To better understand the nursery students' perception of case-based instruction in anatomy and physiology course, researchers conducted a study by using both quantitative and qualitative research methods (Woody, Albrecht & Hines, 1999). Nursing students stated that case studies were very helpful in learning concepts related to anatomy and physiology.

Effectiveness of case based teaching was also evaluated by comparing of three different types of case-based teaching method. The study focused on the acquisition of knowledge and clinical reasoning skills of psychiatric nursing students (Thomas, O'Conner, Albert, Bountain, & Brandt, 2001). By comparing and contrasting three types of case method teaching (the written cases in a seminar, standardized patients in an assessment course, and web based cases) researchers stated that, although there were some differences among three types of case method, each way of case-based teaching contributed students' retention skills, clinical reasoning processes and also increased students' confidence level. Likewise, a study by Jamkar, Yemul and Singh (2006) demonstrated that case-based instructional approach improved students' clinical reasoning skills, competence, and motivation to learn. Additionally, it was stated by students that case-based learning increased their self-learning skills and their positive attitudes towards medical education.

Related study which evaluated effects of case-based instruction on student learning during the switch from the curriculum dominated teaching to the problem based and clinically based system (Owen, Ryall, & Corrigan (2007). Findings of their research demonstrated that acquisition of the knowledge with the case-based instruction was

effective teaching strategy to transfer the knowledge and skills into practical situations. Researchers also suggested that, when education is situated in case-based instructional environment, students more appreciated the presentation of the content and management issues.

Hamilton (2005) reviewed the literature to examine possible factors that affect the knowledge and skill acquisition and retention in order to maximize survival rate of victims of cardiac arrest. According to the data derived from the reviewed references, he proposed that the training should be based on scenarios in hospital, up-to-date evidence based guidelines, and usage of simulations. He suggested that scenarios will help nurses to face potential real life experiences which will effect their future actions of the emergency cases. It was also stated by the Ackermann, Kenny and Walker (2007) that in the nursing area knowledge and skill deterioration was the main topic for 20 years. By considering the usefulness of the human patient scenarios he conducted a study in order to compare the effects of standard CPR training (n= 33) and the combination of the standard training and human patient scenarios (n= 32) in nursing education. By comparing the two groups in terms of acquisition and retention of CPR knowledge and skills, he found that human patient scenarios improved the acquisition of knowledge and skills. However, CPR knowledge and skills significantly decreased in both groups after three months interval. In 1969, Miles suggested that, visual and practical teaching aids should be maximized in first aid training. Additionally, he recommended first-hand experiences to acquisition of the knowledge and skills.

In summary, many educational studies concerned with the most effective instructional strategies in order to increase the quality of the instruction. The problem of poor knowledge, skill acquisition, and also retention after training had been one of the most important problems for a long time in the area of first aid and CPR. Main reasons reported as the curricula, instructional methods, and the instructor (Chamberlain & Hazinski, 2001). Since first aid necessitates many practical skills, case method of teaching considered one of the useful strategies for application of the

theoretical knowledge into real life events. Most of the accidental events requires the first aiders that will effectively act to the many stressful situations such as traffic accidents, traumatic situations, various cardiac disorders, and sometimes deaths. In order to cope with these stressful situations, first aiders have to be trained with the most effective teaching methods. It is evident from the literature that case-based instruction is very influential method that constructs real world scenarios for students to think critically on various perspectives, to analyze the condition and to discover the most practical solution to the problems.

2.3.3 Web-Based Instruction

First aid education, including cardiopulmonary resuscitation, has been focused on to enable people to help in the case of emergencies for many years. For this purpose, different educational strategies developed and applied in order to provide acquisition and retention of first aid skills. However, many research reports revealed that, complex and demanding psychomotor skills, especially CPR, acquired and retained poorly after conventional first aid training (Chamberlain & Hazinski, 2001). Researchers pointed out two main reasons for the poor outcomes: (a) inadequate training of instructors who devoted too much time to presenting information and too little time to hands-on practice and (b) lack of teaching methods appropriate for laypersons, which had a negative effect both on learning and psychological willingness to respond.

The ILCOR was an institution that identifies and reviews international science and knowledge relevant to CPR and emergency cardiovascular care (ECC) and offers consensus on treatment recommendations. ILCOR (2001, 2005) recommended using different and newer instructional methods to provide more effective and appropriate instruction. Advances in technology and internet lead to development of innovative teaching methods for first aid and CPR education such as online instruction, self-instruction and mobile multimedia devices.

The development and the application of the internet into a teaching environment affected the way of teaching and learning. Although, web-based education is a new term, it continued to play a prominent role in educational area and became popular among educators (Aggarwal & Legon, 2002). This popularity attributed to various factors such as geographical independence and time flexibility (Wang & Gearhart, 2006). Although it was called with different names such as on-line learning, internet-based learning, distance learning, computer-mediated communication, web-based instruction described as a type of education that is available anytime, anyplace, to anyone, and irrespective to time and distance (Aggarwal, 2003; Aggarwal & Legon, 2002). Web-based instruction was also known to have various informational uses of the World Wide Web (Berry, 2002). Some features of web-based instruction listed as: accessible at any time/any place, being a brick-n-mortar to click-n-learn, user-centric, individual goal oriented, and self-motivated (driven), providing just-in-time information, and offer non-linear learning (Aggarwal & Legon, 2006).

World Wide Web was invented in 1991 by the Tim Berners-Lee in order to simplify the exchange of excessive data related with the physics. Modem was main equipment for the exchange of the information. The device was connected simultaneously to a computer and to a telephone system, and was also used to transform the information from a computer into a form that can be transmitted through the telephone system's infrastructure (Pritchard, 2004). It was a great invention that made the scientific findings and materials available for researchers and teachers across the globe (Khosrow-Pour, 2002). Along the way, advances in computer and communication technologies have had a great impact on every aspects of life including education. World Wide Web became a new method of teaching. Two main uses of computers were reported in educational area: computer-assisted instruction and the web-based instruction (Johnson, 2005).

Many methods and techniques described in the literature for delivering instruction through the web. For example, it was categorized as: (a) face-to-face with some web-based instruction; (b) web-based instruction with some on-site requirements; and (c)

purely web-based instruction (Porter, 2004). Face-to-face with some web-based instruction represented by the usage of the internet and the meeting of the teacher and students for the class activities. Web-based instruction with some on-site requirements includes the completion of the work or class electronically (online), and the on-site laboratory activities and/or tests. Purely web-based instruction comprised of information totally found on a web site or through the internet. Similarly, Aggarwal (2003) characterized two dimensions to describe web-based teaching: time and place. It was specified as expanding from same-time, same-place (synchronous) to anytime, anyplace (asynchronous). Considering these two dimensions, web- based education classified into four major types (Aggarwal & Bento, 2002) (Table 8).

Table 8

Time and Place Dimensions of Teaching Environments

		TIME	
		Same	**Any**
Place	**Same**	Type I Traditional classrooms ↓ Students congregate at the same time, in the same place, to be taught simultaneously the same material by the same person.	Type II Lab modules ↓ Students come at different times to receive modularized instruction at the same place, such as a lab, information center, or library.
	Any	Type III Distance learning, video, audio programs ↓ Students widely dispersed geographic areas can be taught simultaneously through one-way or interactive audio and video technology.	Type IV Correspondence Courses ↓ Students can learn on their own anywhere, anytime, and take exams as needed.

Source: Web-Based Education. Chapter V of Web Based Instructional Learning. Ed. Mehdi Khosrow-Pour, by Aggarwal, A. K. & Bento R., 2002. Copyright, Mehdi Khosrow-Pour. IRM Press. Hershey, PA.

In many of the research findings, it was stated that the use of computer mediated communication improved learning (Erlich, 2005). It also enabled both synchronous (communication occurs in real time) and asynchronous (communication does not occur in real time) communication (Table 9). Erlich (2005) reported one of the most important impact of the computer mediated communication on the teaching learning process as the change of student-teacher roles: teacher became a facilitator, mentor, and motivator rather than the passive transmitter of the knowledge.

Table 9

Asynchronous and Synchronous Forms of Computer Mediated Communication

	Asynchronous	**Synchronous**
One-Alone	Online, noninteractive resources	Online interactive resources
One-to-One	E-mail	Chat
One-to-Many	E-mail with distribution list Notice board (message board)	Lessons broadcast to remote classrooms
Many-to-Many	Discussion groups (forums) Bulletin board system	Chat rooms (group chat) Teleconferencing: video, audio, and computer conferencing

Source: Erlich, 2005.

Although usage of both synchronous and asynchronous computer and internet technologies has many useful features for educational purposes, they also have some limitations. Asynchronous communication stated as having an advantage of anytime and anywhere accession enabling the learners to fix their own schedules. Learners from different geographical locations had a difficulty to fix their schedule for the synchronous communication (Kung-Ming & Khoon-Seng, 2005). Web-based instruction was also accepted as a useful pedagogical tool to solve the problem of crowded classes which sometimes included hundreds of students (Makkonen, 2002). However, visual or aural cues and the instant feedback, that was one of the major strengths of the synchronous communication, were absent in asynchronous communication.

Web-based instruction has been compared with other instructional delivery methods in terms of their effectiveness, advantages, disadvantages, strengths, and weaknesses

among them. In a study which compared web-supported and lecture-based learning, Frederickson, Reed and Clifford (2005) found no significant differences between students' acquisition of knowledge and their perceptions of their self-confidence and competence. Students' knowledge level was improved and their anxiety level towards course was decreased. Both versions of the course positively affected students' perceptions of their self-confidence related with the course. Another study on comparison of online and traditional instruction revealed that the students mostly preferred online instruction because of its easiness to adapt their time and place (Hannay & Newvine, 2006). Students also perceived online instructional methods as a high quality approach for knowledge acquisition. In their review on the experimental studies concerning the web-based instruction, Astleitner (2003) reported that web-based instruction was at least as effective as traditional classroom learning. He also pointed out that the successes of both types of instruction were affected by many other factors. Learning strategy, for example, affected the outcomes of the instructional delivery methods (Shih & Gamon, 2002). Similar to other instructional delivery methods, there are some conditions in web-based instruction that should be fulfilled in order to provide maximum learning. In traditional learning environments, these conditions encouraged by teachers. In effective web-based instructional environment, it was suggested that following conditions should be considered and fulfilled for the improvement of learning (Salter, 2003):

- a learning environment rich in resources;
- multiple representations of content;
- authentic tasks and assessment;
- active engagement;
- opportunities for practice;
- modeling of metacognitive strategies;
- social negotiation; and
- collaborative learning.

It was a common belief that web-based instruction provided many educational opportunities. Many universities have been developing online courses for millions of students. Students have also been preferred to attend web-based courses due to several factors. Especially adult learners were one of the largest populations that prefer web-based courses. Aggarwal and Legon (2002) analyzed web-based educational experiences and the forthcomings at university setting. According to results derived from evaluation forms, researchers concluded that there was no significant difference in student satisfaction with their courses (subject), and that there was a slightly more positive reaction to the course materials in the online sections. Additionally, they found significantly more positive reaction to the instructors in the classroom, however, than to those online (Table 10).

Table 10

Evaluation of Different Teaching Models

Teaching Mode	**Subject**	**Material**	**Instructor**	**# of Sections**
All Face-to-Face Business Courses	4.06	3.75	4.14	69
All Online Business Courses	4.04	3.93	3.70	24
Same Instructor-Face-to-Face	4.12	3.74	4.30	10
Same Instructor-Online	4.13	3.89	3.95	7
Same Course-Face-to-Face	3.99	3.71	4.11	44
Same Course-Online	4.04	3.93	3.70	24

Source: Proceedings of the 36th Annual Hawaii International Conference on System Sciences (HICSS'03) - Track 5 - Volume 5, by Aggarwal, A. K., and Ron Legon, R., 2002.

Contradictory to the usefulness over the traditional instruction, it was argued that the web-based instruction cannot entirely be replaced with the traditional classroom instruction. Additionally, Marold, Larsen and Moreno (2002) indicated that it is not functional to use web sources for all courses and all disciplines. Salter (2003) claimed that the online instruction has the potential to improve the acquisition of the knowledge, however it can also be used inappropriately, or it can negatively effects to learning. He stated that the online course may decrease the access, students may feel isolated, and it may reduce the students' motivation. He suggested using different ways to maximize learning in computerized environments by considering the various learning styles. The necessity of applying and maintaining the pedagogical efficacy

and integrity was stressed in order to reach the goals in all types of instructional delivery methods (Buchanan, 1999). Different factors should be considered before construction of the online courses. Because, it may not be useful for every type of course, program, or grade level.

Hara and Kling (2001) qualitatively analyzed the graduate-level students' persistent frustrations which inhibited educational opportunities in web-based teaching environment. Their results reported three main factors causing students' frustrations and distress: technological problems; minimal and not timely feedback from the instructor that caused students' confusion and anxiety; and, ambiguous instructions on the Web site as well as in e-mail. Researchers also stated that web-based education lacked some features which were necessary for communication between teacher and students, such as facial expressions and body language.

Most of the research literature related with the first aid education focused on the CPR training. This was mainly due to the uniqueness of CPR as being a life saving method during cardiac arrest or related emergency conditions. It was always remarked that there was an urgent need for more and more trained people on CPR to save lives during emergency situations. For this purpose different instructional methods were constructed and evaluated to find out their effectiveness on learning. Various instructional methods, such as lecture method, video and audio cassettes, interactive computer program, video self-instruction, and automated voice advisory manikin system have been conducted for first aid training for many years. In 1984, Nelson and Brown compared effects of self-taught modular CPR course and standard lecture course in terms of cognitive and psychomotor skills. Their study findings revealed poor results in both groups of students and they found no significant difference in retention of skill performance (53.5 % for modular/video and 50% for lecture) after one year. In spite of the results, it was suggested to use self-taught courses as a good alternative to lecture based courses.

The four hour lecture method for the CPR training has always been complained for being a barrier to spread the life saving skills among people. In traditional classrooms limited numbers of students have been trained effectively. In 1900s video-self-instruction gained popularity as a simple, quick and inexpensive alternative to lecture-based CPR training. The effectiveness of the method has been proved in various studies. Video self-instruction training consists of a 34-min training tape (practice-as-you-watch approach) and an inexpensive CPR manikin (Braslow et al., 1997). Focusing on the complaint that traditional classroom-based instruction of CPR was ineffective to achieve desired outcomes of the CPR training; Braslow et al. (1997) conducted a study to compare video self-instruction and traditional CPR instruction. Trainees in video self-instruction group performed more compressions correctly, more ventilations correctly, and more assessment and sequence skills correctly than the trainees in traditional group. Moreover, trainees in video self-instruction group were rated as being competent or better 80.0% of the time, compared with traditional group of trainees, who achieved this rating only 45.1% of the time. Similarly, Todd et al. (1998) conducted a study in order to test whether 34-minute video self-instruction training would demonstrate better results than the community standard course (AHA-Heartsaver course) in terms of CPR skills. According to results, video self-instruction trainees showed superior overall performance than the traditional trainees in terms of CPR performance (ventilation and chest compression characteristics), and written tests of CPR-related knowledge and attitudes.

By the support of the European Union fund, researchers evaluated the learning effects of the interactive CD to teach CPR and other emergency topics (Monsieurs, et al., 2004). The CD-ROM on CPR was applied to the groups of 60 students. They trained for a mean period of 42 min and their skill performance was videotaped and analyzed. Although compared to the control group (no training), users of CD performed better CPR skills, however their chest compressions and breathing techniques were ineffective. Participants also demonstrated positive attitudes towards helping behavior. Researchers stated that the CD was an effective tool for CPR training of the

lay person, but they also stressed that motor skill acquirement requires alternative instructional strategies. Similarly, Dracup, Moser, Doering and Guzy (1998) conducted a study on the parents (n= 480) of infants at high risk for cardiopulmonary arrest. They compared three different instructional delivery methods (an instructor-taught CPR class, an instructor-taught CPR class followed by a social support intervention, and a self-training video module) to teach CPR. Following the interventions CPR performance was evaluated by using CPR skills checklist. Totally, 63% of the parents successfully performed CPR. However, parents from the two instructor-taught classes were performed significantly better than the self-training video class. According to findings researchers reported that self-training video instruction may not be an adequate alternate for instructor-taught CPR. Another study, which compared traditional teaching method and interactive videodisc, was conducted by the Edwards and Hannah in 1985 with the sample of nurses. Researchers found no significant difference between groups in terms of theoretical CPR knowledge and skill practice. Performance of nurses in both groups was poor. Twenty percent of the nurses in traditional group, and 36.8% in experimental groups were successful. Moreover, their knowledge and skills deteriorated after one year.

Plank and Steinke (1989) were also compared CPR skills of nurses that were taught by lecture based instructional format and videotaped demonstration format. Results demonstrated that nurses in lecture group performed better than the videotaped instructional group. However, no significant difference found between two groups of students in terms of psychomotor performance. Studies on self-instruction CPR training were generally proved its effectiveness and it was suggested as useful way to reach more and more people (Braslow et al., 1997; Batcheller et al., 2000; Done et al., 2002). However, there were also contradictory research findings on effectiveness of video-self instruction. In their study to increase the rate of bystander CPR in a community, researchers distributed 8.659 free 10-minute CPR videotape to the intervention group by mail (Eisenberg et al. (1995). Additionally, 8.659 selected as a control group (no-videotape group). Both intervention and control group was observed from December 1991 to March 1993 to report existence of cardiac arrest

and initiated CPR. Researchers also conducted telephone interview to obtain additional information about cardiac arrest and the usage of the videotape. During the time period totally 65 cardiac arrests occurred (31 arrests occurred in videotape group, 34 arrests occurred in control group). The overall rate of bystander CPR found as 47% in the videotape group and 53% in the no-videotape group. Although, nine cardiac arrests witnessed by people from videotape group, six of these nine cases (66%) had bystander CPR. According to their results, researchers pointed out that the mass mailings of CPR videos were ineffective in increasing the rate of bystander CPR in community.

One of the conflicting results related with the computer instruction was found by Fabius, Grissom and Fuentes (1994). Their study aimed to compare traditional and computer method of instruction. They compared the knowledge scores, pass/fail rate, time spent, satisfaction, and skill retention of CPR with total sample of 70 participants. Results of their study demonstrated no significant difference between the groups in terms of knowledge or performance scores. On the contrary, significant differences found in time spent, learner satisfaction, and pass/fail rate favoring the traditional method of instruction. Thirty-four percent of the participants from the lecture group passed all the skills, while 6% of the participants from the computer group passed all the skills. Also, computer based and the traditional instruction made no significant difference in CPR skill retention.

Effectiveness and the usefulness of the video self-instruction lead many other researches which conducted on different samples. Tod, Heron, Thompson, Dennis, O'Connor, and Kellermann (1999) conducted a study on African American community (volunteers from church) to find out the effectiveness of video self-instruction compared to traditional CPR. Similar with other studies, researchers found that trainees in video self-instruction group performed better (%40) than the traditional group of trainees (%16). It was suggested that the thirty-four minutes of video-self instruction could effectively be used as an alternative method to traditional CPR. Done and Parr (2002) also found similar results with the sample of medical

students who provided by an educational package. Students were provided by a hardcopy and web based information, an in-house produced audio-video tape demonstrating BLS, and open access to manikins in a Skills Centre where the students learnt in pairs. Students were assessed after their perceived readiness. Following the evaluation, 47 of the 51 students were reported to be competent in performing CPR and researchers suggested self-directed learning as an effective method to teach CPR.

In a comparative study on computer-assisted instruction and interactive video, Umlau*F(*1990) evaluated the effectiveness of instructional methods on rural federal hospital staff members. Participants were trained over a 2-month period with the learning systems. At the end of the study, the success of computer-assisted instruction and interactive video was attributed to the simplicity of operation, employee eagerness, and easy access to the equipment. Moreover, new instructional strategy was described as efficient, cost effective, and time-saving. Long (1992) also compared the effectiveness of lecture method and the audiovisual tape to teach parents (n= 30) infant CPR. After the completion of two forms of instruction, parents were evaluated twice (initial testing and retention) with 20-item skill checklist. They found no significant differences between groups at either initial testing or in retention testing. However, researchers implied that the videotape method was more cost effective. Another study that compares traditional instruction, interactive-computer training, and interactive-computer training plus instructor-led (hands-on) practice was conducted by Reder, Cummings and Quan (2006). Researchers evaluated the effects of these new instructional methods on high school students' CPR training. Results demonstrated higher scores for all outcomes in computerized training groups than the traditional instruction groups. Although computer software recommended teaching series of actions related with CPR, researchers stressed to find more innovative techniques to teach psychomotor skills effectively.

Computers have also been an important role in the area of medicine. Curran, Aziz, O'Young, and Bessel (2004) revealed that the computerized training simulator of

neonatal resuscitation was effective as the video based instruction. Their study on 3rd year medical students (n= 60) demonstrated fulfilling results on the effectiveness of the computer simulation training for the neonatal resuscitation. Similar satisfying results on comparison of computer-based instruction and traditional were found by Clark et al. (2000). They conducted study on 3rd year medical students (n= 60) by applying computer-based CD-ROM related with resuscitation. At the end of the evaluation, use of the computer program made no significant difference between the two groups of medical students in terms of practical skills. Conversely, theoretical and the overall test results demonstrated significant improvement in students knowledge. In line with results, researchers suggested hands on practice as the best way to teach CPR. Besides they recommended computer based training to be used effectively as a supplement to the taught courses.

Wik, Myklebust, Auestad and Steen (2002) were also attempted to analyze the possible effects of the new pedagogical strategy on acquisition and retention of CPR. Researchers applied the 20 minute automated voice advisory manikin system on 35 volunteers. New computerized tool improved chest compression rate from a mean of 33 to 77%, and correct inflations from a mean of 9 to 58%. Additionally, it was also successful strategy for the long-term retention of CPR skills. In their review related with the knowledge and skill retention of cardiopulmonary resuscitation training in nursing area, they proposed that video self-instruction improved the quality of resuscitation.

With the aim of reaching and training many people on CPR, various instructional methods and research studies have been conducted. One of these studies conducted with the sample of 12-14 years pupils at 806 primary schools (Isbye, Rasmussen, Ringsted, & Lippert, 2007)**.** Researchers distributed 35002 CPR instruction materials (CPR manikins and 24-minute instructional DVD) to pupils in order to evaluate the possibility of widespread CPR training. Students were trained in CPR and they trained their families and friends with the same materials. The study was completed successfully by spreading CPR training among 2.5 persons per pupil. Researchers

recommended using the personal resuscitation manikins in order to reach large population. Similarly, to increase the CPR training in Quebec, researchers conducted a study on junior college students by applying four different instructional methods: a) control group, 4 h course, manikin to student ratio 1:4; b) 4 h course, manikin to student ratio 1:1; c) 2 h course, manikin to student ratio 1:1; d) video-assisted CPR instruction, manikin to student ratio 1:1 (Liberman, Golberg, Mulder, & Sampalis, 2000). Students' performance was poor among all groups. However, it was advised to use video-assisted CPR training as a cost-effective way to reach large amount of young people.

Effectiveness of the self instruction method was also studied with the sample of people over 40 years of age (Batcheller, Brennan, Braslow, Urrutia, & Kaye, 2000). Researchers assigned 202 subjects into two groups of classes: video self-instruction and traditional instruction. According to the results, subjects in the video self-instruction performed 20.8% of all compressions and 25.1% of all ventilations correctly. However, subjects in the traditional class performed 3.4% of compressions and 1.7% of ventilations correctly. Additionally, in terms of total 14 CPR skills, video self-instruction subjects performed an average of 10.1 and traditional class subjects performed 4.7 of the total skills correctly. Researchers also reported that video self-instruction subjects were 62.7% and traditional class subjects were 6.1% competent regarding the overall performance. It was concluded that video self-instruction was effective, convenient and inexpensive tool for the CPR training. Likewise, it was stated that the older adults were most likely to witness cardiac arrests. Considering the importance of the increased number of trained people in a society, researchers conducted a study to evaluate effectiveness of the CPR self-instruction program compared with the traditional Heartsaver Classes (Lynch et al., 2005). Self-instruction program comprised of 22-min video, inflatable training manikin, and audio prompting device. Participants, who were between 40 and 70 years, were assigned into control group, Heartsaver training or video self-instruction group. It was reported that participants in video self-instruction group performed better than untrained control group and Heartsaver class subjects in terms of CPR

skills. Older adults effectively learned basic CPR skills in half and hour with the video self-instruction. Training suggested as being effective in increasing the number of people who can perform CPR. As well as the acquisition of the CPR skills, retention of these skills after certain period of time is also very critical issue. Researchers also evaluated the effectiveness of the video self-instruction on the CPR skill retention by assessing the immediately after post-training and after 2 months post-training (Einspruch, Lynch, Aufderheide, Nichol, & Becker, 2007). Observations of the post training demonstrated significant decrease in assessing responsiveness (from 72% to 60% for Heartsaver subjects and from 90% to 77% for self-trained subjects), calling 911 (from 82% to 74% for Heartsaver subjects and from 71% to 53% for self-trained subjects), and overall performance (from 42% to 30% for Heartsaver subjects and from 60% to 44% for self-trained subjects). Also, records of sensored manikin showed significant decrease in the ventilation volume (from 40% to 36% for Heartsaver subjects and from 61% to 41% for self-trained subjects) and correct hand placement (from 68% to 59% for Heartsaver subjects and from 80% to 64% for self-trained subjects). Results, which were derived immediately after the post training, revealed that both Heartsaver and self-trained subjects' CPR skills declined at a similar rate. However, the results of the observations 2 months after post-training showed that both groups declined their CPR skills, but self-trained subjects generally demonstrated CPR skill retention equivalent to that of Heartsaver-trained subjects. Researchers proposed video self-instruction as effective as traditional training in retention of CPR skills.

Validating the effectiveness of video self-instruction, researchers also searched for various alternatives for the learners that have limited educational opportunities and resources. Eight minute self-instructional DVD was introduced for the CPR instruction (Jones, Handley, Whitfield, Newcombe, and Chamberlain, 2007). In order to test the usefulness of the DVD, researchers conducted a comparative study on two groups: control group which taught by an instructor using a standard course, and DVD group which taught by a short (8-min) self-instructional DVD with practice on a simple training manikin. The self-instructional group improved their CPR skills

similar with the control group for all measured skill variables. The only different variable score was the compression dept which was significantly greater in the control group. However, average compression dept scores of the DVD group were within an acceptable level. Researchers suggested that DVD-based self-instructional packages could be used widely in distance learning and other environments which included inadequate learning facilities.

Usage and effectiveness of online instruction for first aid was also evaluated by comparing to control group (control group; n= 11 and test group; n= 12) (Teague & Riley, 2006). Researchers found significant differences in the CPR knowledge of participants in both groups. However, there were no significant difference in the skill performance between the test and the control group. According to findings researchers concluded that the online course was effective in improving theoretical CPR knowledge, but ineffective for improvement of CPR skills. Related study was conducted by Vries and Handley (2007) to evaluate effects of web-based application on acquisition of basic life support skills. Participants (n= 16) completed on-line training in their own time over 8 weeks period. The program consisted of theory, scenario training, and self-testing. Any supplements (manikin) for skill practice, and instructor support were included. Participants were assessed without prior warning. According to results, most of the participants (84-100%) performed skills correctly. However, performance on chest compression depth and rate demonstrated decreased results (59% and 67% of the participants performed correctly). Similarly, participants' performance on opening airway and lung inflation was poor (38% and 13% of the participants performed correctly). The lesser score obtained from the variable of checking for safety (19% of the participants performed correctly). As being a pilot study, researchers recommended on-line training program as an effective method to achieve basic life support skill acquisition. They also mentioned to use the manikins in practicing CPR skills for better results.

Aforementioned studies indicated that the acquisition and retention of life saving first aid skills was poor following the instructional methods in different formats.

Additionally, many investigators have suggested the different methods for the teaching life saving skills such as video self instruction, interactive video instruction, and computer assisted instruction. According to the research findings, it was mentioned that usage of technological advances like computers and web based sources were effective in CPR skill acquisition and retention. Especially, video self-instructional methods which supplied DVD and practice manikin suggested as the simple, quick, and inexpensive way of training for the CPR training of large samples. Additionally, instructional methods which include the solely visual or theoretical information neither found as effective to teach practical skills of first aid and was nor recommended for the training of the individuals.

2.4 Summary of the Literature Review

In the case of emergency events people who are present at the area or those who arrive first play an important role for the survival of the casualties. During emergencies immediate first aid procedures were the most important life saving actions that should be provided as quickly as possible. When a person is injured with any of the life threatening events, actions taken by the bystanders are often important to prevent the worsening of the situation because it is known that arrival of the professional help takes time. It was known that many people die from and many more negatively affected by insufficient and timely first aid. It would be better to equip as many people with essential life saving skills in the society in order to decrease the number of deaths and injuries.

Most studies from the literature revealed that first aid related knowledge and skill acquisition and retention was poor following the instruction (Chamberlain & Hazinski, 2001; Pearn, Dawson, Leditschr, Petrie, & Nixon, 1980; Eisenburger & Safar, 1999; Alspach, 2005; Price, Bell, Janes, & Ardagh, 2006; Madden, 2006). Ineffective instructional strategies were stated as one of the contributing factors for the poor skill acquisition and retention among laypersons (Chamberlain et al., 2003). As a consequence of the unsatisfying results by conventional instructional methods in

teaching life supporting first aid knowledge and skills, many investigators have introduced alternative instructional methods (Todd et al., 1998; Curran & Aziz, 2004; Morgan et al., 1996). For instance, advances in technology increased the availability and the functionality of the internet and web-based and computer supported instructional methods was suggested as an alternative way to teach first aid skills (Umlauf, 1990; Fabius, Grissom, & Fuentes, 1994; Curran & Aziz 2004; Teauge & Riley, 2006; Monsieurs et al., 2004). One of the other examples of instructional methods for skill development was case-based instruction which includes scenario-based activities and role-playing (Meyer, 2004), and which provides students real life experiences (Delpier, 2006; Hamilton, 2005). Many other instructional methods, such as usage audio feedback (Wik et al., 2002; interactive video-discs (Monsieurs et al., 2004), and television spots (Moran et al., 1996, Capone et al., 2000) were initiated.

A range of instructional strategies have been used to improve the first aid knowledge and skill acquisition as well as retention. The impact of these strategies on learners first aid knowledge and skills was evaluated to specify the most effective and useful instructional method(s). The need was evident for the evaluation of applicability and effectiveness of different types of instructional strategies. Therefore, this study aimed to evaluate the effects of different instructional strategies on students' acquisition and retention of first aid cognitive, psychomotor, and affective behaviors.

CHAPTER III

METHOD

This study was designed to determine if students' cognitive, psychomotor, and affective behaviors of first aid are influenced by the instructional delivery methods and retention. The chapter begins with the overall design of the study, and covers description of variables, data source, treatment, data collection instruments, data collection procedures, data analysis, and limitations of the study.

3.1 Overall Design of the Study

A quasi-experimental design, where comparison of three groups consisting of 30 students each, was selected for the study. The design was chosen to examine the possible differences among three treatment groups of students in terms of cognitive, psychomotor, and affective behaviors of first aid, and to investigate the possible effects of time on 18 weeks time interval on these behaviors (Figure 7). Ninety participants included in the study were the second (n= 3), the third (n= 44), and the fourth (n= 43) year students selecting first aid as an elective course at METU. Students were assigned to one of the three groups randomly before the treatment started: Group I-Traditional instruction (30 students), Group II-Case-based instruction (30 students), and Group III-Web-based instruction (30 students). Heterogenic groups formed as much as possible by considering gender of the participants during random assignment. After random assignment to the groups, all students were concurrently (each group of students tested at their class time) pre-tested for their perceived computer literacy, first aid cognitive behaviors, first aid psychomotor behaviors, and first aid affective behaviors. First aid psychomotor behaviors were tested individually in an isolated laboratory. Order of the tests was: perceived computer literacy test, first aid affective behavior scale, first aid cognitive

behavior test, and first aid psychomotor behavior assessment. Perceived computer literacy test was originally developed by Dusick and Yildirim (2000) and adapted to Turkish by Çınar (2002). First aid psychomotor behaviors were evaluated by the manikin and the skill checklists that were prepared inline with the related literature (Brennan et al., 1998; Chamberlain & Hazinski, 2001). Other measurement instruments including interview questions were developed by the researcher by considering the validity and reliability issues. There were 13 questions in the interview schedule excluding prompts. Each of the 36 students was interviewed individually. Students were interviewed for the purpose of underlying reasons of first aid affective behaviors. For the interview groups (12 students from each of the three groups), maximum variation sampling was chosen to document the range of diversity among students. Students were selected randomly for interview by considering their grade, gender and the CumGPA scores. For the interviews, students were appointed to one hour schedules throughout one week. They were interviewed at the most suitable time according to their time schedule. After pretest, students in Group 1, Group 2, and Group 3 followed first aid course for 12 weeks in their assigned course format. All instructional groups started and completed their instruction at the same time. Although instructional delivery methods were different, students were administered the standard first aid program approved by Ministry of National Health, European Resuscitation Council and European Reference Center for First Aid Education. Following to completion of the course content (after 12 weeks) students in three groups took concurrent post-test with the same evaluation instruments for cognitive behaviors and affective behaviors (First Aid Test, Attitude Scale). Interviews and psychomotor skill testing was conducted individually (Psychomotor Skill Checklists, and Resusci Anne Skill Reporter). Each individual was videotaped for psychomotor skills, and their performance was analyzed via these videotaped records by using skill checklists. For the retention test all testing procedures were applied individually approximately within 2 weeks period. All data were collected by the same researcher.

A mixed factorial ANOVA was used in order to measure the effects of instructional

methods and time on the first aid related behaviors (cognitive, psychomotor, and affective). Two factors of the mixed factorial ANOVA was the instructional methods (traditional, case-based, and web-based) and tests (pre-test, post-test, and retention test). Factorial designs allow studying two or more independent variables in order to determine their independent and interactive effects on the dependent variable (Fraenkel & Wallen, 2003). It is suggested as an efficient and economic measurement of multiple variables.

3.2 Research Questions

The main problem of the study is to determine if students' cognitive, psychomotor, and affective behaviors on first aid are influenced by the instructional delivery methods, and the time. Based on this main problem statement, the following research questions were formulated:

1. What is the effect of different teaching methods on students' cognitive, psychomotor, affective behaviors?

- **1.1.** What is the effect of web-based, case-based, and traditional teaching approach on students' cognitive behavior?
- **2.1.** What is the effect of web-based, case-based, and traditional teaching approach on students' psychomotor behavior?
- **3.1.** What is the effect of web-based, case-based, and traditional teaching approach on students' affective behavior?

2. What is the effect of different teaching approaches on students' retention of cognitive, psychomotor, affective behaviors by controlling for gender and pre-test scores?

- **2.1.** What is the effect of web-based, case-based, and traditional teaching approach on students' retention of cognitive behavior?
- **2.2.** What is the effect of web-based, case-based, and traditional teaching approach on students' retention of psychomotor behavior?
- **2.3.** What is the effect of web-based, case-based, and traditional teaching approach on students' retention of affective behavior?

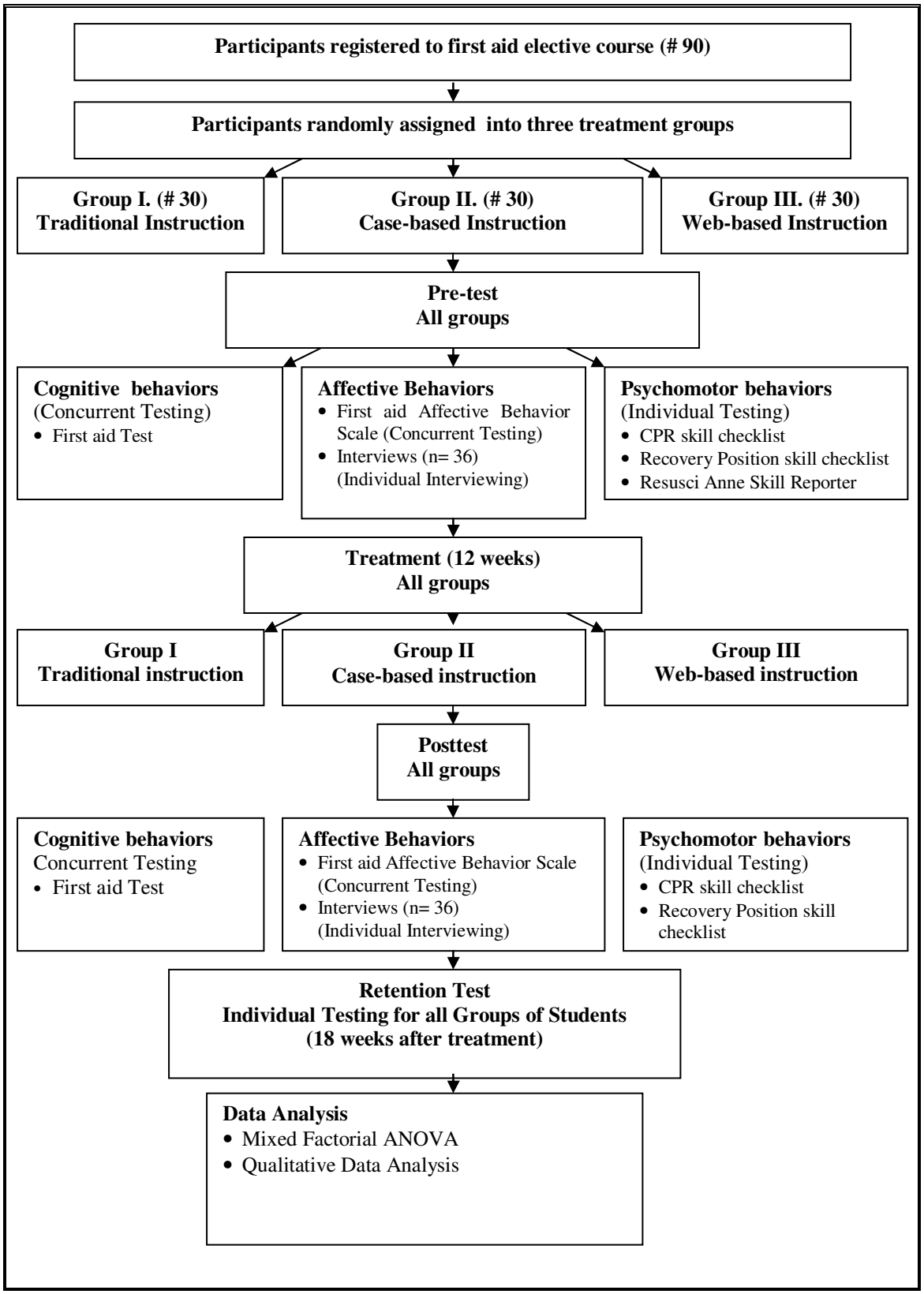

Figure 7. Overall design of the study

3.3 Hypotheses

1.1.1. There will be statistically no significant difference between students' cognitive behaviors of first aid according to web-based, case-based, and traditional teaching approach.

1.2.1. There will be statistically no significant difference between students' psychomotor behaviors of first aid according to web-based, case-based, and traditional teaching approach.

1.3.1. There will be statistically no significant difference between students' affective behaviors of first aid according to web-based, case-based, and traditional teaching approach.

2.1.1. There will be statistically no significant difference between students' retention of cognitive behaviors of first aid according to web-based, case-based, and traditional teaching approach.

2.2.1. There will be statistically no significant difference between students' retention of psychomotor behaviors of first aid according to web- based, case-based, and traditional teaching approach.

2.3.1. There will be statistically no significant difference between students' retention of affective behaviors of first aid according to web-based, case-based, and traditional teaching approach.

3.4 Description of Variables

Students' Cognitive Behaviors: Cognitive behavior in this study refers to students' scores they received from a first aid cognitive behavior test. First aid is defined as "immediate help provided to a sick or injured person" and includes "procedures and techniques, requiring minimal or no equipment, that can be taught to the general public in first aid courses" (Velde et al., 2007, p. 241). It was suggested that the guidelines related with the first aid should be standard in European countries. In order to teach effective, safe, feasible, and scientifically proven first aid procedures ERC (Handley, Koster, Perkins, Davies, and Bossaert, 2005) and Belgian Red Cross-

Flanders (Velde et al., 2007) documented the guidelines for the European countries. As being one of the European countries Turkey follows the European first aid guidelines. In the current study, evidence based, valid and reliable first aid standards suggested by the Ministry of Health of Turkey and Turkish Red Crescent Society were used in first aid course content which is prepared in line with the European First Aid Guidelines. By considering these suggested first aid guidelines, in the recent study the first aid knowledge included: principles of first aid, actions at an emergency situations, resuscitation, disorders of respiratory system, disorders of circulatory system, wounds and bleeding, special types of wounds, foreign bodies , other emergency conditions, burns and scalds, effects of extremes of temperature, poisoning, bites and stings, disorders of skeletal system, soft tissue injuries, dressing and bandaging, transferring the casualty. Cognitive behaviors were determined by the scores that students received from a knowledge test based on the above stated content.

Students' Affective Behaviors: Students' affective behaviors include their perceived affective behaviors related with the application of first aid procedures during emergency situations. These behaviors affected by positive (having knowledge, sense of responsibility, and sense of humanity) and negative (negative mood, decreased motivation, and fear of contracting a communicable diseases) factors. These factors are crucial to be clarified in order to find out possible barriers or motivating issues and to increase helping behavior in the society. In the current study these factors affecting to students' affective behaviors analyzed in terms of the characteristics of the casualties (gender, age, and appearance), characteristics of the first aiders (knowledge level, gender, and experience level), characteristics of the emergency situations (clarity, appearance of the physical accidental environment, and hygiene), social factors (presence of other bystanders, sense of responsibility, and sense of empathy), and other factors (danger, risk, and time constraints). Affective behaviors were determined by the scores that students received from the first aid affective behavior scale.

Students' Psychomotor Behaviors: All first aid interventions to the emergency events necessitate psychomotor skills. Content of the first aid includes many subjects for the variety of the emergencies. For the purpose of the study two most important life supporting psychomotor skills were selected for the analysis. First one is the first aid skills to deal with unconscious casualty who has a pulse and breathing (Recovery position), and the second one is to deal with the unconscious casualty who has no pulse and no breathing (CPR). Ministry of Health of Turkey and Turkish Red Crescent Society follows the ERC rules and regulations related with the first aid. According to the latest ERC guidelines (2005) on the survival of the casualties, first aider should turn the unconscious casualties who have pulse and breathing into a recovery position while waiting for the emergency medical help. Steps of the recovery position includes: checking safety (both for the victims and the first aiders), checking for response, shouting for help (if the casualty is unresponsive), opening airway, checking breathing, turning the casualty into recovery position (if the casualty is breathing), and calling the medical help. All these steps ensure the safety of the casualty and should effectively be applied by the first responder. Because leaving the casualty in his/her original position or lying down position is not safe, and may be harmful for the airway and breathing functions. CPR is another selected life saving psychomotor skill for the current study. In most of the literatures CPR was mentioned as the most important life saving skill for many years. Like recovery position, it includes steps to be completed for the unconscious casualty who has no breathing and no pulse. ERC (2005) documented the guidelines for the CPR as: checking safety (both for the victims and the first aiders), checking for response, shouting for help (if the casualty is unresponsive), opening airway, checking breathing, if the casualty is not breathing ERC stressing on the activation of the medical help by sending someone to call or if the first aider is alone calling by his/her own, and starting CPR by 30 chest compressions and 2 breaths until medical help arrives, the victim starts breathing normally, or the first aider become exhausted without any interruption. The aim of CPR is mostly to circulate the oxygen to the vital organs especially to brain and to prevent the brain damage. In order for CPR to be effective, chest compressions and breaths must be applied properly. ERC also reported latest guidelines for the

effective chest compressions and breathing and these guidelines had taken as a source for the present study. Psychomotor behaviors in the present study shortly determined by the students' performance scores on specified first aid skills.

***Retention*:** Students' scores on cognitive, psychomotor and affective behaviors after 18 weeks time interval following completion of the instruction.

3.5 Data Source

Participants in this study were those who voluntarily registered for First Aid course in the department of Physical Education and Sports. Ninety students (52 female, 48 male) in total registered the course as a 3 credit elective. They were mainly 2nd 3rd and 4th year students from the Education Faculty of Computer Education and Instructional Technology (n= 16), Foreign Language Education (n= 14), Elementary Education including the departments of Elementary Science, Elementary Math (n= 19), Secondary Science and Mathematics (n= 15), Science Education including Math, Physics, and Chemistry teaching (n= 15). Eleven students were from the other faculties including Faculty of Arts and Sciences, Faculty of Engineering and Faculty of Economic and Administrative Sciences. For the purpose of the study 3 groups were formed by randomly assigning students to each group: Group 1 (traditional instruction), Group 2 (case-based instruction), and Group 3 (web-based instruction). Afterwards the researcher decided what instructional treatments each group would be subjected to. Informed consent was obtained from all subjects who participated in the study.

3.6 Treatment

Subjects in Group 1 (traditional instruction) were taught by certified instructor (Turkish Red Crescent (TRC) Certificate-Trainee of the First Aiders) via traditional classroom instruction (Appendix A). All content was provided in a face to face manner in which teachers talked-and students listened seventy per cent of class time

(Goodlad, 1984, p.4). The instruction combined with the use of lecture and skills practice. The traditional classroom-based first aid training was presented with the same content as in the case-based and the web-based training. The instructional environment for the traditional instruction was the classroom. The role of instructor in traditional instruction was to present the course content mainly in a lecture format. Students listened to the instructor and participated in class discussions. They were also provided a course book.

Subjects in Group 2 (case-based instruction) were taught by face to face instruction supported by case scenarios related with the first aid (Appendix B). Additionally, most of the scenarios were practiced in laboratory environment. The role of the instructor was to enhance learning by preparing case scenarios, observing learners, asking key questions, and explaining points that have not been understood. Students took part in case studies as actors like bystanders and casualties. In some parts of the course, students made groups to prepare the case scenarios to present them to their classmates. All students participated in class discussions about the case scenarios in order to improve their skills in analyzing and dealing with the unclear emergency situations. They determined the effective action to intervene in a most suitable way for the given scenario. Students were encouraged to participate in class activities solving ambiguous problems such as discussion, listening, and presenting suggestions and opinions. Cases were prepared mostly in a role playing format with some written scenarios. Instructor used white board, adult and infant CPR manikin with and without skill guide (to teach CPR skills), trauma make-up including simulated blood concentrate (for realistic trauma cases), dressings (to teach students to control bleeding; to protect wounds, to minimize swelling, to prevent infection, and to ease pain); elastic bandages (to teach students effectively to control bleeding, to keep dressings in position, to give supports); and triangular bandages (to teach students how to support an arm in a sling and additional support to help a splint in place). Student also used the written course materials such as books and journal articles.

Subjects in Group 3 (web-based instruction) were administered the web-based version of the First Aid course. There were asynchronous learning in which communication between instructors to students and students to students did not occur simultaneously. The instructional environment for the course was the World Wide Web. Students were provided with an account to use the web-page that contains the first aid related information. The web-based instruction delivered to students via the NET-ClassR: Learning Management System: Reengineered (Appendix C). It was developed by Middle East Technical University (METU) Informatics Institute in 1997. NET-Class has been currently used in many web based learning projects at METU, including online certificate and degree programs and courses lectured throughout the campus. It was reported by the METU Informatics Institute that by the end of 2004, there were approximately 6000 students enrolled to courses during each academic semester and almost 500 instructors have been using NET-Class as a supplementary tool for their courses. NET-ClassR was dedicated to meet e-learning needs. It was designed for education providers to easily manage their courses and students in an online environment. The system provided an interactive, secure and easy to use interface for students to study online. NET-ClassR allowed both students and instructors to follow and manage web-based asynchronous courses using standard web interfaces. The instructors could easily organize and manage the lecture notes of their courses by using the tool related with the lecture notes, syllabus, schedule, forum, online exam, announcements, tips, links, contact, assignments and grade book (Appendix D). Also, learners had chance to communicate with the instructor and other learners by means of both synchronous and asynchronous communication, follow the assignments given by the instructor of the course, view the announcements, take online exams and track the results of the exam, and edit their profile information. Additionally, each student in web-based instruction course was provided with Mini Anne CPR Kit (Appendix E) which was developed by a Laerdal Medical (Norway). Laerdal Medical was established in 1980 with the objective of providing financial support to research and development projects in the field of acute medicine. The Foundation has so far, together with a sister foundation in the US, supported about 1500 projects including breathing function, heart function, CPR,

brain function, circulation/shock, treatment outside hospital by in excess of 15 million $. Mini Anne CPR Kit was research proven personal learning product that teaches lay people, in the comfort of their own homes, the core skills to perform adult and child CPR in 22 minutes (Lynch et al., 2005). It was designed in the "practice-while-watching" format. The kit contained a personal, inflatable Manikin (Mini Anne) with integrated adult/child compression clicker, a CPR Skills Practice DVD, a CPR resource booklet and other program accessories.

The web-based program was presented with the same content found in the traditional classroom based and the case-based first aid training. The role of instructor was to provide the content that is easy to follow for students, and the role of the learner was to follow the course via internet and web site constructed for the "Interactive First Aid" course. They have a responsibility of the communication with the instructor and with their class mates by using web based sources such as instant messenger, forums, and/or e-mails.

3.7 Data Collection Instruments

Data collection instruments were used in order to identify possible effects of traditional, case-based, and web-based instruction on students' first aid cognitive, psychomotor and affective behaviors and their retention. For each of these areas different data collection instruments were developed and utilized. Each of these instruments explained below:

Assessment of computer literacy skills: In order to determine any difference among the students in terms of perceived computer literacy, "Computer Literacy Skills Test" was conducted to all students at the beginning of the semester. Computer literacy skills test was developed by Dusick and Yildirim (2000). It was originally used to measure the students' perceived computer competency levels on the use of word processor, databases, spreadsheets, Internet applications, presentation software, and operating systems and maintenance of computers. In 2002, Çınar adapted the test into

Turkish with the internal consistency reliability score of 0.98. It was composed of 8 main headings including word processor, database management, spreadsheet, Internet applications, use of presentation software and educational software, operating systems and maintenance of computers. It was originally developed to evaluate the perceived computer competency levels of teachers. However, in 2005, it was used as a test to evaluate the computer competencies of undergraduate students at METU by eliminating the heading of "educational software" (Yecan, 2005). For the purpose of the study researcher also adapted the scale of measurement from "not familiar to very familiar" in the form of 4 degree scale. She conducted the reliability analysis and found coefficient alpha as .97 which indicated high reliability. In the current study, 4 degree scale was used to measure the perceived computer competency level of the students (Appendix F). The test was applied to all students concurrently at the first meeting of the course and took maximum 30 minutes to complete.

Assessment of cognitive behaviors: Cognitive behaviors were evaluated by First Aid Test which includes multiple choice test items (Appendix G) with 4 alternatives. It took 75 minutes to complete, and it was prepared by the researcher according to the course objectives. All groups took the pre-test and post-test at the same time and at the same classroom. However, retention test was applied individually within two weeks period for all groups of students. All tests were administered by the course instructor/researcher. At the beginning of the preparation period of the test, an item pool was set up by collecting the potential questions from previously applied quizzes, mid-terms, and final examinations. Moreover, additional items were added to include as much of the objectives of the course. Test of specification (Table 11) was constructed according to the course content and objectives. In Table 11, the specifications demonstrate the relationship between the content and objectives, and related number of questions for each set of objectives and content.

Table 11

The Table of Specifications for First Aid Test

Content	Levels of Understanding			Total
	Knowledge & Comprehension	**Application**	**Analysis, Synthesis & Evaluation**	
Principles of First Aid	1 (2 %)	1 (2%)	2 (4%)	4 (8%)
Action at an Emergency Situation	2 (4%)	1(2%)	2 (4%)	5 (10%)
Disorders of Respiratory System	0	2 (4%)	2 (4%)	4 (8%)
Disorders of Circulatory System	4 (8%)	2 (4%)	0	6 (12%)
Wounds and Bleeding	0	3 (6%)	2 (4%)	5 (10%)
Burns and Scalds	2 (4%)	1 (2%)	0	3 (3%)
Skeletal System	1 (2%)	5 (10%)	3 (6%)	9 (18%)
Transfer the Casualty	0	0	2 (4%)	2 (4%)
Other Emergency Conditions	6 (12)	5 (10%)	1 (2%)	12 (24%)
Total	16 (32%)	20 (40%)	14 (28%)	50 (100%)

Note: Numbers indicates the number of questions, and percentage in parenthesis indicates the percentage of questions

The first aid test was also checked by an English language expert for the language clarity of the items. In order to estimate the reliability of a test, Kuder – Richardson 21 Reliability Coefficient (KR-21) was utilized (Figure 8):

Putting the values of First aid test items into KR-21 formula, test reliability was found as 0.663. It was suggested that reliability should be at least .70 and preferably higher (Fraenkel & Wallen, 2003). In the present study, the reliability coefficient was below the suggested level, but accepted as low to moderate reliability.

Assessment of affective behaviors: In order to prepare the items of "First Aid Affective Behaviors Scale", open-ended questions were given to the 20 undergraduate and 8 doctoral students from different departments of Faculty of Education at METU, and 3 nurses from METU Medical Center (certified as a trainer by TRC). The questions were about the possible factors that affect the person positively and negatively to act or not to act in emergency situations. Totally 50 factors were listed by the participants as affecting their actions during emergencies. Additionally, 2 interviews were conducted with the certificated trainers by TRC. Trainees were described their own opinions about general attitudes towards first aid interventions, and also they provided information according to their observations from training sessions. Related literature was also searched and findings were used for the purpose of developing items for first aid affective behavior scale (Cacioppo, Petty, & Losch, 1986; Axelsson et al., 1998; Axelsson et al., 2000; Fischer et al., 2006).

Based on responses to open-ended questions, interviews, and the related literature review a 50 item 5 points scale ranging from positively effects to negatively effects was developed. It was checked by an expert (certified by and TRC on trainer of the trainees) in the field of first aid training for the content validity. The pilot survey was conducted on 43 undergraduate students to eliminate any ambiguous statements, and to clarify the items. In accordance with the feedback received from the pilot study, the number of items decreased to 27. Similar and the inappropriate items for the Turkish society were deleted. After the construction of the final form of the scale, test-retest was administered to a group of 77 undergraduate students with a week time interval for the stability of item ratings. Results of the Pearson's correlation indicated that there was a significant positive relationship between the first and the second application of the first aid test for each of the items (27 items) $p < .001$. Means and standard deviations were given in Table 12.

Table 12

Results of Pearson's Correlation for First Affective Behaviors Scale

Items	**Tests**	***M***	***SD***	***r***	***Items***	***Tests***	***M***	***SD***	***r***
Item 1	test	2.96	.498	.947	Item 15	test	2.83	1.15	.991
	retest	2.94	.535			retest	2.80	1.17	
Item 2	test	2.89	.446	.974	Item 16	test	1.77	1.03	.924
	retest	2.88	.485			retest	1.67	1.08	
Item 3	test	3.40	1.31	.993	Item 17	test	1.64	.899	.927
	retest	3.37	1.28			retest	1.63	.901	
Item 4	test	3.15	1.03	.981	Item 18	test	2.80	.585	.960
	retest	3.10	1.11			retest	2.76	.666	
Item 5	test	2.76	.582	.869	Item 19	test	3.64	.870	.991
	Retest	2.71	.645			retest	3.63	.857	
Item 6	test	3.27	1.07	.984	Item 20	test	4.01	.880	.983
	retest	3.25	1.11			retest	4.01	.880	
Item 7	test	2.28	.886	.975	Item 21	test	2.62	.811	.991
	retest	2.29	.859			retest	2.61	.829	
Item 8	test	2.68	1.10	.982	Item 22	test	4.32	.895	.993
	retest	2.63	1.15			retest	4.31	.935	
Item 9	test	3.06	.408	.971	Item 23	test	4.07	.739	.988
	retest	3.05	.455			retest	4.06	.731	
Item 10	test	1.24	.610	.765	Item 24	test	2.37	1.01	.968
	retest	1.18	.578			retest	2.36	1.01	
Item 11	test	4.37	.932	.977	Item 25	test	3.58	.816	.991
	retest	4.36	.887			retest	3.57	.849	
Item 12	test	1.31	.519	.740	Item 26	test	2.22	.995	.994
	retest	1.22	.503			retest	2.20	1.00	
Item 13	test	3.46	1.10	.977	Item 27	test	1.68	1.29	.996
	retest	3.41	1.22			retest	1.70	1.28	
Item 14	test	4.41	.832	.991					
	retest	4.42	.818						

The factor analysis of affective behaviors yielded 5 factors including characteristics of the first casualty, characteristics of the first aider, characteristics of the event, social factors and other factors. Characteristics of the casualty included gender of the casualty, age of the casualty, physical appearance of the casualty, and relatedness of the casualty to the first responder. Additionally, characteristics of the firs aider included the factors related with the gender of the first responder, literacy level of the first responder on first aid, and experience level of the first responder. Also, clarity of the event, existence of body fluids (vomit and blood), and risks of cross infectious diseases (like AIDS of Hepatitis B) was found as factors of characteristics of the event. It was also found that existence of other bystanders; feeling of responsibility,

empathetic feelings, possibility of being praised-punished, and being popular were social factors that would possibly affect first responder's actions during emergencies. Other factors included the items related with the possibility of danger for first responder's life, possibility of risks, having time to intervene casualty, clarity of the laws related with the first aid actions, location of the event, and possibility of the 112 emergency services in a short time (Appendix H).

Additionally, in order to get in-depth information related with the first aid affective behaviors, totally 32, 12 from each group, students were interviewed individually before and after the training. The sample size was determined by considering the maximum variation sampling model (Figure 9). According to the model grades (3rd and 4th), gender (male and female), and CumGPA scores (below 2, between 2-3, and above 2) was taken into account. Although there were also 2nd year students in the sample of the study, because of their rareness in total sample they didn't selected for the interview groups.

<table>
<tr><td colspan="3">Interview Groups
Traditional Instruction (12 students)
Case-based Instruction (12 students)
Web-based instruction (12 students)</td></tr>
<tr><td colspan="3">Grade</td></tr>
<tr><td colspan="2">3rd Class (6 students)</td><td>4th Class (6 students)</td></tr>
<tr><td colspan="3">Gender</td></tr>
<tr><td colspan="2">Male (3 students)</td><td>Female (3 students)</td></tr>
<tr><td colspan="3">CumGPA</td></tr>
<tr><td>2< (1 student)</td><td>2-3 (1 student)</td><td>3> (1 student)</td></tr>
</table>

Figure 9. Maximum variation sampling criteria for the selection of participants for interviews

Interview questions were determined according to the research question of "What is the effect of different teaching methods on students' affective behaviors?" Interview topics were selected in line with the items of first aid affective behaviors scale.

Possible interview questions were formulated by the researcher and revised by a three experienced qualitative researchers. As a pilot study 3 interviews were conducted. Based on the feedback derived from the pilot interviews some prompts were added, some questions removed, and final form of the interview questions was developed (Appendix I).

Assessment of psychomotor behaviors: Since first aid content is composed of many skills, two main life saving skills was selected to be tested: dealing with the unconscious casualty who has no pulse and no breathing (CPR) and dealing with the unconscious casualty who has a pulse and breathing (Recovery Position). Two skills (CPR and recovery position) executed by each student (totally 90) after the treatment (post-test) and 18 weeks after the treatment (retention) were videotaped individually in laboratory setting. Each videotaped student was analyzed for selected psychomotor skills by using checklist. Students provided informed consent for their psychomotor skills to be videotaped. They were declared that their records were confidential. In order to analyze the videotaped skills following checklists were developed:

- **Cardiopulmonary Resuscitation (CPR) Checklist:** CPR is one of the selected life supporting technique in the recent study which is applied to the unconscious, pulseless and breathless casualty. European Resuscitation Council (ERC, 2005) explains the steps that should be followed during application of the CPR. According to these guidelines the first aider starts with the initial assessment by: a) checking for the safety (for both bystanders and the casualty); b) checking for the response; c) shouting for help (if the casualty is unconscious); d) opening airway; e) checking for breathing; f) sending someone or going for help (if the casualty is not breathing); and conducting CPR (30 chest compressions and 2 breaths). CPR has two main components: chest compressions and ventilations. In order to apply effective CPR to the cardiac arrest casualties, combination of compressions and ventilations should be applied in an effective way by considering the compression rate, compression rhythm, and compression depth; and ventilation, ventilation duration, and ventilation volume.

During the evaluation of the CPR skills, there is a need for observation of the movement (body position, arm position, hand placement of the first aiders) and also the variables related with the compression and ventilation. It was suggested in the CPR literature that single evaluation method were not appropriate for all conditions in terms of measuring teaching outcomes (Chamberlain & Hazinski, 2001). Especially CPR skills need to be evaluated with multiple methods, since it includes both observable behaviors (checking for responsiveness, checking for breathing, hand placement, and body position during CPR), and measurable variables.

In order to evaluate observable behaviors CPR skill checklist was prepared by adapting the valid, reliable, and recommended CPR skill checklist (Brennan et al., 1998) (Appendix J). Reason for the adaptation of the CPR checklist instead of using the same checklist was the changes and updates of CPR skills from 1998 to 2005. It was changed according to the 2005 ERC Guidelines (Handley et al., 2005). All the psychomotor behaviors related with the CPR and Recovery position were recorded for 90 students by video recorder.

Interobserver and intraobserver agreement was confirmed by analyzing videotaped CPR and recovery position skills of totally 12 students. Two students were selected from each of the instruction groups (traditional, case-based, and web-based) for both post-test and retention test. For the inter observer agreement, in which two observers observes same skills simultaneously on given checklist, two judges rated students' performance according to pre-defined skills and descriptions. Similarly, intraobserver agreement, in which one observer consistently uses a given instrument, was confirmed by analysis of same records twice at two different times. Van der Mars (1989, pp.78) defined interobserver agreement as "degree to which two persons viewing the same activity with the same coding rules and procedures at the same time agree on what they see/hear", and intraobserver agreement as "degree to which one person records the same data on two separate occasions using the same coding rules and procedures while viewing the same events". Observer agreement for CPR and

recovery position skills was calculated by using the following formula (Van der Mars, 1989):

$$\textbf{Percentage of agreement} = \frac{\textbf{Agreements}}{\textbf{Agreements + disagreements}} \textbf{ x 100}$$

Figure 10. Formula for inter and intra observer agreement

By putting the values into formula the percentage of interobserver agreement of CPR skill checklist was found as 85.71, and intra-observer agreement was found as 89.65.

Additionally, the evaluation of the performance related with the chest compressions and ventilations Resusci Anne Skill Reporter manikin (produced by Laerdal Medical) was used (Appendix K). It is a manikin that measures the CPR performance of the performers in terms of their compression and ventilation skills.

- **Recovery position:** Recovery position is a position that the unconscious casualty with pulse and breathing should be turned into in order to be kept safe until emergency medical service's arrival. European Resuscitation Council (ERC) documented the process for initial assessment of the casualty as: a) checking for the safety (for both bystanders and the casualty); b) checking for the response; c) shouting for help (if the casualty is unconscious); d) opening the airway; e) checking for breathing; f) turning the casualty into recovery position (if the casualty is breathing); g) sending someone or going for help (112); and h) checking for continued breathing (Handley et al., 2005). According to the Guidelines 2000, it was declared that there was no single perfect recovery position for all casualties; instead the first aider should consider some basic principles related with the recovery position: The victim should be in as near a true lateral position as possible, with the head dependent to allow free drainage of fluid. There was no suggested skill checklist for the recovery position in the literature. The skill checklist was developed by the

researcher according to the ERC Guidelines 2005 for the recovery position (Handley et al., 2005) (Appendix L). Additionally, rating scale was adapted from CPR skill checklist (Brennan at al., 1998).

Inter and intraobserver agreement was found by using same formula which was used in the calculation of percentage of agreements in CPR skill checklist. By putting the values into formula interobserver reliability for recovery position checklist was calculated as 88.24, and percentage of intraobserver agreement was found as 93.6.

3.8 Data Collection Procedures

In September 15, 2006, all participants were pre-tested for their cognitive, psychomotor and affective behaviors before the treatments started. After the pretest they were randomly assigned to the treatment groups. Instruction started in September 20, 2006. Following the 12 weeks of intervention in September 29, 2006, participants were post-tested for their cognitive, psychomotor, and affective behaviors. In order to see the effects of time on these behaviors, students were tested by the same instruments 18 weeks after the treatment in third and fourth week of May, 2007. Pre-test and posttest were applied concurrently for the First Aid Cognitive Behavior Test, First Aid Affective Behavior Scale. However, First Aid Psychomotor Behaviors and interviews were applied individually. Data were collected by same instruments and by the same researcher. First Aid Cognitive Behavior Test and First Aid Affective Behavior Scale were administered in the classroom, psychomotor tests and interviews conducted individually in an isolated laboratory. First Aid Cognitive Behavior Test took 75 minutes, First Aid Affective Behavior Scale 20 minutes to complete.

3.9 Data Analysis

Data analysis included the analysis of scores obtained from (a) cognitive behaviors, (b) affective behaviors, (c) and psychomotor behaviors. A mixed factorial ANOVA

was used to compare the cognitive, affective, and psychomotor behaviors of students taught by different teaching methods, and also to compare the effects of different instructional methods on student's acquisition and retention of cognitive, affective and psychomotor behaviors. A mixed factorial ANOVA is used to analyze the effects of two or more independent variables, on a single dependent variable. It calculates the test statistic (F) for each of the independent variables and for the interactions between the variables. In the study, 2 independent variables included instructional methods (Groups) with 3 categories (traditional, case-based, and web-based), and tests (Tests) with three (in some parts two) categories (pre-test, post-test, and retention test). The dependent variables were the students' behaviors on cognitive, psychomotor and affective as measured by various instruments. Main effect was the influence of the independent variables; instructional methods and tests, on dependent variable; cognitive, psychomotor, and affective behaviors. Also, interaction effect was the influence of the independent variables (instructional methods and tests) on dependent variable (cognitive, psychomotor and affective behaviors).

Additionally, in order to get in-depth information related with the first aid affective behaviors, qualitative interviews were conducted and the data were analyzed by qualitative data analysis methods. The entire interviews were tape recorded with the permission of the participants. Transcription of the raw data included word-for-word quotations of the participants' responses. These transcribed data were analyzed in line with the hypothesis related with the affective behaviors and the first aid affective behavior scale. In order to analyze data, transcribed responses by students were read over and over and coded to decrease the complexity of the unstructured data, and to dip into students' answers to the questions. Following the initial coding, students' responses in each group were analyzed for each of the interview questions. The data were re-organized according to students' answers to questions in order to identify consistencies and differences among them both in before the instruction started and after the instruction was ended. In the last step, responses were categorized and presented corresponding to the "first aid affective behavior scale". Although

interviews were analyzed mostly in a qualitative manner, some of the data were presented in quantitative form (numbers, frequencies, and percentages).

3.10 Limitations

- Participants were limited to those students taking First Aid course as an elective course.
- Interaction between groups was not controlled
- Web resources other than those prepared by instructor were available to all groups

CHAPTER IV

RESULTS

The purpose of the study was to investigate if students' cognitive, psychomotor, and affective behaviors of first aid were influenced by the instructional delivery methods (traditional, case-based, and web-based) and retention time.

This chapter, which was divided into five sections, presents the results obtained in the study. The first section describes the demographic information of the participants. The second section provides data related with the first aid cognitive behaviors. The third section includes results associated with psychomotor behaviors, and the fourth section with affective behaviors.

4.1 Demographic Information of the Participants

Demographic information related with the participants was gathered at the beginning of the semester including perceived computer literacy. Gender, grade, and CumGPA distribution was given in (Table 13). Participants were 2nd (N= 3), 3rd (N= 44) and 4th (N= 43) grade undergraduate students. Of the participants, 48 were male and 52 were female. Ten percent of the participants had a CGPA lower than 2, 67% had between 2 and 3, and the 13% had above 3 out of 4.

Table 13

Demographic Characteristics of the Sample

		Traditional instruction	Case-based instruction	Web-based instruction	Total
		N	*N*	*N*	*N*
Gender					
	Male	18	17	13	48
	Female	12	13	17	52
	Total	30	30	30	90
Grade					
	2nd	1	2	0	3
	3rd	14	15	15	44
	4th	15	13	15	43
	Total	30	30	30	90
CumGPA					
	<2	3	5	2	10
	2-3	22	22	23	67
	>3	5	3	5	13
	Total	30	30	30	90

Since one of the treatment groups was web-based, which necessitates basic computer literacy skills, all participants took perceived computer literacy scale. A one-way analysis of variance was conducted to investigate the possible differences among traditional, case-based, and web-based instruction groups in terms of perceived computer literacy level. The dependent variable was the perceived computer literacy score, and the independent variable was instruction groups (three levels; traditional, case-based and web-based). The ANOVA test was not significant for the perceived computer literacy level including MS Word, $F(2,85) = 1.62$, $p = .204$; MS Access, $F(2,85) = 3.03$, $p = .054$; MS Excel, $F(2,85) = .312$, $p = .732$, and Internet, $F(2,85) = .269$, $p = .765$. There was no significant difference among students in relation to perceived computer literacy level.

4.2 First Aid Cognitive Behaviors

In order to test the effects of instructional methods (traditional, case-based and web-based) on student's first aid cognitive behavior and retention of cognitive behavior,

two research questions and two related hypotheses were formulated:

Research Questions:

1. What is the effect of web-based, case-based, and traditional instruction on students' first aid cognitive behavior?
2. What is the effect of web-based, case-based, and traditional instruction on students' retention of first aid cognitive behavior?

Related Hypothesis:

H^{o}_{1}: There will be statistically no significant difference between students' first aid cognitive behavior among web-based, case-based, and traditional instruction.

H^{o}_{2}: There will be statistically no significant difference between students' retention of first aid cognitive behavior among web-based, case-based, and traditional instruction.

In order to test the hypothesis on first aid cognitive behaviors and its retention, the data, gathered via 50 questions five alternatives multiple choice test, were subjected to a Mixed Factorial ANOVA. Before the Mixed Factorial ANOVA, the statistical tests of normality were conducted. Data screening indicated that the dependent variable was normally distributed for each of the instructional groups as defined by different levels of the factors. Results of the analysis on normality assumptions demonstrated that, the data met the assumptions for parametric statistical analysis according to values derived from the Skewness (traditional: .860, case-based: -.695, web-based: -.555), Kurtosis (traditional: 1.208, case-based: .932, web-based: -.687), histograms and Quantile-Quantile (QQ) Plots.

For the purpose of evaluating the impact of different instructional methods and time on first aid cognitive behavior test score, a Mixed Factorial ANOVA was conducted. The dependent variable was a first aid cognitive behavior test score, the between factor was instructional methods (Groups) with three levels (traditional, case-based, and web-based) and the within subjects factor was tests with three levels (pre-test, pos-test and retention test).

The Groups and Tests main effects and Groups by Tests interaction effect were tested for **"first aid cognitive behavior"**. Standard deviation and mean score values for the three groups and the three tests (pre-test, post-test, and retention test) were given in Table 14.

Table 14

Means and Standard Deviations of First Aid Cognitive Behaviors

	Groups	*M*	*SD*	*N*
Pre-Test	Traditional Instruction	11.66	4.36	29
	Case-Based Instruction	10.47	6.28	30
	Web-Based Instruction	11.38	4.07	29
	Total	11.16	4.98	88
Post-Test	Traditional Instruction	43.69	3.79	29
	Case-Based Instruction	43.07	3.77	30
	Web-Based Instruction	41.38	4.62	29
	Total	42.72	4.14	88
Retention Test	Traditional Instruction	38.76	5.58	29
	Case-Based Instruction	34.77	5.46	30
	Web-Based Instruction	33.24	5.13	29
	Total	35.58	5.82	88

A three by three mixed factorial ANOVA results revealed that there was a significant main effect of Groups, $F(2, 85) = 4.61$, $p < .05$, $\eta^2 = .10$; and Tests, $F(2, 85) = 1404.13$, $p < .05$, $\eta^2 = .94$; also interaction effect of Groups by Tests, $F(4, 85) = 3.50$, $p < .05$, $\eta^2 = .08$ (Table 15).

Table 15

Analysis of Variance Results for First Aid Cognitive Behaviors

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	337.61	168.81	4.61	.01	.10
Error 1	85	3110.33	36.59			
			Within Subjects			
Tests	2	48160.05	24080.03	1404.13	.00	.94
Tests * Groups	4	239.77	59.94	3.50	.01	.08
Error 2	170	2915.41	17.15			

Results of the analysis demonstrated that scores of students in traditional, case-based, and web-based instructional groups were significantly different in terms of first aid cognitive behavior test scores in pre-test, post-test, and retention test (Figure 11).

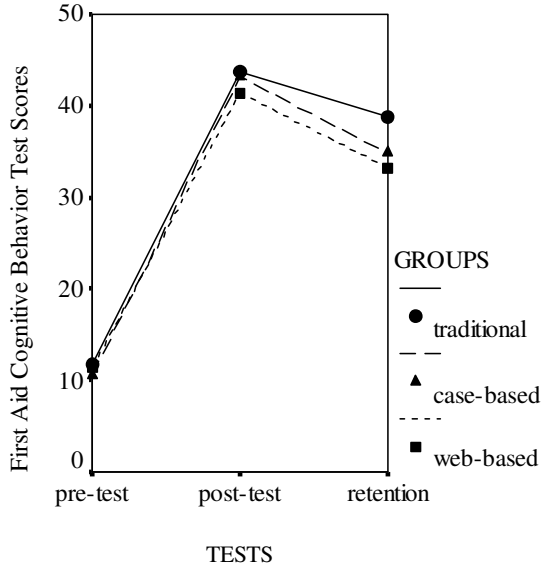

Figure 11. First aid cognitive behaviors by three instruction groups in three tests

The subsequent analysis of the Groups by Tests interaction effect necessitates finding out nature of the interaction. The effect of one independent variable within one category of a second independent variable was analyzed using a simple main effects analysis (Field, 2005). Results demonstrated that, scores of students in all three groups significantly changed from pre-test to post-test, and post-test to retention test (Table 16). Students in three groups had the lowest scores in pre-test (before the instruction), their scores increased dramatically in post-test (after the instruction), and students scores significantly decreased in retention test due to 18 weeks time interval (Table 15).

Table 16

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in terms of First Aid Cognitive Behaviors*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Traditional instruction by Tests	17256.16	2	8628.08	503.11	.00
Case-based instruction by Tests	17221.40	2	8610.70	502.10	.00
Web-based instruction by Tests	13960.37	2	6980.18	407.02	.00

Additionally, in order to examine mean differences among three instruction groups in each test simple main effects analysis was conducted. Results indicated that students' scores, who were in traditional, case-based, and web-based instruction groups, on first aid cognitive behaviors were not different in pre-test and post-test. However, significant difference was observed among instructional groups in retention test (Table 17).

Table 17

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of First Aid Cognitive Behaviors

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Test 1 (pre-test)	22.93	2	11.46	.46	.636
Groups by Test 2 (post-test)	83.00	2	41.50	2.50	.088
Groups by Test 3 (retention test)	471.46	2	235.73	8.09	.001

A One-way between groups analysis of variance was conducted to determine the differences among three instructional groups in retention test. Results derived from one-way ANOVA demonstrated that, there were statistically significant differences at the $p<$ .05 level in first aid cognitive behaviors test scores for the three instruction groups in retention test, $F(2, 432) = 8.09$, $p= .001$. The effect size, calculated using eta squared, was .16 (Cohen, 1988) (Table 18).

Table 18

One-Way Analysis of Variance for Retention Test in Terms of First Aid Cognitive Behaviors

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
Between Groups	2.00	471.46	235.73	8.09	.00	.16
Within Groups	85.00	2475.99	29.13			
Total	87.00	2947.44				

Post-hoc tests were performed after finding statistical significance among three instruction groups in retention test. Results of the analysis were demonstrated in Table 19.

Table 19

Post Hoc Comparisons of Differences among First Aid Cognitive Behavior Test Scores of Traditional, Case-Based, and Web-based Instruction Groups in Retention Test

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
traditional inst.	case-based inst.	3.99	1.41	.02
traditional inst	web-based inst.	5.52	1.42	.00
case-based inst.	web-based inst.	1.53	1.41	.53

Post hoc comparisons using the Tukey HSD test indicated that the mean score for traditional group *(M* = 38.76, *SD*= 5.58) was significantly higher from case-based *(M* = 34.77, *SD*= 5.46) and web-based instruction groups *(M* = 33.24, *SD*= 5.14). However case-based and web-based instruction groups did not differ significantly (Table 20).

Table 20

Means and Standard Deviations of First Aid Cognitive Behaviors for Three Instruction Groups in Retention Test

	N	*M*	*SD*
Traditional Instruction	29	38.76	5.58
Case-based Instruction	30	34.77	5.46
Web-based instruction	29	33.24	5.14
Total	88	35.58	5.82

These results supported the hypothesis (H^o_1) that there was statistically no significant difference between student' in first aid cognitive behaviors among traditional, case-based, and web-based instruction groups. It should be noted that pre-test scores were not statistically significant among three groups. The data for the post-test was collected after students provided by a three different instructional methods for first aid instruction. The data demonstrated that students trained with three different instruction methods improved at almost identical level.

However, results failed to support the hypothesis (H^o_2) that there was statistically no significant difference between student's retention of first aid cognitive behaviors among traditional, case-based, and web-based instruction groups. Retention test was implemented 18 weeks after the training and traditional instruction group obtained significantly higher score than the web-based and case-based instruction group. Furthermore, retention test scores indicated that all the three groups' scores on first aid cognitive behavior decreased as compared to their post-test scores (Figure 11).

These findings were also consistent with the literature on acquisition and retention of first aid knowledge. Many studies indicated that, training had a positive effect on improvement of first aid knowledge (Broomfield, 1996; O'Donnel & Skinner, 1993; Seraj & Naguib, 1990; Su, et al., 2000; Weaver, Ramirez, Dorfman, Raizner, 1979), but time negatively influenced on first aid knowledge (Broomfield, 1996; Lewis, Kee, & Minick, 1993).

There have been many previous research studies on the effects of different instructional methods on acquisition and retention of first aid related knowledge and skills. For example, Sunde et al. (1998) examined the impact of a wall calendar, which was related with safety and first aid, on the first aid knowledge of lay people. They distributed the calendars by using the mass mailing (free-of-charge) procedure and company campaign. Researchers found no educational effect of mass mailing procedure to increase the first aid knowledge and skills. The effectiveness of different instructional methods over the others was one of the major concerns in the first aid

area. One of the popular instructional methods was stated as a self-instruction. Kaczorowski et al. (1998) found no significant benefit of the hands on practice method and the video instruction over the control group. Furthermore, the retention of knowledge and skills remained poor in all groups. It was mentioned by the Eisenburger and Safar (1999) that the individualized practice on manikins and video supported instruction had some advantages on the instructor led courses. Fabius et al. (1994) also compared the traditional and computer-based instructional methods in teaching CPR. He indicated that, no significant difference was observed in terms of knowledge and skills between two groups, but time spent, learner satisfaction and pass/fail rate favored the traditional method of instruction. Present study indicated that, traditional, case-based and web-based instructional methods correspondingly and positively had influence students' first aid cognitive behavior. Parallel to the literature, students' first aid knowledge decreased significantly after 18 weeks time period, but slight difference found in traditional instruction group compared to case-based and web-based instruction groups.

4.3 Psychomotor Behaviors of First Aid

First aid content includes various psychomotor skills. Two main skills were selected to be assessed in the present study: intervention to unconscious casualty who has no pulse and breathing (cardiopulmonary resuscitation-CPR), and intervention to unconscious casualty who has a pulse and breathing (recovery position). Psychomotor skills related with the CPR were evaluated by using 2 different procedures. First procedure was Laerdal Resusci Anne CPR Skill Reporter Manikin which provides printed report on compression and ventilation skill performance. Second procedure was observation through the videotaped records by using observation checklist. In the second procedure students' performance on intervention to unconscious casualty who has pulse and breathing and intervention to unconscious casualty who has no pulse and breathing were videotaped at the time of the skill practice and later observed by the researcher for analysis of data. Data were gathered by using checklists while the skills were being performed. Quality of student's

performance on CPR was determined by using a checklist which ranged from "not competent" (1) to "outstanding" (5). This part includes the results related with the CPR skills derived from the skill reporter and the checklist. In order to test the effect of instructional methods and time on students' psychomotor behaviors two research questions and two related hypothesis were formulated:

Research Questions:

3. What is the effect of web-based, case-based, and traditional teaching approach on students' first aid psychomotor behavior?
4. What is the effect of web-based, case-based, and traditional teaching approach on students' retention of first aid psychomotor behavior?

Related Hypothesis:

H^{o}_{3}: There will be statistically no significant difference between students' first aid psychomotor behavior among web-based, case-based, and traditional instruction groups

H^{o}_{4}: There will be statistically no significant difference between students' retention of first aid psychomotor behaviors among web- based, case-based, and traditional instruction groups.

Research questions and hypothesis above were tested using the data derived from a Laerdal Resusci Anne CPR Skill Reporter Manikin and skill checklist through skill observation.

4.3.1 CPR Skills Performance Derived from Skill Reporter Manikin

Measurements made by skill reporter manikin system included the data on two important components of CPR: compressions (average compression rate, average compression depth, average number of compressions per minute, average percent of compressions, too deep compressions, too shallow compressions, too low hand position, wrong hand position, and total number of compressions) and ventilations (average number of ventilations per minute, average volume of ventilations, minute

volume of ventilations, too fast ventilations, too little ventilations, too much ventilations, total number of ventilations, average percentage of correct ventilations). Pre-test was conducted for CPR skills of students, however they had no knowledge about how to conduct CPR. Post-test and retention test scores were analzed.

4.3.1.1 CPR Chest Compression Skill Performance

In order to test the effects of different instructional methods and time on students' compression skills Mixed Factorial ANOVA was conducted. The dependent variables were skills to deal with unconscious casualty who has no pulse and breathing (CPR). The Skill Reporter Manikin reported the information related with CPR including chest compressions (average rate, average depth, average number of compressions per minute, number of correct compressions, too deep compressions, too shallow compressions, total number of compressions, too low hand position, wrong hand position).

The main effects and interaction effect for each compression skills were tested using the Mixed Factorial ANOVA. In the case(s) of statistically significant main effects and interaction effect, post hoc analysis (by controlling familywise error rate across the tests by using Holm's sequential Bonferoni approach), pairwise comparisons and simple main effects analysis were conducted (Field, 2005).

Compression rate was described as "the speed at which compressions are given" (Handley et al., 2005) and the average compression rate was suggested as being applied 100 compressions per minute (ILCOR, 2005). However, compression rate of 90-110 was accepted as a satisfactory score (Vries & Handley, 2007). As measured by skill reporter manikin, the Tests and Groups main effects and Groups by Tests interaction effects were tested for **"average compression rate"**. Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) are given in Table 21.

Table 21

Means and Standard Deviations of Psychomotor Performance on Chest Compressions

	Traditional instruction				Case-based instruction				Web-based instruction			
	Post-test		Retention		Post-test		Retention		Post-test		Retention	
Skills	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	106.32	18.33	105.25	18.19	105.83	16.88	108.37	58.76	94.64	24.83	91.29	25.05
2	42.82	5.95	43.18	5.43	42.47	4.30	41.80	5.56	31.36	9.34	33.14	11.08
3	63.82	9.45	63.11	10.93	66.30	8.66	62.30	7.53	63.00	15.80	62.00	15.08
4	79.96	26.48	67.68	30.44	82.70	19.15	68.93	29.50	18.04	28.87	13.71	23.87
5	5.57	14.50	10.68	18.98	4.47	9.61	5.17	9.59	4.68	16.72	10.43	30.27
6	11.36	24.70	20.82	34.69	12.60	24.11	26.27	36.99	90.61	47.54	73.32	48.20
7	.04	.19	2.86	8.41	.37	1.54	2.30	9.03	11.93	31.23	11.79	31.26
8	119.57	3.80	120.29	2.71	121.70	5.75	119.10	2.59	122.64	8.52	117.25	11.53
9	7.68	16.19	10.46	20.48	2.87	5.92	5.03	14.44	37.68	41.38	47.07	49.40
10	.04	.19	.00	.00	.93	3.11	.33	1.30	.14	.45	.04	.19

1: Average compression rate
2: Average compression depth
3: Average number of compressions
4: Percentage of correct chest compressions
5: Number of too deep chest compressions
6: Number of too shallow chest compressions
7: Number of too low hand positions
8: Total number of compressions
9: Number of wrong hand positions
10: Number of incomplete releases

A two by three mixed factorial ANOVA on average compression rate revealed that there was no significant main effect of Groups, $F(2, 83) = 2.79$, $p>.05$, $\eta^2 = .06$, Tests, $F(1, 83) = .03$, $p>.05$, $\eta^2 = .00$; and interaction effects of Groups by Tests, $F(2, 83) = .19$, $p>.05$, $\eta^2 = .01$ (Table 22).

Table 22

Analysis of Variance Results for Psychomotor Performance on Average Compression Rate

	df	*SS*	*MS*	*F*	*p*	η^2
Source			Between Subjects			
Groups	2	6934.41	3467.20	2.79	.07	.06
Error 1	83	103300.76	1244.59			
			Within Subjects			
Tests	1	17.14	17.14	.03	.87	.00
Tests * Groups	2	256.73	128.36	.19	.83	.01
Error 2	83	56675.88	682.84			

This effect showed that the average compression rate was not different in post-test and retention test for students who taught by three different instructional methods (Figure 12).

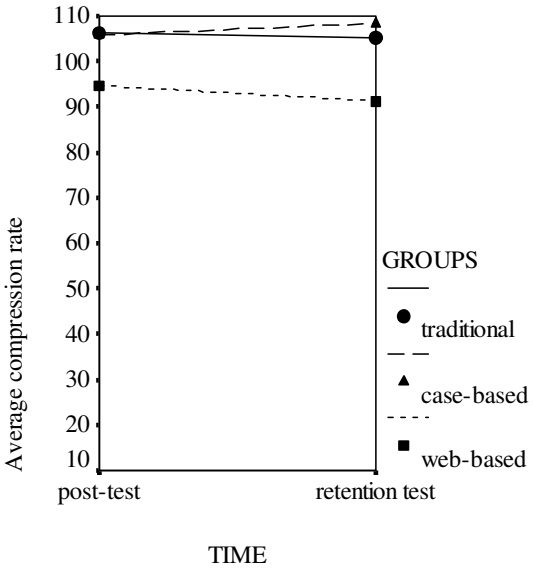

Figure 12. The average compression rate by three instruction groups in two tests

In the current study, average compression rate was about 106 per minute for traditional, 106 for case-based and 95 for web-based instruction groups in the post-test. Also in retention test, compression rates were about 105 for traditional group, 108 for case-based group and 91 for the web-based group. Although students in traditional and case-based instruction groups seemed to performed more chest compressions per minute, students in three different instruction groups performed up to standard level of chest compression rate per minute in both post-test and retention test.

According to the guidelines presented by ILCOR (2005) that, in order chest compressions be effective the adult human chest (sternum) should compressed with a force to displace the sternum at least 4 to 5 cm. These specified numbers directly related with the quality of the CPR performance. Skill reporter manikin measured the students' performance on average compression depth in millimeters. By using these data the Tests and Groups main effects and Groups by Tests interaction effects were tested for **"average compression depth"**. Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on average compression depth revealed that the Groups main effect was significant, $F(2, 83) = 24.96$, $p < .05$, $\eta^2 = .38$. However, Tests main effect, $F(1, 83) = .40$, $p > .05$, $\eta^2 = .01$; and Groups by Tests interaction effect was not significant, $F(2, 83) = .85$, $p > .05$, $\eta^2 = .02$ (Table 23).

Table 23

Analysis of Variance Results for Psychomotor Performance on Average Compression Depth

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	4029.85	2014.92	24.96	.00	.38
Error 1	83	6701.43	80.74			
			Within Subjects			
Tests	1	10.40	10.40	.40	.53	.01
Tests * Groups	2	43.79	21.90	.85	.43	.02
Error 2	83	2150.91	25.92			

Student's in traditional and case-based instruction groups achieved higher results on average compression depth than web-based instruction group in both post-test and retention test (Figure 13).

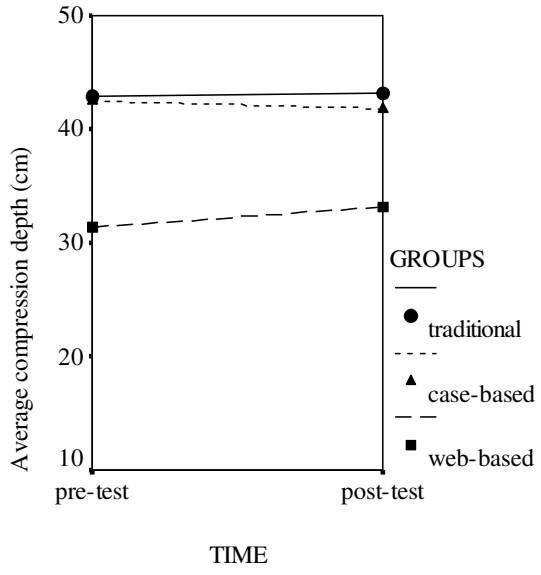

Figure 13. The average compression depth by three instruction groups in two tests

Post hoc comparisons using Tukey HSD test (at $p \leq 0.05$) were conducted to examine further effect of Groups (Table 24).

Table 24

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Average Compression Depth

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	.87	1.67	.86
Traditional Inst.	Web-Based Inst.	10.75	1.70	.00
Case-Based Inst.	Web-Based Inst.	9.88	1.67	.00

The average compression depth in traditional *(M* = 43.00) and case-based *(M* = 42.13) instruction groups were significantly higher than the web-based *(M* = 32.25) instruction group in both post-test and retention test (Table 25). Both in post-test and retention test, students in traditional and case-based instruction group performed up to standard level of compression depth, but students in web-based instruction group performed below than the acceptable level.

Table 25

Descriptive Statistics of Psychomotor Performance on Average Compression Depth by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	43.00	1.20
Case-Based Instruction	42.13	1.16
Web-Based Instruction	32.25	1.20

Scientific guidelines on chest compressions suggested 100 compressions per minute during CPR (ILCOR, 2005). However, students in three groups performed about 65 compressions per minute which were insufficient to be effective. By using the data collected by using skill reporter manikin the Tests and Groups main effect and Groups by Tests interaction effect were tested for **"average number of compressions per minute"**. Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on average number of compressions per minute revealed that there was statistically no significant main effect of Groups, *F(*2,

83) = .23, p>.05, η^2 = .01, and Tests, F(1, 83) = 2.49, p>.05, η^2 = .03; and also interaction effects of Groups by Tests, F(2, 83) = .78, p>.05, η^2 = .02 (Table 26).

Table 26

Analysis of Variance Results for Psychomotor Performance on Average Number of Compressions per Minute

	df	*SS*	*MS*	*F*	*p*	η^2
Source			Between Subjects			
Groups	2	6934.41	3467.20	.23	.80	.01
Error 1	83	103300.76	1244.59			
			Within Subjects			
Tests	1	155.84	155.84	2.49	.12	.03
Tests * Groups	2	97.05	48.53	.78	.46	.02
Error 2	83	5190.86	62.54			

Mean scores of students in traditional, case-based, and web-based instruction groups were not different in both post-test and retention test. As Table 21 indicated students in traditional group performed around 63, case-based group 66 and web-based group 63 chest compressions per minute in post-test. Similarly in retention test, traditional instruction group performed 63, case-based group 62, and web-based group 62 chest compressions per minute.

The skill reporter manikin also measured the percentage of correct compressions by students. The correct chest compressions included the sufficient chest compressions and compressions inside the acceptable pressure point. By using the data from skill reporter manikin the Tests and Groups' main effect and Groups by Tests' interaction effects were tested for **"percentage of correct chest compressions"**. Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on percentage of correct chest compressions indicated that there was a significant Groups main effect, $F(2, 83) = 84.90$, $p < .05$, $\eta^2 = .67$; and also, Tests main effect, $F(1, 83) = 6.84$, $p < .05$, $\eta^2 = .08$. However, there was no interaction effect of Groups by Tests, $F(2, 83) = .58$, $p > .05$, $\eta^2 = .01$ (Table 27).

Table 27

Analysis of Variance Results for Psychomotor Performance on Percentage of Correct Chest Compressions

	df	*SS*	*MS*	*F*	*p*	η^2
Source			Between Subjects			
Groups	2	131487.75	65743.87	84.90	.00	.67
Error 1	83	64271.32	774.35			
			Within Subjects			
Tests	1	4403.17	4403.17	6.84	.01	.08
Tests * Groups	2	735.52	367.76	.58	.57	.01
Error 2	83	53446.59	643.94			

Results indicated that scores of students in three instruction groups differed in terms of percentage of correct chest compressions in post-test and retention test (Figure 14). As demonstrated in Table 21, students in traditional and case-based instruction groups performed higher percentage of correct chest compressions than students in web-based instruction group both in post-test and retention test.

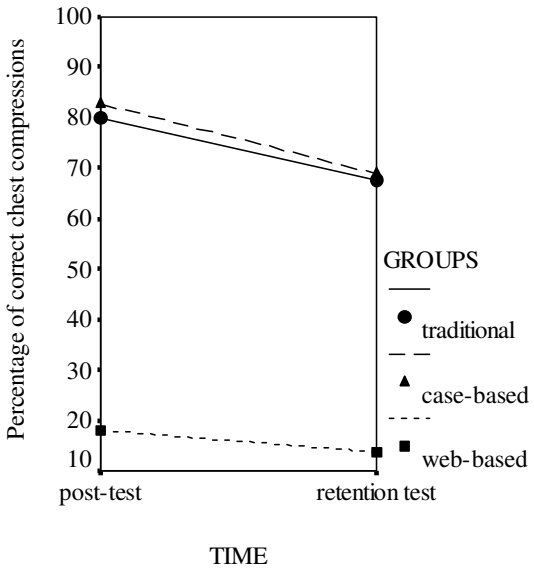

Figure 14. Percentage of correct chest compressions by three instruction groups in two tests

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill reporter manikin. Subjects were divided into three groups according to instructional methods that they assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was a statistically significant difference at the $p < .05$ level in percentage of correct chest compressions for three instructional groups both in post-test [$F(2, 83) = 60.47$, $p = .00$] and retention test [$F(2, 83) = 35.62$, $p = .00$]. Parallel with the statistical significance, the actual difference in mean scores a between group was large. The effect size, calculated using eta squared, was .59 for post-test and .46 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 28).

Table 28

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Percentage of Correct Chest Compressions in Post-Test and Retention Test

	(I) Groups	(J) Groups	(I-J) *MD*	*SE*	*p*
Posttest	Traditional Inst.	Case-Based Inst.	-2.74	6.58	.91
	Traditional Inst.	Web-Based Inst.	61.93	6.69	.00
	Case-Based Inst.	Web-Based Inst.	64.66	6.58	.00
Retention	Traditional Inst.	Case-Based Inst.	-1.25	7.39	.98
	Traditional Inst.	Web-Based Inst.	53.96	7.52	.00
	Case-Based Inst.	Web-Based Inst.	55.22	7.39	.00

Post-hoc comparisons indicated that the percentage of correct chest compressions for traditional instruction group *(M* = 79.96) and case-based instruction group *(M* = 82.70) was significantly higher than the web-based instruction group *(M* = 18.04) in post-test. Similarly, in retention test students in traditional *(M* = 67.68) and case-based *(M* = 68.93) instruction groups performed higher percentage of correct chest compressions than the students in web-based instruction group *(M* = 13.71) (Table 21).

Additionally, a paired samples t-test was conducted to evaluate the impact of the 18 weeks time interval on student's performance scores of the percentage of correct chest compressions. Although, students performance on percentage of correct chest compressions were decreased as a result of 18 weeks time interval (Table 29), statistically significant change was observed only in the performance of case-based instruction group. There was a statistically significant decrease in percentage of correct chest compressions by students in the case-based instruction group.

Table 29

Paired Samples T-Test For Percentage Of Correct Chest Compressions in Post-Test and Retention Test

		M	*N*	*SD*	*t*	*df*	*p*
Traditional instruction	Post-test	79.96	28	26.48	1.62	27	.12
	Retention test	67.68	28	30.44			
Case-based instruction	Post-test	82.70	30	19.15	2.64	29	.03
	Retention test	68.93	30	29.50			
Web-based instruction	Post-test	18.04	28	28.87	.60	27	.56
	Retention test	13.71	28	23.87			

Chest compressions contribute blood flow to the vital organs and prevent brain tissue damage. Efficiency of chest compressions directly effects to survival of the casualties in the case of cardiac arrest. However, results showed that mean percentage of correct chest compressions was significantly lower in web-based instruction group.

As it was previously mentioned, standard chest compression includes depression of sternum about 4-5 cm in adults in order to maintain blood flow to the brain and other vital organs. In the study compression depressed sternum over 51 mm was recorded as too deep compression (Handley & Vries, 2007). The related data were recorded by skill reporter manikin and the Tests and Groups' main effects and Groups by Tests interaction effect were tested for **"too deep chest compressions"**. Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on too deep chest compressions demonstrated that there was no significant main effect of Groups, $F(2, 83) = .41$, $p>.05$, $\eta^2 = .01$; and Tests, $F(1, 83) = 3.35$, $p>.05$, $\eta^2 = .04$; as well as interaction effect of Groups by Tests, $F(2, 83) = .58$, $p>.05$, $\eta^2 = .01$. Scores were not different among three instruction groups in post-test and retention test (Table 30).

Table 30

Analysis of Variance Results for Psychomotor Performance on Too Deep Chest Compressions

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	366.09	183.23	.41	.67	.01
Error 1	83	37211.45	448.33			
			Within Subjects			
Tests	1	637.48	637.48	3.35	.07	.04
Tests * Groups	2	221.29	110.64	.58	.56	.01
Error 2	83	15818.11	19059			

Figure 15 indicated that number of too deep compressions changed approximately between 4 and 10 and increased by the 18 weeks time interval. However, these changes in scores on too deep chest compressions were not statistically significant.

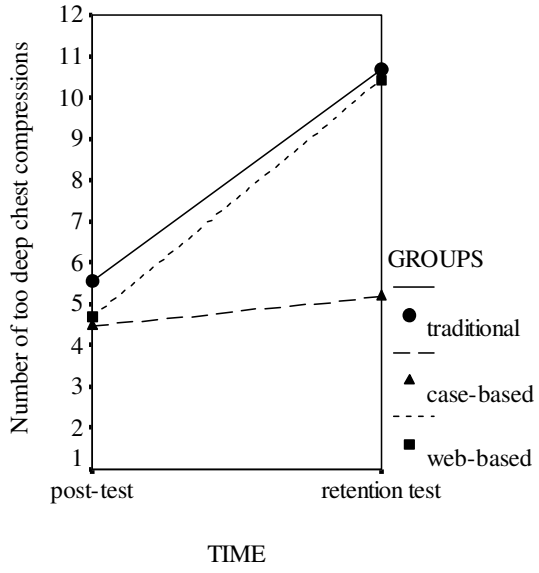

Figure 15 . Number of too deep chest compressions by three instruction groups in two tests

Although statistically no significant difference found among three instruction Groups in post-test and retention test, mean frequency of too deep compressions were about 6-11 for traditional, 4-5 for case-based and 5-10 for web-based instruction Groups.

The pressure below 38 mm is accepted as too shallow for the effective chest compression (Handley & Vries, 2007). The skill reporter manikin provided the data to test the Tests and Groups main effect and Groups by Tests interaction effects for **"too shallow chest compressions".** Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on number of too shallow chest compressions indicated that there was a significant main effect of Groups, $F(2, 83) = 38.96$, $p < .05$, $\eta^2 = .48$; and interaction effect of Groups by Tests, $F(2, 83) = 5.25$, $p < .05$, $\eta^2 = .11$. However, there was statistically no significant main effect of Tests, $F(1, 83) = .21$, $p > .05$, $\eta^2 = .00$ (Table 31).

Table 31

Analysis of Variance Results for Psychomotor Performance on Too Shallow Chest Compressions

	df	*SS*	*MS*	*F*	*p*	η^2
Source	Between Subjects					
Groups	2	155722.66	77861.33	38.96	.00	.48
Error 1	83	165859.72	1998.31			
	Within Subjects					
Tests	1	163.07	163.07	.21	.65	.00
Tests * Groups	2	8026.73	4013.36	5.25	.01	.11
Error 2	83	63424.67	7664.15			

Figure 16 indicated that students in web-based instruction group were performed considerably higher number of too shallow chest compressions than the traditional and case-based instruction groups.

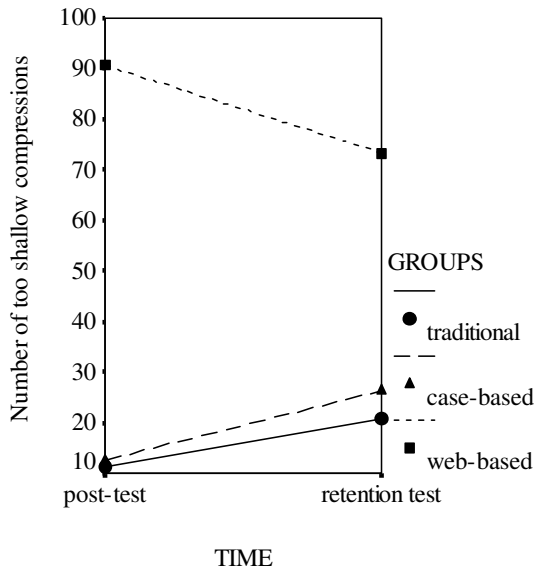

Figure 16. Number of too shallow compressions by three instruction groups in two tests

A simple main effect analysis was conducted to examine the effect of 18 weeks time interval on students' performance of number of too shallow chest compressions. Results of the analysis showed that the number of too shallow chest compressions differed significantly from post-test to retention test in web-based instruction group for the students in web-based instruction group (Table 32). As demonstrated in Figure 6, students in web-based instruction group decreased their number of too shallow chest compressions from post-test to retention test, however, students in traditional and case-based instruction group increased number of chest compressions from post-test to retention test, but the results were not significant.

Table 32

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in terms of Number of Too Shallow Chest Compressions*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Traditional instruction by Tests	1254.02	1	1254.02	1.64	.204
Case-based instruction by Tests	2801.67	1	2801.67	3.67	.059
Web-based instruction by Tests	4183.14	1	4183.14	5.47	.022

Additionally, simple main effect analysis was conducted to find out the differences among instructional groups in each Test (post-test and retention test). Results showed that in posttest and also in retention test there was a big group differences (Table 33). Mean scores, which were given in Table 25, also demonstrated group differences in two tests. The findings were consistent with the Figure 5, which showed the change in the number of too shallow compressions over Tests within each instruction group.

Table 33

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of Number of too Shallow Chest Compressions

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Tests 1 (post-test)	116706.45	2	58353.22	51.33	.000
Groups by Tests 2 (retention test)	47042.94	2	23521.47	14.47	.000

A one-way between-groups analysis of variance was conducted to evaluate the difference among students' performance in post-test and retention test. The ANOVA was significant for both post-test, $F(2, 83) = 51.33$, $p = .000$, and retention test, $F(2, 83) = 51.33$, $p = .000$. The actual difference in mean scores between groups was large for the post-test, but small for the retention test. The effect size, calculated using eta squared, was .55 for post-test and .03 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 34). Follow up tests were conducted to evaluate pairwise differences among the means. There was a significant difference in the means between the traditional (post-test $M = 11.36$, retention test $M = 20.82$) and web-based (post-test $M = 90.61$, retention test $M = 73.32$) instruction groups, and also case-based (post-test $M = 12.60$, retention test $M = 26.27$) and web-based instruction groups (Table 21).

Table 34

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Number of Too Shallow Chest Compressions in Post-test and Retention Test

	(I) Groups	(J) Groups	(I-J) *MD*	*SE*	p
Posttest	Traditional Inst.	Case-Based Inst.	-1.24	8.86	.99
	Traditional Inst.	Web-Based Inst.	-79.25	9.01	.00
	Case-Based Inst.	Web-Based Inst.	-78.01	8.86	.00
Retention	Traditional Inst.	Case-Based Inst.	-5.44	10.59	.87
	Traditional Inst.	Web-Based Inst.	-52.50	10.78	.00
	Case-Based Inst.	Web-Based Inst.	-47.05	10.59	.00

The mean score of web-based instruction group was significantly higher than the traditional and case-based instruction groups both after the instruction and 18 weeks time interval (Table 21). Data on the number of too shallow compressions revealed that students in web-based instruction group performed critically more too shallow chest compressions than students in traditional and case-based instruction groups. These results directly related with the effectiveness of the chest compressions to provide sufficient blood flow to the vital body organs.

Total number of compressions in four sets (1 set= 30 chest compressions + 2 breaths) were also recorded by skill reporter manikin. The Tests and Groups main effects and Groups by Tests interaction effect were also tested for **"total number of compressions".** Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on total number of chest compressions demonstrated that there was a statistically significant main effect of Tests, $F(1, 83) = 5.86$, $p < .05$, $\eta^2 = .07$. However, there was no significant main effect of Groups, $F(2, 83) = .09$, $p > .05$, $\eta^2 = .00$; and interaction effect of Groups by Tests, $F(2, 83) = 3.03$, $p > .05$, $\eta^2 = .07$ (Table 35).

Table 35

Analysis of Variance Results for Psychomotor Performance on Total Number of Chest Compressions

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	8.37	4.18	.09	.91	.00
Error 1	83	3703.45	44.62			
			Within Subjects			
Tests	1	252.85	252.85	5.86	.02	.07
Tests * Groups	2	261.74	130.87	3.03	.06	.07
Error 2	83	3581.80	43.15			

As shown in Figure 17 student's scores were decreased from post-test to retention test as a result of 18 weeks time interval.

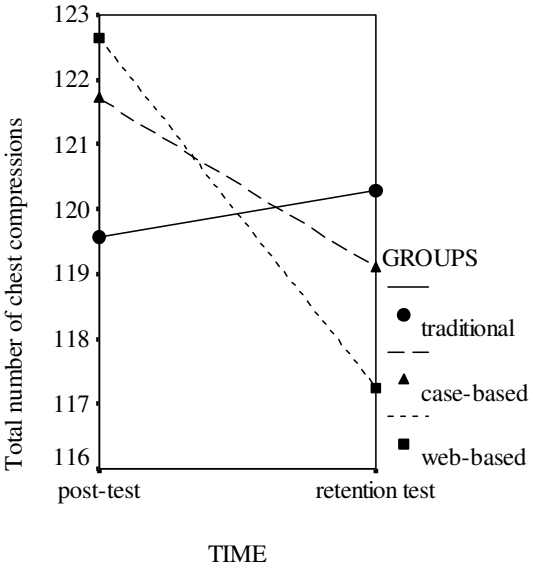

Figure 17. Total number of compressions by three instruction groups in two tests

Pairwise comparisons were conducted to test main effect of Tests on total number of compressions. Results demonstrated significant difference between the post-test and the retention test (Table 36).

Table 36

Pairwise Comparisons of Performance Scores on Total Number of Chest Compressions in Post-test and Retention Test

(I) Tests	(J) Tests	*(I-J) MD*	*SE*	*p*
Post-Test	Retention Test	2.43	1.00	.02

Students' performance scores were significantly decreased from post-test *(M* = 121.31) to retention test *(M* = 118.88) (Table 37).

Table 37

Descriptive Statistics of Psychomotor Performance on Total Number of Chest Compressions in Post-test and Retention Test

Tests	*M*	*SE*
Post-Test	121.31	.681
Retention Test	118.88	.747

Proper hand position for the chest compressions was described as placing hands in the center of the casualty's chest, but pressing on to the sternum rather than the ribs (Handley et al., 2005). It was also stressed out that pressure should not be applied over the upper abdomen or the bottom end of the sternum. As it was recorded by skill reporter manikin the Tests and Groups main effect and Groups by Tests' interaction effects were tested for **"too low hand positions".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on number of too low hand positions demonstrated significant main effect of Groups, $F(2, 83) = 4.72$, $p < .05$, $\eta^2 = .10$; but non significant main effect of Tests, $F(1, 83) = .41$, $p > .05$, $\eta^2 = .01$; and interaction effect of Groups by Tests, $F(2, 83) = .13$, $p > .05$, $\eta^2 = .00$ (Table 38).

Table 38

Analysis of Variance Results for Psychomotor Performance on Too Low Hand Positions during Chest Compressions

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	4139.85	2069.92	4.72	.01	.10
Error 1	83	36395.53	438.50			
			Within Subjects			
Tests	1	101.51	101.51	.41	.53	.01
Tests * Groups	2	64.96	32.48	.13	.88	.00
Error 2	83	20652.70	248.83			

Figure 18 demonstrated that students in web-based instruction group performed higher number of too low hand positions both in post-test and retention test than students in traditional and case-based instruction groups.

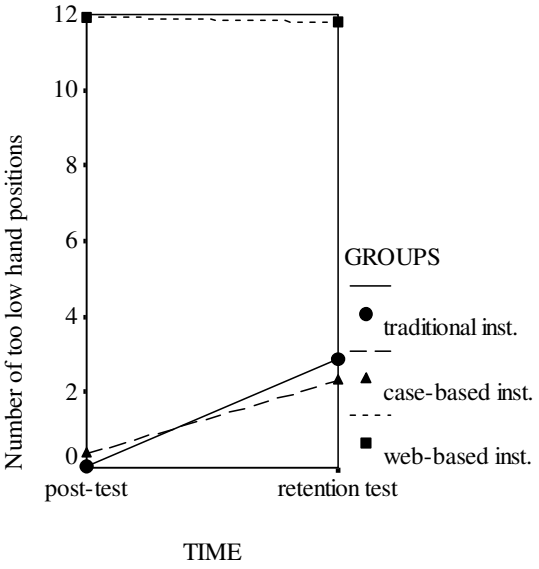

Figure 18. The number of too low chest compressions by three instruction groups in two tests

Post-hoc comparisons indicated significant differences between traditional and web-based, and case-based and web-based instruction groups (Table 39).

Table 39

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Too Low Chest Compressions

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	.11	3.89	1.00
Traditional Inst.	Web-Based Inst.	-10.41	3.96	.027
Case-Based Inst.	Web-Based Inst.	-10.52	3.89	.022

The mean score for the web-based instruction group *(M* = 11.86) was significantly higher than the traditional *(M* = 1.45) and the case-based instruction group *(M* = 1.33). Additionally, no significant difference found between the traditional and case-based instruction groups in terms of number of too low hand positions (Table 40).

Table 40

Descriptive Statistics of Psychomotor Performance on Number of Too Low Hand Positions during Chest Compressions

Groups	*M*	*SE*
Traditional Instruction	1.45	2.80
Case-Based Instruction	1.33	2.7
Web-Based Instruction	11.86	2.80

Too low hand positions, which performed by web-based more frequently, may damage to internal organs.

The correct hand position is critical to ensure effective CPR and to increase the survival of the casualties. In order to make it simpler and easier to remember proper location of the compression was specified as the middle of the chest (sternum). Different points outside the acceptable area (below and above the chest, right and left side of the chest) specified as the incorrect locations to compress during CPR (Handley et al., 2005). The more specifically skill reporter manikin counted the wrong hand positions when chest is depressed outside the correct area either on one

of the sides or at the upper part of thorax, and also when the chest is depressed with hands placed outside the correct area at the lower center part of thorax. By using the data by skill reporter manikin the Tests and Groups' main effects and Groups by Tests interaction effects were tested for **"wrong hand position".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 21.

Results revealed statistically significant main effect of Groups, $F(2, 83) = 22.33$, $p < .05$, $\eta^2 = .35$. However, no significant main effect of Tests, $F(1, 83) = 1.79$, $p > .05$, $\eta^2 = .02$; and interaction effect of Groups by Tests were found, $F(2, 83) = .42$, $p > .05$, $\eta^2 = .01$ (Table 41).

Table 41

Analysis of Variance Results for Psychomotor Performance on Number of Wrong Hand Positions during Chest Compressions

	df	*SS*	*MS*	*F*	*p*	η^2
Source			Between Subjects			
Groups	2	49577.50	24788.75	22.33	.00	.35
Error 1	83	92132.69	1110.03			
			Within Subjects			
Tests	1	982.16	982.16	1.79	.18	.02
Tests * Groups	2	455.87	227.94	.42	.66	.01
Error 2	83	45464.78	547.77			

Results were also consistent with the Figure 19 that web-based instruction group was performed higher numbers of wrong hand positions compared to traditional and case-based instruction groups both in post-test and retention test.

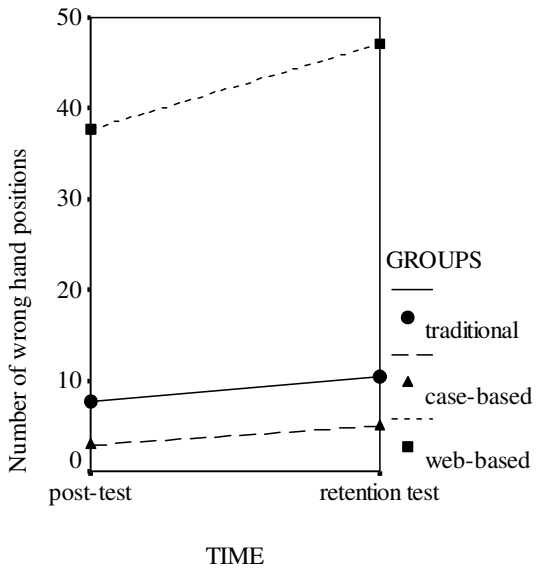

Figure 19. The number of wrong hand positions by three instruction groups in two tests

Post-hoc comparisons indicated significant difference between traditional and web-based, and case-based and web-based instruction groups in terms of number of wrong hand positions (Table 42).

Table 42

Multiple Comparisons of Different Instruction Groups on Number of Wrong Hand Positions

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	5.12	6.19	.69
Traditional Inst.	Web-Based Inst.	-33.30	6.29	.00
Case-Based Inst.	Web-Based Inst.	-38.43	6.19	.00

It was found that the mean score for the web-based instruction group *(M* = 42.38) was significantly higher than the traditional *(M* = 9.07) and the case-based instruction group *(M* = 3.95) (Table 43).

Table 43

Descriptive Statistics of Psychomotor Performance on the Number of Wrong Hand Positions

Groups	*M*	*SE*
Traditional Instruction	9.07	4.45
Case-Based Instruction	3.95	4.30
Web-Based Instruction	42.38	4.45

Similar to some other CPR skills related with the chest compressions, students in web-based instruction group performed poorer than students in traditional and case-based instruction groups in terms of wrong hand positions during chest compressions (Table 21).

Incomplete release defined as a ‘‘leaning’’ phenomenon in which force is not completely removed between chest compressions during CPR (Kramer-Johansen, Edelson, Losert, Köhler, & Abella, 2007). After the chest compression, the pressure must be released completely to allow the chest returning its normal position after each compression (AHA, 2000). The Tests and Groups main effects and Groups by Tests interaction effect were also tested for **“incomplete release during chest compressions”.** Standard deviation and mean score values for the three groups and the two tests (post-test and retention test) were given in Table 21.

A two by three mixed factorial ANOVA on the number of incomplete releases during chest compressions revealed significant main effect of Groups, $F(2, 83) = 3.19$, $p \leq .05$, $\eta^2 = .07$. However, there was no significant main effect of Tests, $F(1, 83) = 1.34$, $p > .05$, $\eta^2 = .02$; and interaction effect of Groups by Tests, $F(2, 83) = .70$, $p > .05$, $\eta^2 = .02$ (Table 44).

Table 44

Analysis of Variance Results for Psychomotor Performance on Number of Incomplete Release during Chest Compressions

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	13.28	6.64	3.19	.05	.07
Error 1	83	172.47	2.08			
			Within Subjects			
Tests	1	2.63	2.63	1.34	.25	.02
Tests * Groups	2	2.77	1.38	.70	.50	.02
Error 2	83	163.42	1.97			

As indicated in Figure 20 students in case-based instruction group performed higher number of incomplete releases during chest compressions than students in traditional and web-based instruction groups.

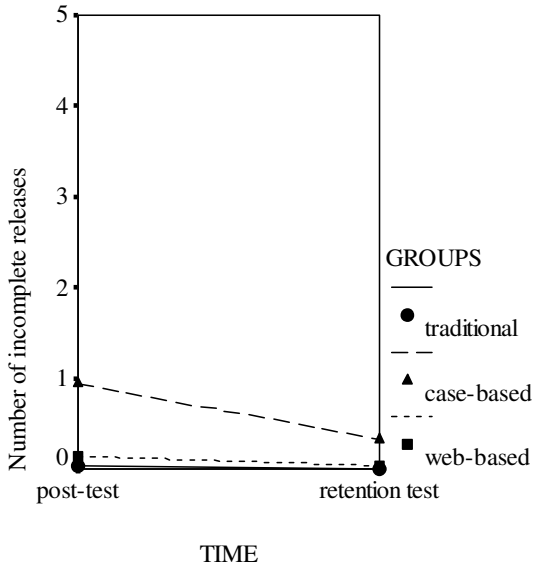

Figure 20. The number of incomplete release by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of instructional groups on the psychomotor performance of number of incomplete releases during chest compressions. Table 45 indicated that student's performance did not differ significantly among three different instruction groups.

Table 45

Multiple Comparisons of Number of Incomplete Releases in Different Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.62	.27	.06
Traditional Inst.	Web-Based Inst.	-.07	.27	.96
Case-Based Inst.	Web-Based Inst.	.54	.27	.11

Post-hoc comparisons indicated that the mean scores of traditional *(M* = .02), case-based *(M* = .63), and web-based *(M* = .09) instruction groups were not significantly different in terms of their performance on incomplete release (Table 46).

Table 46

Descriptive Statistics of Psychomotor Performance by Instruction Groups on Number of Incomplete Release during Chest Compressions

Groups	*M*	*SE*
Traditional Instruction	.02	.19
Case-Based Instruction	.63	.19
Web-Based Instruction	.09	.19

Results of the study demonstrated that number of incomplete release was low in all three groups of students.

4.3.1.2 Performance on Ventilation Skills

Ventilation, which maintains adequate oxygenation of body tissues, is another important component of CPR. It has some previously mentioned critical elements that should be performed properly for the effective CPR. In order to test the effects of different instructional methods and Tests on students' ventilation skills, which collected via CPR Skill Reporter Manikin, a Mixed Factorial ANOVA was conducted. The within subjects factors were Tests with two levels (post-test and retention test) and between subject factors were Groups with three levels (traditional,

case-based, and web-based). Each of the ventilation skills were analyzed independently.

Students required to perform totally 8 ventilations in a 4 sets of CPR (1 set= 30 chest compressions + 2 ventilations) during the evaluation. By using the data derived from skill reporter manikin the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"average number of ventilations".** Standard deviation and mean score values for three groups and the two tests (post-test and retention test) were given in Table 47.

Table 47

Means and Standard Deviations of Psychomotor Performance on Ventilations

	Traditional instruction				Case-based instruction				Web-based instruction			
	Post-test		Retention		Post-test		Retention		Post-test		Retention	
Skills	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	3.79	.83	3.82	.82	3.90	.71	3.83	.59	1.64	1.92	1.82	1.93
2	1005.00	146.83	946.79	213.30	1058.33	174.06	967.67	180.80	486.43	548.41	541.43	564.75
3	3804.29	986.42	3663.93	1256.16	4087.33	833.17	3774.67	1150.67	1577.14	2162.84	1809.29	2152.94
4	3.43	2.86	3.04	3.26	3.30	2.59	4.33	3.26	1.50	2.55	1.79	2.79
5	1.36	1.57	1.46	2.20	.73	1.68	.93	1.48	1.54	2.35	1.21	1.89
6	1.36	1.79	3.68	3.07	1.70	2.53	3.33	3.08	1.04	2.47	1.75	2.77
7	7.96	.57	8.11	1.03	8.07	.37	8.10	.55	3.68	3.80	3.96	3.78
8	36.07	26.46	28.43	29.64	38.40	32.12	22.90	26.90	7.14	14.03	9.54	15.60

1: Average number of ventilations
2: Average volume of ventilations
3: Minute volume ventilations
4: Number of too fast ventilations
5: Number of too little ventilations
6: Number of too much ventilations
7: Total number of ventilations
8: Percentage of correct ventilations

There was a significant main effect of Groups, $F(2, 83) = 39.28$, $p < .05$, $\eta^2 = .49$. However, there was no significant main effect of Tests, $F(1, 83) = .10$, $p > .05$, $\eta^2 = .00$; and interaction effect of Groups by Tests, $F(2, 83) = .21$, $p > .05$, $\eta^2 = .01$ (Table 48).

Table 48

Analysis of Variance Results for Psychomotor Performance on Average Number of Ventilations

	df	*SS*	*MS*	*F*	*p*	η^2
Source			Between Subjects			
Groups	2	167.32	83.66	39.28	.00	.49
Error 1	83	176.76	2.13			
			Within Subjects			
Tests	1	.10	.10	.10	.75	.00
Tests * Groups	2	.44	.22	.21	.81	.01
Error 2	83	85.47	1.03			

Student's performance on average number of ventilations was higher in traditional and case-based instruction groups compared to student's scores in web-based instruction group (Figure 21)

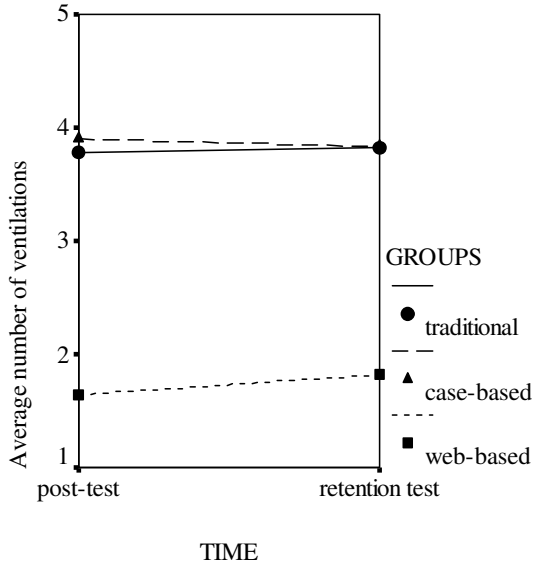

Figure 21. Average number of ventilations by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of groups (Table 49). Post-hoc comparisons indicated that the students performance on average number of ventilations were different between traditional and web-based, and case-based and web-based instruction groups.

Table 49

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Average Number of Ventilations

(I) GROUPS	(J) GROUPS	*(I-J) MD*	*SE*	*p*
traditional inst.	case-based inst.	-.06	.27	1.00
traditional inst.	web-based inst.	2.07	.28	.00
case-based inst.	web-based inst.	2.14	.27	.00

The student's scores on average number of ventilations in traditional *(M* = 3.80) and the case-based instruction Groups *(M* = 3.87) were significantly higher than web-based instruction group *(M* = 1.73) (Table 50).

Table 50

Descriptive Statistics of Psychomotor Performance on Average Number of Ventilations

GROUPS	*M*	*SE*
traditional instruction	3.80	.20
case-based instruction	3.87	.19
web-based instruction	1.73	.20

Students required to perform totally 8 ventilations in a 4 sets of CPR during the evaluation. However, their scores were lower than the standard of 8 ventilations in both post-test and retention test (Figure 21).

The European Resuscitation Council (ERC) had recently suggested the adequate tidal volume of ventilation as 405–600 ml (6-7 ml kg^{-1}). Guidelines, described by ERC in 2005, accepted over 600 ml inflation volume as excessive. The skill reporter manikin provided data on "**average volume of ventilations**" and Tests and Groups main

effects and Groups by Tests interaction effect were tested. Standard deviation and mean score values for three groups and the two tests (post-test and retention test) were given in Table 47.

A two by three mixed factorial ANOVA on average volume of ventilations demonstrated that there was a statistically significant main effect of Groups, $F(2, 83) = 23.91$, $p < .05$, $\eta^2 = .37$. However, statistically no significant main effect of Tests, $F(1, 83) = .68$, $p > .05$, $\eta^2 = .01$; and interaction effect of Groups by Tests was found, $F(2, 83) = 1.35$, $p > .05$, $\eta^2 = .03$ (Table 51).

Table 51

Analysis of Variance Results for Psychomotor Performance on Average Volume of Ventilations

	df	*SS*	*MS*	*F*	*p*	η^2
Source	Between Subjects					
Groups	2	8783525.09	4391762.55	23.91	.00	.37
Error 1	83	15243401.1	183655.44			
	Within Subjects					
Tests	1	42065.07	42065.07	.68	.41	.01
Tests * Groups	2	167193.75	83596.88	1.35	.26	.03
Error 2	83	5125248.69	61749.98			

As it was shown in Figure 22, student's performance on average volume of ventilations was higher in traditional and case-based instruction groups compared to students in web-based instruction group.

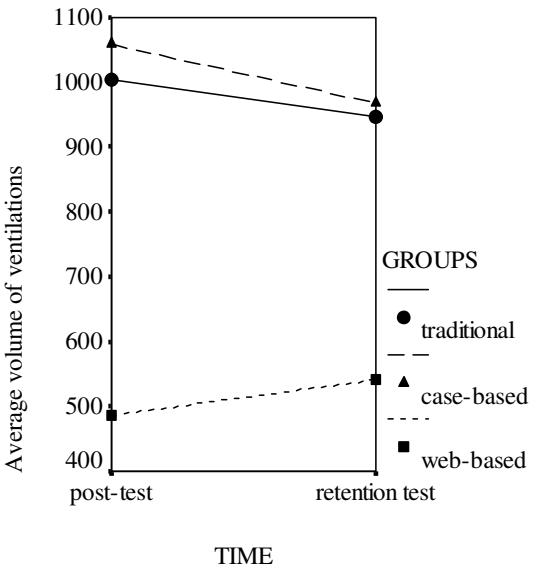

Figure 22. Average volume of ventilations by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of groups Results of the analysis demonstrated significant difference between the performance scores of traditional and web-based, and case-based and web-based instruction groups (Table 52).

Table 52

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Average Volume of Ventilations

(I) GROUPS	(J) GROUPS	*(I-J) MD*	*SE*	*p*
traditional inst.	case-based inst.	-37.11	79.63	.89
traditional inst.	web-based inst.	461.96	80.99	.00
case-based inst.	web-based inst.	499.07	79.63	.00

The average volume of ventilations in traditional *(M* = 975.89) and the case-based instruction Groups *(M* = 1013.00) were significantly higher than web-based instruction group *(M* = 513.93) (Table 53).

Table 53

Descriptive Statistics of Psychomotor Performance on Average Volume of Ventilations

GROUPS	*M*	*SE*
traditional instruction	975.89	57.27
case-based instruction	1013.00	55.33
web-based instruction	513.93	57.27

The data, demonstrated in Table 47, revealed that students in traditional and case-based instruction groups ventilated large amount of air into the casualty's lungs in both post-test and retention test causing to some physiological damages and lessened cardiac output (Handley et al., 2005).

Minute volume ventilations for normal ventilation refer to the total volume of gas in liters exhaled from the lungs per minute. However in CPR it refers to the total volume of gas in liters breath into the lungs of the casualty by the first aider. The data related with the minute volume ventilations collected by the skill reporter manikin and the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"minute volume ventilations".** Standard deviation and mean score values for three groups and the two tests (post-test and retention test) were given in Table 47.

A two by three mixed factorial ANOVA on minute volume of ventilations demonstrated that there was a statistically significant main effect of the Groups, $F(2, 83) = 26.89$, $p < .05$, $\eta^2 = .39$; but statistically no significant main effect of Tests, $F(1, 83) = .18$, $p > .05$, $\eta^2 = .00$; and interaction effect of Groups by Tests, $F(2, 83) = .84$, $p > .05$, $\eta^2 = .02$ (Table 54).

Table 54

Analysis of Variance Results for Psychomotor Performance on Minute Volume of Ventilations

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	174524894	87262447.13	26.89	.00	.39
Error 1	83	269379967	3245541.77			
			Within Subjects			
Tests	1	232853.70	232853.70	.18	.68	.00
Tests * Groups	2	2227044.25	1113522.13	.84	.43	.02
Error 2	83	109474877	1318974.43			

Figure 23 demonstrated that students' performance on minute volume ventilations in traditional and case-based instruction groups were higher than the web-based instruction group.

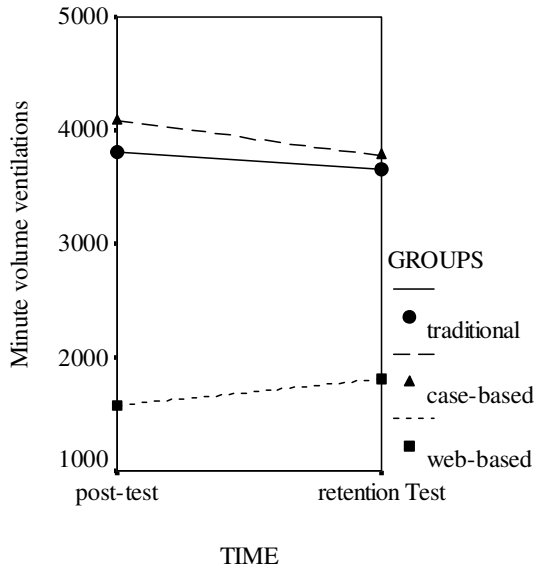

Figure 23. Minute volume ventilations by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of groups. Results demonstrated that student's scores on minute volume ventilations differed significantly between the traditional and web-based, and case-based and web-based instruction groups (Table 55).

Table 55

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Minute Volume of Ventilations

(I) GROUPS	(J) GROUPS	*(I-J) MD*	*SE*	*p*
traditional inst.	case-based inst.	-196.89	334.74	.83
traditional inst.	web-based inst.	2040.89	340.46	.00
case-based inst.	web-based inst.	2237.79	334.74	.00

The minute volume ventilations in web-based group was significantly lower *(M* = 1693.21) than the traditional *(M* = 3734.11) and the case-based instruction groups *(M* = 3931.00) (Table 56).

Table 56

Descriptive Statistics of Psychomotor Performance on Minute Volume of Ventilations by Three Instruction Groups

GROUPS	*M*	*SE*
traditional instruction	3734.11	240.74
case-based instruction	3931.00	232.58
web-based instruction	1693.21	240.74

The too fast ventilations, refers to the flow of ventilations over 1 liter/sec. The guidelines related with the adult CPR suggested not giving rapid and forceful ventilations to avoid gastric inflation and related problems (Handley et al., 2005). Students' performance on ventilations including number of too fast ventilations were measured by skill reporter manikin, and the Tests and Groups main effects and Groups by Tests interaction effect were tested for **"too fast ventilations".** Standard deviation and mean score values for three groups and the two tests (post-test and retention test) were given in Table 47.

A two by three mixed factorial ANOVA on number of too fast ventilations demonstrated that there was a statistically significant main effect of the Groups, *F(*2, 83) = 7.39, $p < .05$, $\eta^2 = .15$. However, there was no significant main effect of Tests,

$F(1, 83) = .58$, $p > .05$, $\eta^2 = .01$; and interaction effect of Groups by Tests, $F(2, 83) = 1.05$, $p > .05$, $\eta^2 = .03$ (Table 57).

Table 57

Analysis of Variance Results for Psychomotor Performance on Too Fast Ventilations

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	145.04	72.52	7.39	.00	.15
Error 1	83	814.82	9.82			
			Within Subjects			
Tests	1	4.09	4.09	.58	.45	.01
Tests * Groups	2	14.76	7.38	1.05	.35	.03
Error 2	83	581.68	7.01			

Students' performance on too fast ventilations was lower in traditional and case-based instruction groups compared to web-based instruction group (Figure 24).

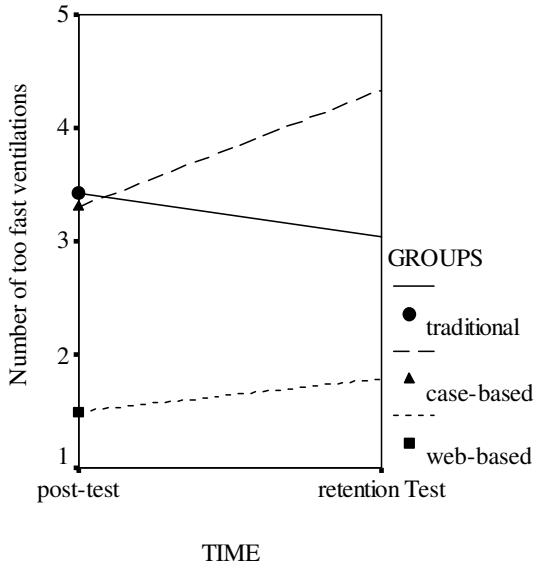

Figure 24. The number of too fast ventilations by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of Groups. Results of the analysis demonstrated that there was statistically significant difference between

students' scores, who were in traditional and web-based, and case-based and web-based instruction groups, on number of too fast ventilations (Table 58).

Table 58

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Too Fast Ventilations

(I) GROUPS	(J) GROUPS	*(I-J) MD*	*SE*	*p*
traditional instruction	case-based instruction	-.58	.58	.58
traditional instruction	web-based instruction	1.59	.59	.02
case-based instruction	web-based instruction	2.17	.58	.00

The number of too fast ventilations in web-based group was significantly lower *(M* = 1.63) than the traditional *(M* = 3.23) and the case-based instruction Groups *(M* = 3.82) (Table 59).

Table 59

Descriptive Statistics of Psychomotor Performance on Too Fast Ventilations by Too Fast Ventilations

GROUPS	*M*	*SE*
traditional instruction	3.23	.42
case-based instruction	3.82	.40
web-based instruction	1.64	.42

As it was mentioned before, too fast ventilations were described as the ventilations with the inflation rate of over 1000 ml/s (ERC, 2000). In guidelines by ERC (2005), it was suggested that the rescue breaths should be given over about 1 s period, with enough volume for the chest rise. It was also suggested to avoid rapid or forceful breaths. Considering the total 8 ventilations during the evaluation, student's performance on number of too fast ventilations were critically higher, and will possibly damage to the casualty's lungs and/or stomach, will diminish the cardiac output, as well as will possibly block the airway.

The ventilation volume lower than 400 ml which was considered as ineffective and too little. However, rather than the larger volumes, smaller volumes had more acceptable harmful effects (ILCOR, 2005). It was measured by the skill reporter manikin, and the Tests and Groups main effects and Groups by Tests interaction effect were tested for **"too little ventilations".** Standard deviation and mean score values for three groups and the two tests (post-test and retention test) were given in Table 47.

A two by three mixed factorial ANOVA on number of too little ventilations revealed that there was no significant main effect of Groups, $F(2, 83) = 1.66$, $p>.05$, $\eta^2 = .04$; main effect of Tests, $F(1, 83) = .00$, $p>.05$, $\eta^2 = .00$; and interaction effect of Groups by Tests, $F(2, 83) = .33$, $p>.05$, $\eta^2 = .01$ (Table 60).

Table 60

Analysis of Variance Results for Psychomotor Performance on Too Little Ventilations

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	12.27	6.13	1.66	.20	.04
Error 1	83	307.01	3.70			
			Within Subjects			
Tests	1	.00	.00	.00	.99	.00
Tests * Groups	2	2.21	1.10	.33	.72	.01
Error 2	83	281.79	3.40			

As Figure 25 indicated, number of too little ventilations was small for all three Groups of students in both post-test and retention test.

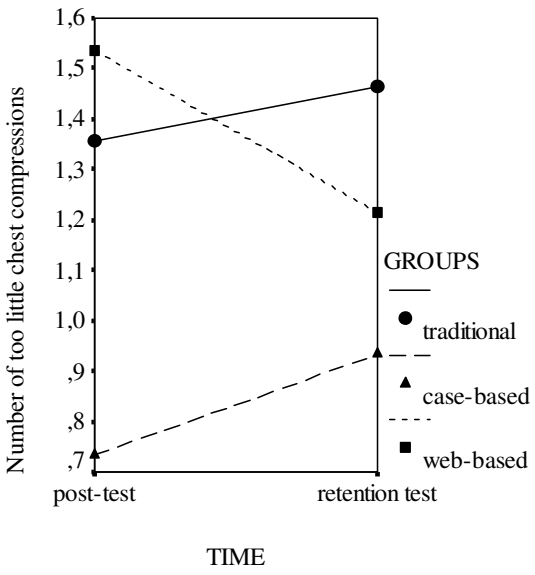

Figure 25. The number of too little ventilations by three instruction groups in two tests

If you breathe in too much air into the victim's lungs, the excess air will enter the victim's stomach and this will cause gastric distention which can lead to vomiting. If the victim vomits they could easily aspirate their vomit into their airway which could be deadly. The Tests and Groups main effect and Groups by Tests interaction effects were tested for **"too much ventilations".** Standard deviation and mean score values for three groups and the two tests (post-test and retention test) were given in Table 47.

A two by three mixed factorial ANOVA on number of too much ventilations showed that there was a statistically significant main effect of Tests, $F(1, 83) = 18.13$, $p < .05$, $\eta^2 = .18$; however there was no significant main effect of Groups, $F(2, 83) = 2.85$, $p > .05$, $\eta^2 = .06$; and interaction effect Groups by Tests, $F(2, 83) = 1.59$, $p > .05$, $\eta^2 = .04$ (Table 61).

Table 61

Analysis of Variance Results for Psychomotor Performance on Too Much Ventilation

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
	Between Subjects					
Groups	2	47.75	23.87	2.85	.06	.06
Error 1	83	695.32	8.38			
	Within Subjects					
Tests	1	104.05	104.05	18.13	.00	.18
Tests * Groups	2	18.21	9.11	1.59	.21	.04
Error 2	83	476.39	5.74			

It was demonstrated in Figure 26 that number of too much ventilations were increased from post-test to retention test.

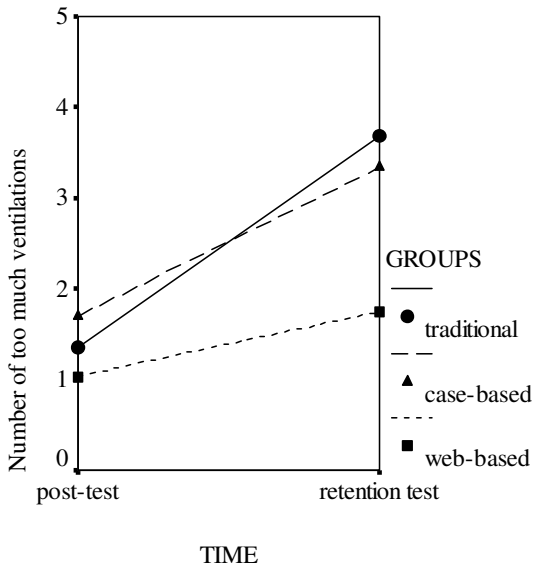

Figure 26. The number of too much ventilation by three instruction groups in two tests

Pairwise comparisons (at $p \leq 0.05$) were conducted to examine further effect of Tests. Results demonstrated significant difference between post-test and retention test in terms of student's performance scores of number of too much ventilation. (Table 62).

Table 62

Pairwise Comparisons of Differences between Too Much Ventilation Scores in Post-test, and Retention Test

(I) Tests	(J) Tests	*(I-J) MD*	*SE*	*p*
Post-Test	Retention Test	-1.56	.366	.00

The number of too much ventilations in post-test was significantly lower *(M* = 1.36) than in retention test *(M* = 2.92) (Table 63).

Table 63

Descriptive Statistics of Psychomotor Performance on Too Much Ventilation in Post-test and Retention Test

Tests	*M*	*SE*
Post-Test	1.36	.25
Retention Test	2.92	.32

It was stated that excessive ventilation is unnecessary and may be harmful for the casualty (AHA, 2005). Such ventilations may contribute air enter the casualty's stomach instead of lungs and may cause vomiting. Although results showed an increase in the number of too much ventilation from post-test to retention test, the number of too much ventilation were not a great deal.

As it was mentioned before total number of ventilations applied by students were 8. In order to test the main effect of Tests and Groups and interaction effect of Groups by Tests mixed factorial ANOVA was conducted for **"total number of ventilations".** Standard deviation and mean score values for three groups and the two tests (post-test and retention test) were given in Table 47.

A two by three mixed factorial ANOVA on total number of ventilations revealed statistically significant main effect of Groups, $F(2, 83) = 48.63$, $p < .05$, $\eta^2 = .54$; but nonsignificant main effect of Tests, $F(1, 83) = .34$, $p > .05$, $\eta^2 = .00$; and non

significant interaction effect of Groups by Tests, $F(2, 83) = .08$, $p>.05$, $\eta^2 = .00$ (Table 64).

Table 64

Analysis of Variance Results for Psychomotor Performance on Total Number of Ventilations

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	678.69	339.34	48.63	.00	.54
Error 1	83	579.23	6.98			
			Within Subjects			
Tests	1	1.02	1.02	.34	.56	.00
Tests * Groups	2	.46	.23	.08	.93	.00
Error 2	83	246.06	2.97			

It was shown in Figure 27 that total number of ventilations were higher in traditional and case-based instruction groups compared to web-based instruction group both in post-test and retention test.

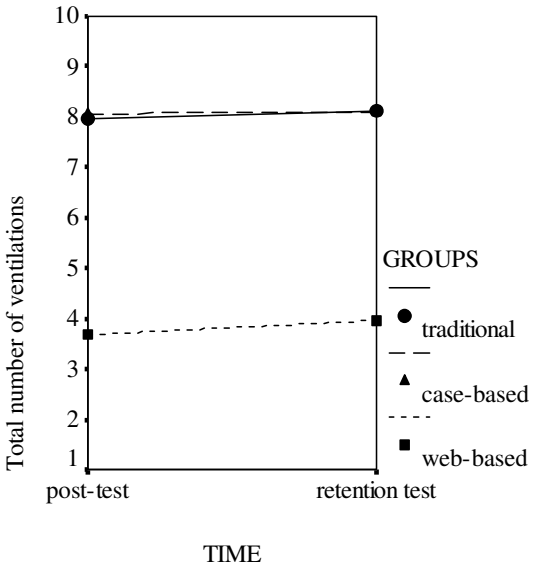

Figure 27. Total number of ventilations by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of groups. Results of

the post hoc analysis demonstrated statistically significant difference between scores of students in traditional and web-based instruction, and also case-based and web-based instruction groups (Table 65).

Table 65

Post Hoc Comparisons of Differences Among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Total Number of Ventilations

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.05	.49	.995
Traditional Inst.	Web-Based Inst.	4.21	.50	.000
Case-Based Inst.	Web-Based Inst.	4.26	.49	.000

The total number of ventilations in traditional *(M* = 8.04) and the case-based *(M* = 8.03) instruction groups were significantly higher than web-based instruction group *(M* = 3.82) (Table 66).

Table 66

Descriptive Statistics of Psychomotor Performance on Total Number of Ventilations by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	8.04	.35
Case-Based Instruction	8.08	.34
Web-Based Instruction	3.82	.35

Students performed 4 sets of (1 set: 30 chest compressions + 2 breaths) CPR during the evaluation. Four sets of CPR included totally 8 ventilations. As Table 78 indicated students in web-based instruction group performed notably lesser number of ventilations which was mainly caused by ineffective ventilations during CPR.

The Tests and Groups main effects and Groups by Tests interaction effect were tested for **"percentage of correct ventilations".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 47.

A two by three mixed factorial ANOVA on percentage of correct ventilations demonstrated that there was a statistically significant main effect of the Groups, $F(2, 83) = 14.08$, $p < .05$, $\eta^2 = .25$; but there was no significant main effect of Tests, $F(1, 83) = 3.72$, $p > .05$, $\eta^2 = .04$; and no significant interaction effect of Groups by Tests, $F(2, 83) = 2.10$, $p > .05$, $\eta^2 = .05$ (Table 67).

Table 67

Analysis of Variance Results for Psychomotor Performance on Percentage of Correct Ventilations

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	20197.81	10098.90	14.08	.00	.25
Error 1	83	59550.70	717.48			
			Within Subjects			
Tests	1	2054.96	2054.96	3.72	.06	.04
Tests * Groups	2	2324.12	1162.06	2.10	.13	.05
Error 2	83	45854.30	552.46			

Percentage of correct ventilations were higher in traditional and case-based instruction groups compared to web-based instruction group both in post-test and retention test (Figure 28)

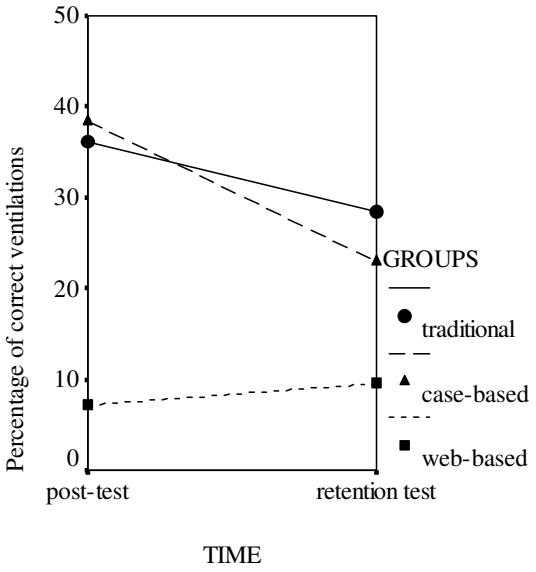

Figure 28. Percentage of correct ventilations by three instruction groups in two tests

Post hoc comparisons using Tukey HSD test (at $p<0.05$) were conducted to examine further effect of Groups Results of the post hoc analysis demonstrated that students scores in traditional and web-based, and also case-based and web-based instruction groups differed significantly in terms of percentage of correct ventilations (Table 68).

Table 68

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Percentage of Correct Ventilations

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	1.60	4.98	.945
Traditional Inst.	Web-Based Inst.	23.91	5.06	.000
Case-Based Inst.	Web-Based Inst.	22.31	4.98	.000

The percentage of correct ventilations in the traditional *(M* = 32.25) and the case-based *(M* = 30.65) instruction groups were significantly higher than web-based instruction group *(M* = 8.34) (Table 69).

Table 69

Means and Standard Deviations of Psychomotor Performance on Percentage of Correct Ventilations by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	32.25	3.58
Case-Based Instruction	30.65	3.46
Web-Based Instruction	8.34	3.58

Although, the percentages of correct compressions were differed among three groups in post-test and retention test, all groups performed poor ventilations in both tests. Results indicated that web-based instruction was the least effective one to improve ventilation skills.

4.3.2 CPR Performance Derived from Observation Checklist

Psychomotor skills, which were recorded by videotape, were evaluated by using checklist that includes various skills on CPR performance. In order to test the effects of different instructional methods and Tests on students' CPR performance, a mixed factorial analysis of variance was conducted. The dependent variable was a 12 different CPR skills rating of 1= not competent and 5= outstanding. These skills were checking safety, checking unresponsiveness, shouting for help, opening airway using head tilt-chin-lift, checking breathing, calling 112, applying 30 chest compressions, locating compression position between every set of compressions, applying 2 rescue breaths, opening airway between every set of compressions correctly, applying effective breaths between every set of compressions, resuming CPR, attempting a pulse check. Each of these skills was analyzed independently. The within-subjects factors were Tests with two levels (post-test and retention test) and between subject factors were Groups with three levels (traditional, case-based, and web-based). The Tests and Groups main effects and Groups by Tests interaction effects were tested using the Mixed Factorial ANOVA. In the case(s) of statistically significant main effects and interaction effect, post hoc analysis were conducted by controlling familywise error rate across the tests by using Holm's sequential Bonferoni approach (Field, 2005).

Ensuring the safety of the casualty and any other bystanders as well as the first responder him/herself was stated as the first and one of the most important steps before intervening to emergency condition (Handley et al., 2005). That's why the Tests and Groups main effects and Groups by Tests interaction effect were tested for **"checking safety"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

Table 70

Means and Standard Deviations of Psychomotor Performance on Cardiopulmonary Resuscitation

	Traditional instruction				Case-based instruction				Web-based instruction			
	Post-test		Retention		Post-test		Retention		Post-test		Retention	
Skills	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	4.31	1.54	2.52	1.96	5.00	.00	3.53	1.96	2.28	1.87	1.83	1.65
2	4.52	1.27	4.66	1.04	4.60	1.22	4.60	1.22	4.38	1.29	3.55	1.78
3	3.90	1.82	1.59	1.40	3.13	2.03	2.17	1.82	3.34	2.00	1.97	1.74
4	4.59	1.24	3.28	1.96	4.60	1.22	4.07	1.72	2.41	1.80	1.93	1.62
5	4.59	1.24	4.38	1.21	4.73	1.01	4.63	1.13	4.55	1.18	3.34	1.70
6	3.90	1.82	1.62	1.40	3.13	2.03	2.33	1.92	3.34	2.00	1.97	1.74
7	4.90	.56	4.83	.66	5.00	.00	4.80	.81	3.38	1.68	2.79	1.54
8	5.00	.00	5.00	.00	5.00	.00	4.83	.75	3.93	1.56	3.86	1.51
9	4.76	.91	4.14	1.57	4.73	.91	4.50	1.31	2.28	1.77	2.24	1.70
10	4.79	.78	4.00	1.73	4.80	.76	4.57	1.14	2.41	1.82	2.31	1.75
11	4.79	.77	4.17	1.51	4.83	.65	4.37	1.40	2.52	1.81	2.62	1.84
12	5.00	.00	5.00	.00	5.00	.00	4.87	.73	4.86	.74	5.00	.00

1: Checking safety
2: Checking unresponsiveness
3: Shouting for help
4: Opening airway using head tilt-chin-lift
5: Checking breathing for no more than 10 seconds
6: Calling 112
7: Applying 30 chest compressions
8: Locating compression position between every set of compressions
9: Applying 2 rescue breaths
10: Opening airway between every set of compressions using head tilt-chin lift
11: Attempting breaths with at least 1 chest rise between every set of compressions
12: Resuming CPR

Analysis of the data demonstrated that, the Groups main, $F(2, 85) = 25.36$, $p < .05$, $\eta^2 = .37$; and Tests main effects were statistically significant, $F(1, 85) = 26.61$, $p < .05$, $\eta^2 = .24$; but Groups by Tests interaction effect was not, $F(2, 85) = 2.83$, $p > .05$, $\eta^2 = .06$ (Table 71).

Table 71

Analysis of Variance Results for Psychomotor Performance on Checking for Safety

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	73.42	36.71	25.36	.00	.37
Error 1	85	123.07	1.45			
			Within Subjects			
Tests	1	67.20	67.20	26.61	.00	.24
Tests * Groups	2	14.30	7.15	2.83	.07	.06
Error 2	85	214.70	2.53			

Performance scores of traditional and case-based instruction groups on checking for safety were higher than the web-based instruction group in both post-test and retention test. Additionally, all three groups decreased their scores from post-test to retention test (Figure 29)

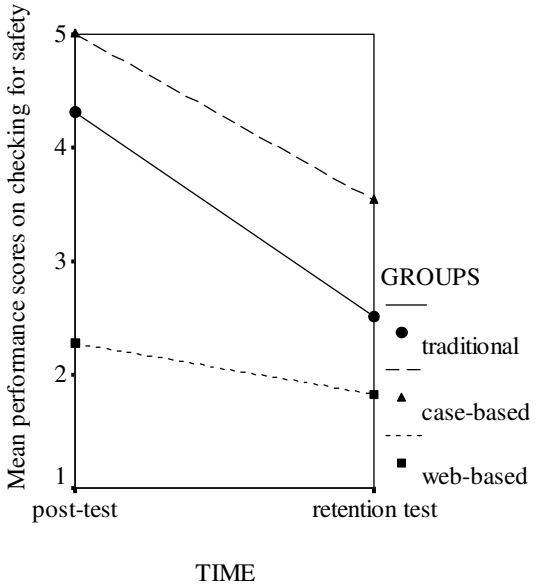

Figure 29. Checking for safety scores by three instruction groups in two tests

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill observation checklist. Subjects were divided into three groups according to instructional methods that they assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was a statistically significant difference at the $p < .05$ level in checking for safety performance for the three instructional groups both in post-test [$F(2, 85) = 30.48$, $p = .00$] and retention test [$F(2, 85) = 6.23$, $p = .00$]. Parallel with the statistical significance, the actual difference in mean scores between groups was large. The effect size, calculated using eta squared, was .42 for post-test and .13 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 72).

Table 72

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Checking for Safety in Post-test and Retention Test

	(I) GROUPS	(J) GROUPS	(I-J) *MD*	*SE*	*p*
Post-Test	Traditional Inst.	Case-Based Inst.	-.69	.36	.14
	Traditional Inst.	Web-Based Inst.	2.03	.36	.00
	Case-Based Inst.	Web-Based Inst.	2.72	.36	.00
Retention Test	Traditional Inst.	Case-Based Inst.	-1.02	.49	.10
	Traditional Inst.	Web-Based Inst.	.69	.49	.34
	Case-Based Inst.	Web-Based Inst.	1.71	.49	.00

Post-hoc comparisons indicated that the percentage of correct chest compressions for traditional instruction group *(M* = 4.31) and case-based instruction group *(M* = 5.00) was significantly higher than the web-based instruction group *(M* = 2.28) in post-test. Similarly, in retention test students in traditional *(M* = 2.52) and case-based *(M* = 3.53) instruction groups performed better checking for safety skills than the students in web-based instruction group *(M* = 1.83) (Table 73).

Additionally, a paired samples t-test was conducted to evaluate the impact of the 18 weeks time interval on student's performance scores on the checking for safety. Although, students performance on checking for safety were decreased as a result of 18 weeks time interval (Table 89), statistically significant change was observed only in the performance of traditional and case-based instruction groups.

Table 73

Paired Samples T-Test for Checking for Safety in Post-Test and Retention Test by Traditional, Case-based and Web-based Instruction Groups

		M	*SD*	*SE*	*t*	*df*	*p*
Traditional	Post-Test Retention Test	1.79	2.29	.43	4.22	28.00	.00
Case-Based	Post-Test Retention Test	1.47	1.96	.36	4.10	29.00	.00
Web-Based	Post-Test Retention Test	.45	2.47	.46	.98	28.00	.34

Skill performance related with the checking for unresponsiveness, which was clearly described in ERC (2005) guidelines, included shaking the casualty's shoulders gently, and asking loudly "are you all right" (Handley et al., 2005). Decision for the casualty's responsiveness is critical and will directly guide to first responder's following actions. Thus. the Tests and Groups main effects and Groups by Tests interaction effect were tested for **"checking for unresponsiveness"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70 .

A two by three mixed factorial ANOVA analysis on checking for unresponsiveness demonstrated that the Groups main effect was significant, $F(2, 83) = 4.33$, $p < .05$, $\eta^2 = .09$. However, Tests main, $F(1, 83) = 1.34$, $p > .05$, $\eta^2 = .02$; and Groups by Tests interaction effects were not statistically significant, $F(2, 83) = 2.28$, $p > .05$, $\eta^2 = .05$ (Table 71).

Table 74

Analysis of Variance Results for Psychomotor Performance on Checking for Responsiveness

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	7.66	3.83	4.33	.02	.09
Error 1	85	75.20	.89			
			Within Subjects			
Tests	1	2.33	2.33	1.34	.25	.02
Tests * Groups	2	7.93	3.97	2.28	.11	.05
Error 2	85	147.79	1.74			

Students' scores on checking unresponsiveness in web-based instruction groups were lower in both post-test and retention test. Additionally, performance of web-based instruction group significantly decreased due to 18 weeks time interval (Figure 30).

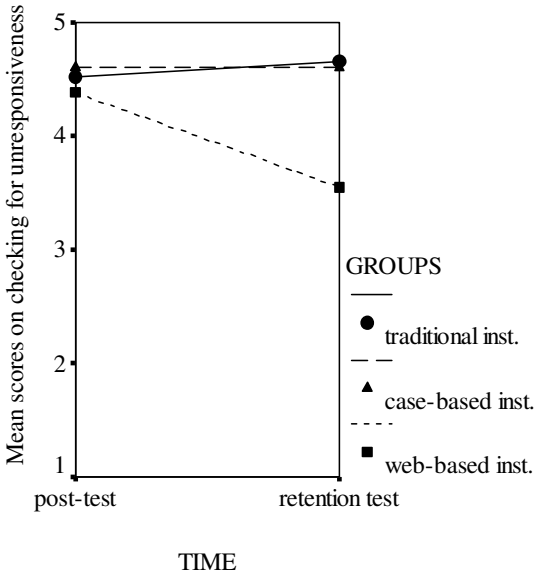

Figure 30. Checking for unresponsiveness scores by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of groups. Results of the post hoc analysis demonstrated significant difference between traditional and web-based and case-based and web-based instruction groups (Table 72).

Table 75

Multiple Comparisons of M Score of Checking for Unresponsiveness by Three Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Instruction	Case-Based Instruction	-.01	.24	.10
Traditional Instruction	Web-Based Instruction	.62	.25	.04
Case-Based Instruction	Web-Based Instruction	.63	.24	.03

The scores on checking unresponsiveness of the casualty in traditional *(M* = 4.59) and the case-based instruction groups *(M* = 4.60) were significantly higher than web-based instruction group *(M* = 3.97) (Table 73). Although scores were outstanding in post-test, students in web-based instruction group decreased their performance significantly in retention test. However, their scores were still at the level of "very good" for checking for responsiveness.

Table 76

Descriptive Statistics on Checking for Unresponsiveness by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	4.59	.17
Case-Based Instruction	4.60	.17
Web-Based Instruction	3.97	.17

Activation of other possible bystanders around the emergency area in order to get help to inform the emergency medical service was another important step of CPR. In most of the emergency conditions, including cardiac arrest, unconscious casualties require medical help. In order to save time, someone rather than the first responder, should activate the medical emergency service while the casualty have been intervened. According to data collected by skill checklist the Tests and Groups main effects and Groups by Tests interaction effect were tested for **"shouting for help"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on shouting for help demonstrated that the Tests main effect was statistically significant, $F(1, 85) = 32.40$, $p < .05$, $\eta^2 = .28$; but Groups main effect, $F(2, 85) = .05$, $p > .05$, $\eta^2 = .00$; and Groups by Tests instruction effects were statistically nonsignificant, $F(2, 85) = 2.13$, $p > .05$, $\eta^2 = .05$ (Table 74).

Table 77

Analysis of Variance Results for Psychomotor Performance on Shouting for Help

	df	*SS*	*MS*	*F*	*p*	η^2
Source			Between Subjects			
Groups	2	.15	.08	.05	.96	.00
Error 1	85	141.44	1.66			
			Within Subjects			
Tests	1	105.97	105.97	32.40	.00	.28
Tests * Groups	2	13.91	6.95	2.13	.13	.05
Error 2	85	278.00	3.27			

Students' scores on shouting for help during emergency situations in all three groups were decreased after 18 weeks time interval (Figure 31).

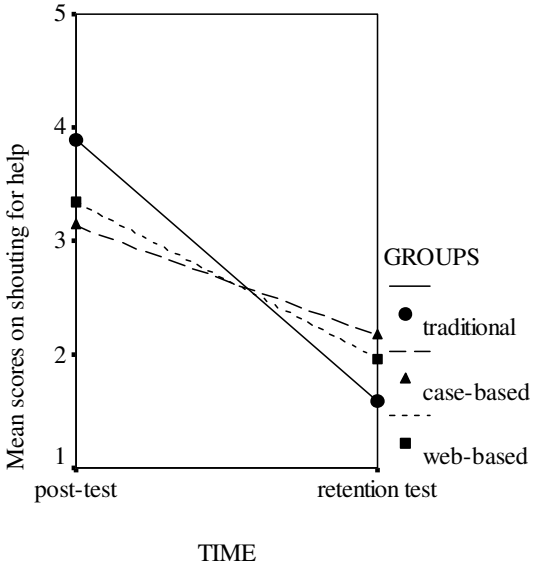

Figure 31. Shouting for help scores by three instruction groups in two tests

Pairwise comparisons were also conducted to examine further effect of Tests. Results of the pairwise comparisons demonstrated statistically significant difference between student's scores in post-test and retention test (Table 75).

Table 78

Pairwise Comparisons of Shouting for Help in Different Tests *with Bonferoni Correction*

(I) Tests	(J) Tests	*(I-J) MD*	*SE*	*p*
Post-Test	Retention Test	1.55	.27	.00

The scores on shouting for helps in post-test was significantly higher *(M* = 3.46) than in retention test *(M* = 1.91) (Table 76). It was revealed that scores were decreased drastically from "very good" level to "questionably competent" level after 18 weeks time interval.

Table 79

Descriptive Statistics of Shouting for Help in Post-test and Retention Test

Tests	*M*	*SE*
Post-Test	3.46	.21
Retention Test	1.91	.18

Opening airway is so important, because airway can be blocked when a person is unconscious due to decreased muscle tone and fall of tongue to the back of airway (Nolan, Deakin, Soar, Bottiger, & Smith, 2005). The head tilt and chin lift method was universally accepted method to open the airway effectively (Handley et al., 2005). For this reason the Tests and Group main effect and Groups by Tests interaction effect were tested for **"opening airway using head tilt-chin-lift"**. Standard deviation and mean score values for the three groups and the three tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on opening airway by using head-tilt-chin-lift method was demonstrated that the Groups main, $F(2, 83) = 25.25$, $p < .05$, $\eta^2 =$

.37; and Tests main effect was statistically significant, $F(1, 83) = 12.19$, $p < .05$, $\eta^2 = .13$; but Groups by Tests interaction effect was statistically not significant, $F(2, 83) = 1.45$, $p < .05$, $\eta^2 = .03$ (Table 77).

Table 80

Analysis of Variance Results for Psychomotor Performance on Opening Airway by Using Head-Tilt-Chin-Lift

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	77.32	38.66	25.25	.00	.37
Error 1	85	130.17	1.53			
			Within Subjects			
Tests	1	26.45	26.45	12.19	.00	.13
Tests * Groups	2	6.27	3.14	1.45	.24	.03
Error 2	85	184.46	2.17			

As it was seen in Figure 32, scores of students in traditional and case-based instruction groups were higher than web-based instruction group. Additionally, students in all three groups decreased their scores after 18 weeks time interval.

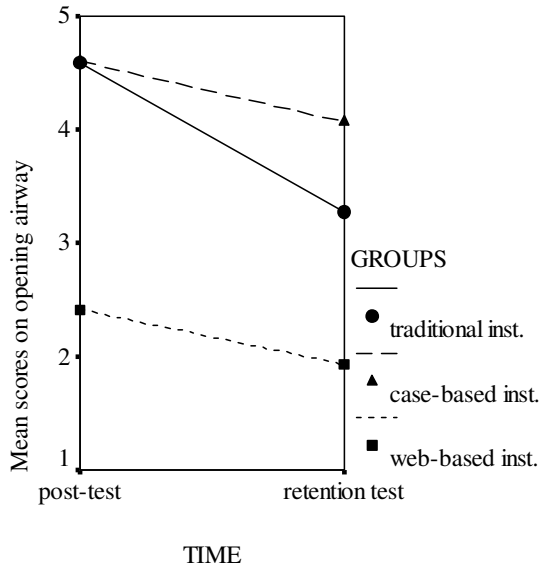

Figure 32. Opening Airway by Using Head-Tilt-Chin-Lift Scores by three instruction groups in two tests

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill observation checklist. Subjects were divided into three groups according to instructional methods that they assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was no statistically significant difference at the $p < .05$ level in scores of students on opening airway by using head tilt-chin lift method for the three instructional groups in post-test [$F(2, 83) = .23$, $p = .80$], however there was a significant difference among group in retention test [$F(2, 83) = 5.88$, $p = .00$]. Parallel with the statistical significance, the actual difference in mean scores between groups was large. The effect size, calculated using eta squared, was .34 for post-test and .20 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 78). Results of the post hoc analysis demonstrated that students' scores on opening airway were not different in post-test (traditional $M = 4.59$, case-based $M = 4.60$, web-based $M = 2.41$), however, in retention test significant difference observed between traditional and web-based and case-based and web-based instruction groups. Scores of students in traditional ($M = 3.28$) and case-based ($M = 4.07$) instruction groups were significantly higher than the web-based ($M = 1.93$) instruction group in retention test (Table 70).

Table 81

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Opening Airway in Post-test and Retention Test

	(I) GROUPS	(J) GROUPS	(I-J) *MD*	*SE*	*p*
Post-Test	Traditional Inst.	Case-Based Inst.	-.08	.33	.97
	Traditional Inst.	Web-Based Inst.	.14	.33	.91
	Case-Based Inst.	Web-Based Inst.	.22	.33	.78
Retention Test	Traditional Inst.	Case-Based Inst.	.06	.36	.99
	Traditional Inst.	Web-Based Inst.	1.10	.36	.01
	Case-Based Inst.	Web-Based Inst.	1.05	.36	.01

Additionally, a paired samples t-test was conducted to evaluate the impact of the 18 weeks time interval on student's performance scores on the percentage of correct

chest compressions. Although, students performance on percentage of correct chest compressions were decreased as a result of 18 weeks time interval (Table 79), statistically significant change was observed only in the performance of traditional instruction group. There was a statistically significant decrease in students' scores on opening airway in the traditional instruction group (post-test M = 4.59, retention test M = 3.28). The eta squared statistic (.28) indicated a large effect size.

Table 82

Paired Samples T-Test for Opening Airway in Post-Test and Retention Test

		M	*SD*	*SE*	*t*	*df*	*p*
Traditional	Post-Test Retention Test	1.31	2.14	.40	3.30	28	.00
Case-Based	Post-Test Retention Test	.53	2.03	.37	1.44	29	.16
Web-Based	Post-Test Retention Test	.48	2.08	.39	1.25	28	.22

Checking for breathing includes three skills that should be applied at the same time. These are described in CPR guidelines as looking for chest movement, listening at the victim's mouth for breath sounds, and feeling for air on cheek (Handley et al., 2005). It is critical to detect whether the casualty is breathing or not, because it would help first aider's preceding first aid actions. Incorrect decisions may result in more damaging consequences for the casualty. Hence the Tests and Groups main effects and Groups by Tests interaction effect were tested for **"checking for breathing"**. Standard deviation and mean score values for the three groups and the three tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on checking for breathing for no more than 10 seconds demonstrated that the Groups main, $F(2, 85) = 5.02$, $p < .05$, $\eta^2 = .11$; and Tests main effects, $F(1, 85) = 7.49$, $p < .05$, $\eta^2 = .08$; as well as Groups by Tests interaction effect was statistically significant, $F(2, 85) = 3.64$, $p < .05$, $\eta^2 = .08$ (Table 80).

Table 83

Analysis of Variance Results for Psychomotor Performance on Checking for Breathing

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	8.47	4.24	5.02	.01	.11
Error 1	85	71.66	.84			
			Within Subjects			
Tests	1	11.20	11.20	7.49	.01	.08
Tests * Groups	2	10.89	5.45	3.64	.03	.08
Error 2	85	127.11	1.50			

Figure 33 demonstrated that students' scores in traditional and web-based instruction groups were similar in post-test, and slight difference was seen between case-based and web-based instruction groups. Additionally, students' scores in all three instruction groups were decreased from post-test to retention test, but the most drastic decrease observed in web-based instruction group.

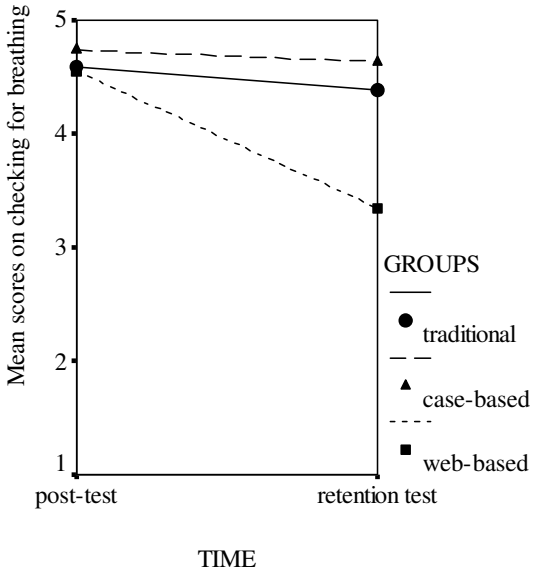

Figure 33. Checking for breathing scores by three instruction groups in two tests

The effects of Tests for each of the instruction groups analyzed by simple main effect analysis (Table 81). According to results, web-based instruction group significantly

decreased their performance scores on checking for breathing from post-test to retention test.

Table 84

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in Terms of Checking for Breathing*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Traditional Group By Tests	.62	1	.62	.42	.521
Case-Based Group By Tests	.15	1	.15	.10	.752
Web-Based Group By Tests	21.12	1	21.12	14.12	.000

The simple main effect analysis was also conducted to find out the effects within the first (post-test) and second (retention-test) levels of the Tests variable. Results showed that in posttest no significant difference found among students in three instruction groups, however, in retention test groups were differed in terms of their scores on checking for breathing (Table 82).

Table 85

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of Checking for Breathing

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Tests 1 (post-test)	.55	2	.28	.21	.812
Groups by Tests 2 (retention test)	27.28	2	13.64	7.32	.001

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill reporter manikin. Subjects were divided into three groups according to instructional methods that they assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was statistically no significant difference at the $p < .05$ level in scores of checking for breathing for three instructional groups both in post-test [$F(2, 83) = .21$, $p = .81$] and but there was a significant difference in retention test [$F(2, 83) = 7.32$, $p = .00$] among groups. Parallel with the statistical significance in retention test, the actual difference in mean scores between groups was large. The effect size,

calculated using eta squared was .15 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 83). Results of the post hoc analysis demonstrated that student's scores on checking for breathing were differed among instructional groups in retention test. Scores of students in traditional *(M* = 4.38) and case-based *(M* = 4.63) instruction groups were significantly higher than the web-based *(M* = 3.34) instruction groups in retention test (Table 70).

Table 86

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Checking for Breathing in Post-test and Retention Test

	(I) GROUPS	(J) GROUPS	(I-J) *MD*	SE	*p*
Post-Test	Traditional Inst.	Case-Based Inst.	-.15	.30	.88
	Traditional Inst.	Web-Based Inst.	.03	.30	.99
	Case-Based Inst.	Web-Based Inst.	.18	.30	.82
Retention Test	Traditional Inst.	Case-Based Inst.	-.25	.36	.76
	Traditional Inst.	Web-Based Inst.	1.03	.36	.01
	Case-Based Inst.	Web-Based Inst.	1.29	.36	.00

Application of first aid procedures (CPR) by first responders in cardiac arrest conditions increases the survival rate of the casualty, however, there is an urgent need for the defibrillation (a process in which an electronic device gives an electric shock to the heart) (AHA, 2008). For these reasons activation of the emergency medical service is important. In ERC guidelines of adult CPR, it was recommended first responders to send someone call for medical help while he/she is performing CPR. In the case that the first responder was alone, it was suggested that first responder should leave the casualty and go for activation of medical help and come back to start chest compressions. In the study the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"calling for 112"**. Standard deviation and

mean score values for the three groups and the three tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on calling 112 showed that the Tests main effect was statistically significant, $F(1, 85) = 30.24$, $p < .05$, $\eta^2 = .26$; however Groups main effect, $F(2, 85) = .05$, $p > .05$, $\eta^2 = .00$; and Groups by Tests interaction effects were statistically not significant, $F(2, 85) = 2.54$, $p > .05$, $\eta^2 = .06$ (Table 84).

Table 87

Analysis of Variance Results for Psychomotor Performance on Calling 112

	df	*SS*	*MS*	*F*	*p*	η^2
Source	Between Subjects					
Groups	2	.17	.08	.05	.95	.00
Error 1	85	149.23	1.76			
	Within Subjects					
Tests	1	97.01	97.01	30.24	.00	.26
Tests * Groups	2	16.27	8.13	2.54	.09	.06
Error 2	85	272.71	3.21			

Figure 34 also indicated that scores of students on calling 112 in all three groups were similar both in post-test and retention test. However, scores were decreased in post-test due to 18 weeks time interval.

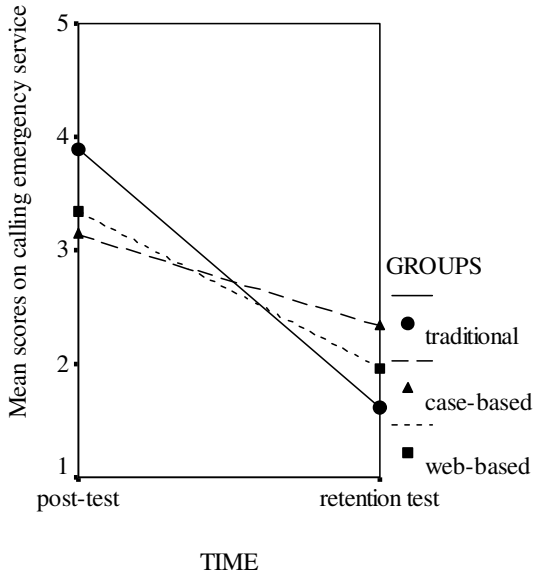

Figure 34. Calling for 112 scores by three instruction groups in two tests

Additionally, pairwise comparisons (at $p \leq 0.05$) were also conducted to examine further effect of Tests. Results of the analysis demonstrated significant difference in students' scores between post-test and retention test in terms of calling 112 (Table 85).

Table 88

Pairwise Comparisons for Calling 112 in Different Tests *with Bonferoni Correction*

(I) Tests	(J) Tests	*(I-J) MD*	*SE*	*p*
Post-Test	Retention Test	1.49	.270	.000

The scores on calling 112 in post-test was significantly higher *(M* = 3.46) than the retention test *(M* = 1.97) (Table 86). Student's scores in all three groups significantly decreased their scores from "competent" to "questionably competent" level.

Table 89

Descriptive Statistics on Calling 112

Tests	*M*	*SE*
Post-Test	3.46	.21
Retention Test	1.97	.18

Chest compressions in CPR included sub-steps to be performed related with body position (Handley et al., 2005) and scoring were determined by considering these sub-steps. Survival of the casualty is positively correlated with the effectiveness of the chest compressions and ventilations. In 2005, ERC published new guidelines and 30 chest compressions and 2 breaths were recommended. Results of the data on application of 30 chest compressions demonstrated that the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"applying 30 chest compressions"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on 30 chest compressions demonstrated that there was a statistically significant main effect of Groups, $F(2, 85) = 55.29$, $p < .05$, $\eta^2 = .57$; but there was no significant main effect of Tests, $F(1, 85) = 3.42$, $p > .05$; $\eta^2 = .04$, and interaction effects of Groups by Tests, $F(2, 85) = 1.01$, $p > .05$, $\eta^2 = .02$ (Table 87).

Table 90

Analysis of Variance Results for Psychomotor Performance on 30 Chest Compressions

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	62.68	31.40	55.29	.00	.57
Error 1	85	48.18	.57			
			Within Subjects			
Tests	1	3.57	3.57	3.42	.07	.04
Tests * Groups	2	2.10	1.01	1.01	.37	.02
Error 2	85	88.85	1.05			

It was demonstrated in Figure 35 that scores of students in traditional and case-based instruction groups were higher than web-based instruction group in both post-test and retention test.

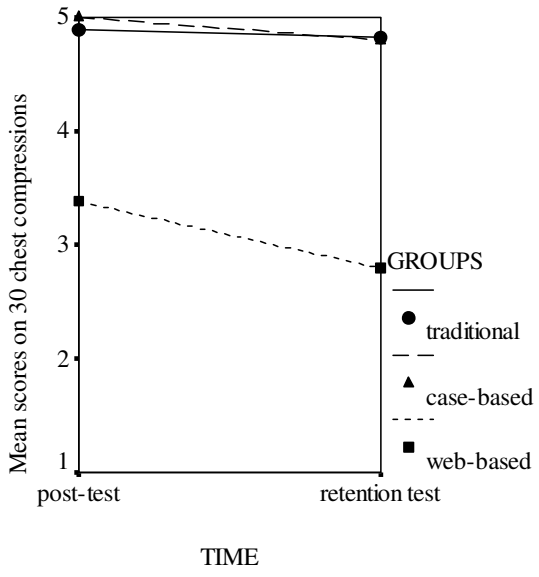

Figure35. Application of 30 chest compressions scores by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of Groups (Table 88). Results demonstrated significant difference between traditional and web-based and case-based and web-based instruction groups in terms of application of 30 chest compressions.

Table 91

Multiple Comparisons of 30 Chest Compressions in Different Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.04	.196	.98
Traditional Inst.	Web-Based Inst.	1.78	.197	.00
Case-Based Inst.	Web-Based Inst.	1.81	.196	.00

The performance score for 30 chest compressions was significantly higher in traditional *(M* = 4.86) and case-based instruction groups *(M* = 4.90) compared to web-based instruction group *(M* = 3.09) (Table 89).

Table 92

Descriptive Statistics on 30 Chest Compressions

Groups	*M*	*SE*
Traditional Instruction	4.86	.14
Case-Based Instruction	4.90	.14
Web-Based Instruction	3.09	.14

As it was previously mentioned, the location for the chest compressions was specified as the middle of chest (sternum). Correct positioning of hand directly related with the blood flow to the vital organs and survival of the casualty (Handley et al., 2005). Thus, the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"locating compression position between every set of compressions"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on locating compression position between every set of compressions demonstrated that the Groups main effect was statistically significant, $F(2, 85) = 18.07$, $p < .05$, $\eta^2 = .30$. However, Tests main effect, $F(1, 85) = .52$, $p > .05$, $\eta^2 = .01$; and Groups by Tests interaction effect was statistically not significant, $F(2, 85) = .20$, $p > .05$, $\eta^2 = .01$ (Table 90).

Table 93

Analysis of Variance Results for Psychomotor Performance on Correct Location of Hands during Chest Compressions

	df	*SS*	*MS*	*F*	*p*	η^2
Source	Between Subjects					
Groups	2	21.99	10.10	18.07	.00	.30
Error 1	85	51.73	.61			
	Within Subjects					
Tests	1	.27	.27	.52	.47	.01
Tests * Groups	2	.21	.10	.20	.82	.01
Error 2	85	44.01	.52			

Scores of students on correct chest compression location in traditional and case-based instruction group were higher than web-based instruction group in post-test and retention test (Figure 36)

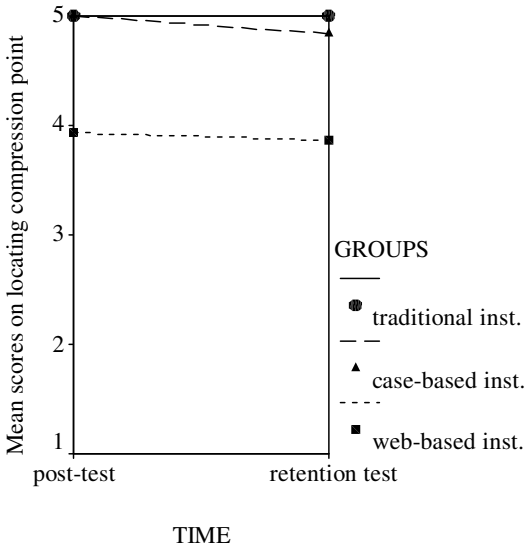

Figure 36. Location of correct hand position scores by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of Groups (Table 91). Results of the post hoc analysis demonstrated statistically significance difference between traditional and web-based and traditional and case-based instruction groups in terms of application of 30 chest compressions.

Table 94

Multiple Comparisons of Correct Location of Hands during Chest Compressions in Different Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	.08	.20	.912
Traditional Inst.	Web-Based Inst.	1.10	.20	.000
Case-Based Inst.	Web-Based Inst.	1.02	.20	.000

The performance score for the locating correct hand position during chest compressions was significantly higher in traditional *(M* = 5.00) and case-based *(M* = 4.92) instruction groups compared to scores of students in web-based instruction

group *(M* = 3.90) (Table 92). However, mean scores of three groups were still between "very good" and "outstanding" level in both post-test and retention test.

Table 95

Descriptive Statistics of Correct Location of Hands during Chest Compressions by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	5.00	.14
Case-Based Instruction	4.92	.14
Web-Based Instruction	3.90	.14

In 2005 guidelines first aiders expected to apply 30 chest compressions and 2 breaths (if the casualty is not breathing) continuously after checking for breathing. Application of breaths is so important hence, the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"2 rescue breaths"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

There was a statistically significant main effect of Groups, $F(2, 85) = 45.78$, $p < .05$, $\eta^2 = .52$; but no significant main effect of Tests, $F(1, 85) = 2.22$, $p > .05$, $\eta^2 = .03$; and interaction effect of Groups by Tests, $F(2, 85) = .74$, $p > .05$, $\eta^2 = .02$ (Table 93).

Table 96

Analysis of Variance Results for Psychomotor Performance on 2 rescue Breaths

	df	*SS*	*MS*	*F*	*p*	η^2
Source	Between Subjects					
Groups	2	10.07	50.54	45.78	.00	.52
Error 1	85	93.82	1.10			
	Within Subjects					
Tests	1	3.86	3.86	2.22	.14	.03
Tests * Groups	2	2.58	1.29	.74	.48	.02
Error 2	85	147.58	1.74			

It was already indicated in Figure 37 that scores of traditional and case-based instruction groups on 2 rescue breaths were higher than web-based instruction group.

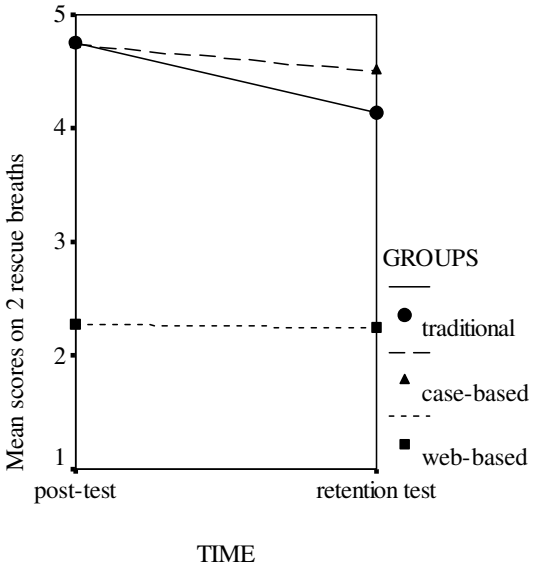

Figure 37. Application of 2 rescue breaths scores by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of Groups (Table 94) results of the post hoc analysis demonstrated that, there was a statistically significant difference between traditional and web-based and case-based and web-based instruction groups in terms of application of 2 rescue breaths.

Table 97

Multiple Comparisons of 2 Rescue Breaths by Three Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.17	.27	.812
Traditional Inst.	Web-Based Inst.	2.19	.28	.000
Case-Based Inst.	Web-Based Inst.	2.36	.27	.000

The performance score for the 2 rescue breaths during ventilations was significantly higher in traditional *(M* = 4.49) and case-based instruction groups *(M* = 4.62) compared to scores of students in web-based instruction group *(M* = 2.26) (Table 95). Scores of students in web-based instruction group were at the level of "questionably

competent", however scores of students in traditional and case-based instruction groups were at the level of "very good" to "outstanding" level.

Table 98

Descriptive Statistics for 2 Rescue Breaths

Groups	*M*	*SE*
Traditional Instruction	4.45	.20
Case-Based Instruction	4.62	.19
Web-Based Instruction	2.26	.20

Opening airway in line with the suggested ERC guidelines (Handley et al., 2005) was a pre-requisite for following first aid procedure of rescue breaths. For this reason, airway must be opened between every set of compressions in order to give rescue breaths effectively. Therefore, the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"opening airway between every set of compressions"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on opening airway between every set of compressions using head-tilt-chin-lift method demonstrated that there was a significant main effect of Groups, $F(2, 85) = 40.25$, $p < .05$, $\eta^2 = .49$; but non significant main effect of Tests, $F(1, 85) = 3.89$, $p > .05$, $\eta^2 = .04$; and interaction effect of Groups by Tests, $F(2, 85) = 1.22$, $p > .05$, $\eta^2 = .03$ (Table 96).

Table 99

Analysis of Variance Results for Psychomotor Performance on Opening Airway between Every set of Compressions

	df	*SS*	*MS*	*F*	*p*	η^2
Source	Between Subjects					
Groups	2	93.64	46.82	40.25	.00	.49
Error 1	85	98.88	1.16			
	Within Subjects					
Tests	1	6.24	6.24	3.89	.05	.04
Tests * Groups	2	3.91	1.95	1.22	.30	.03
Error 2	85	136.41	1.61			

Figure 38 demonstrated that students' scores in traditional and case-based instruction groups in terms of opening airway between every set of compressions by using head tilt-chin-lift method were higher than student's scores in web-based instruction group.

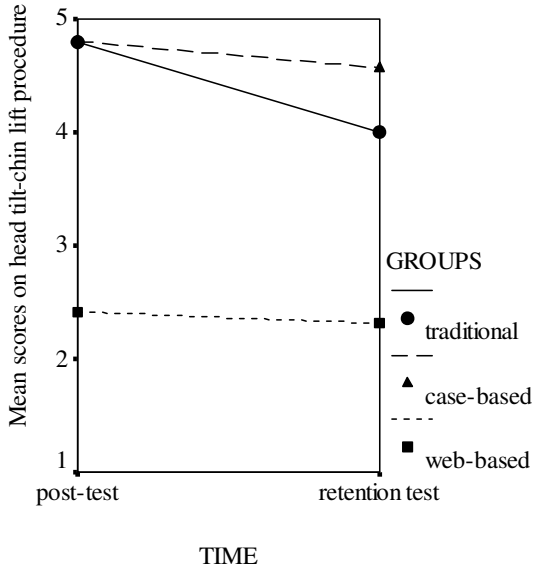

Figure 38. Scores on opening airway by three instruction groups in two tests

Post hoc comparisons using Tukey HSD test (at $p \leq 0.05$) were conducted to examine further effect of Groups (Table 97). Results of the post hoc analysis demonstrated statistically significant difference between traditional and web-based, and case-based and web-based instruction groups.

Table 100

Multiple Comparisons of Opening Airway in Different Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.29	.28	.57
Traditional Inst.	Web-Based Inst.	2.03	.28	.00
Case-Based Inst.	Web-Based Inst.	2.32	.28	.00

The performance scores of students on opening airway higher in traditional *(M* = 4.40) and case-based instruction groups *(M* = 4.68) compared to performance score of web-based instruction group *(M* = 2.36) (Table 98).

Table 101

Descriptive Statistics of Opening Airway Between Every Set Of Compressions

Groups	*M*	*SE*
Traditional Instruction	4.40	.20
Case-Based Instruction	4.68	.20
Web-Based Instruction	2.36	.20

In order to provide effective oxygenation of the tissues, first aider should be able to attain chest rise during ventilation. As observed by skill checklist the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"attempting breaths with at least 1 chest rise between every set of compressions"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on attempting breaths with effective chest rise between every set of compressions demonstrated that there was a significant main effect of Groups, $F(2, 85) = 33.51$, $p < .05$, $\eta^2 = .44$; but non significant main effect of Tests, $F(1, 85) = 2.80$, $p > .05$, $\eta^2 = .03$; and interaction effect of Groups by Tests, $F(2, 85) = 1.25$, $p > .05$, $\eta^2 = .03$ (Table 99).

Table 102

Analysis of Variance Results for Psychomotor Performance on Attempting Breaths with Effective Chest Rise between Every set of Chest Compressions

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	75.92	37.96	33.51	.00	.44
Error 1	85	96.30	1.33			
			Within Subjects			
Tests	1	4.73	4.73	2.80	.10	.03
Tests * Groups	2	4.23	2.12	1.25	.29	.03
Error 2	85	143.49	1.69			

Scores of student in traditional and case-based instruction groups were higher compared to web-based instruction group in terms of attempting breaths with at least one chest rise between every set of compressions (Figure 39).

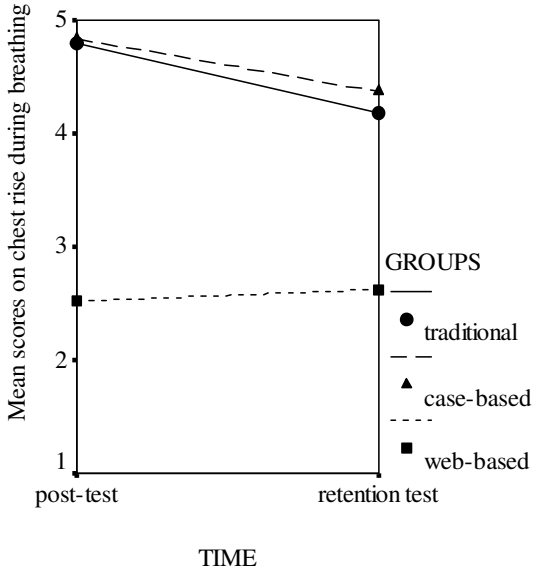

Figure 39. Scores on attempting chest compressions with effective chest rise between every set of compressions by three instruction groups in two tests

Post hoc comparisons using Tukey HSD test (at $p \leq 0.05$) were conducted to examine further effect of Groups (Table 100). Results of the post hoc analysis demonstrated significant difference between traditional and web-based, and case-based and web-based instruction groups.

Table 103

Multiple Comparisons of Attempting Breaths with Effective Chest Rise between Every set of Chest Compressions by Three Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.12	.28	.91
Traditional Inst.	Web-Based Inst.	1.91	.28	.00
Case-Based Inst.	Web-Based Inst.	2.03	.28	.00

The performance score of attempting breaths with at least 1 chest rise between every set of compressions was significantly higher in traditional *(M* = 4.48) and case-based instruction groups *(M* = 4.60) compared to web-based instruction group *(M* = 2.57) (Table 101). Students in web-based instruction group had deficient performance score

between the level of "competent" and "questionably competent" levels in both post-test and retention test.

Table 104

Descriptive Statistics for Attempting Breaths with Effective Chest Rise between Every set of Chest Compressions by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	4.48	.20
Case-Based Instruction	4.60	.19
Web-Based Instruction	2.57	.20

According to the recent updates CPR suggested to include 30 chest compressions and 2 breaths (ERC, 2005). Both chest compressions and ventilations should be applied without interruption. The Tests and Groups main effect and Groups by Tests interaction effects were tested for **"resuming CPR"**. Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 70.

A two by three mixed factorial ANOVA on resuming CPR demonstrated that the Groups main effect, $F(2, 85) = .49$, $p>.05$, $\eta^2 = .01$; Tests main effect, $F(1, 85) = .00$, $p>.05$, $\eta^2 = .00$; and Groups by Tests interaction effect was statistically nonsignificant, $F(2, 85) = 1.49$, $p>.05$, $\eta^2 = .03$ (Table 102).

Table 105

Analysis of Variance Results for Psychomotor Performance on resuming CPR

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	.09	.05	.49	.61	.01
Error 1	85	7.73	.09			
			Within Subjects			
Tests	1	.00	.00	.00	.98	.00
Tests * Groups	2	.54	.27	1.49	.23	.03
Error 2	85	15.46	.18			

Scores of students on resuming CPR were not different in post-test and retention test (Figure 40). Their scores were at the outstanding level in two tests.

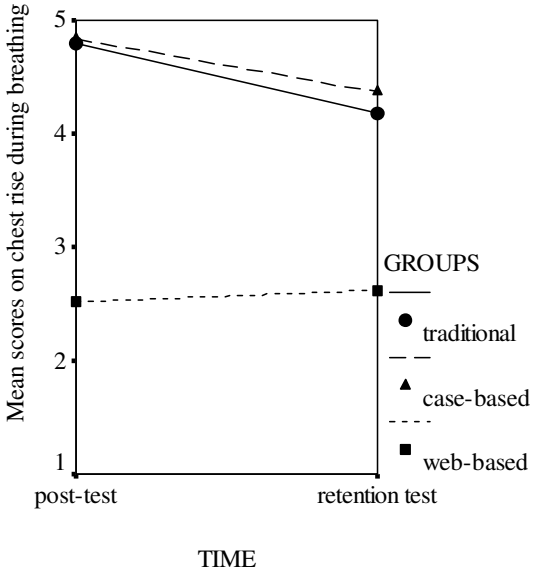

Figure 40. Resuming CPR scores by three instruction groups in two tests

Mean scores of traditional (post-test: M = 5.00, SD= .00, retention: M = 5.00, SD= .00), case-based *(*M = 5.00, SD= .00, retention: M = 4.87, SD= .73), and web-based *(*M = 4.86, SD= .74, retention: M = 5.00, SD= .00) instruction groups were similar and at the outstanding level (Table 70).

4.3.3 Results of Recovery Position Performance

Unconscious casualties, who have pulse and breathing, normally recommended to be turned into recovery position while waiting for medical help (Handley et al., 2005). Simply, it is a position that the casualty is turned into his/her side. Underlying reason for placing the casualties into recovery position was providing a protected airway by opening airway and allowing any possible secretions to drain from the mouth. It was mentioned that when the casualty was unconscious and lying on the back might easily be blocked by the tongue (Handley et al., 2001).

In the present study psychomotor skills related with the recovery position, which were recorded by videotape, were evaluated by skill checklist. A Mixed Factorial ANOVA was conducted to evaluate the effect of instruction methods and Tests on students' recovery position performance. The dependent variables were 11 different recovery position skills for dealing with unconscious casualty who has pulse and breathing. These skills were checking safety, checking unresponsiveness, shouting for help, opening airway using head tilt-chin-lift, checking breathing, positioning arms, positioning legs, positioning body, positioning head, calling emergency medical service, and attempting a pulse check. These skills were analyzed independently. The within-subjects factors were Tests with 2 levels (post-test and retention test) and between subject factors were Groups with 3 levels (traditional, case-based, and web-based). In the case(s) of statistically significant main effects and interaction effect, post hoc analysis were conducted by controlling family wise error rate across the tests by using Holm's sequential Bonferoni approach (Field, 2005).

Before the Mixed Factorial ANOVA, the statistical tests of normality were conducted. Data screening indicated that the dependent variable was normally distributed for each of the instructional groups as defined by the different levels of the factor. It was concluded about the normality assumptions that, the data met the assumptions for parametric statistical analysis according to values derived from the analysis of Skewness (traditional » post-test: -.525, retention test: 1.059, case-based » post-test: -2.273, retention test: -.283, web-based » post-test: 1.831, retention test: 1.276), Kurtosis (traditional » post-test: -1.858, retention test: -.950, case-based » post-test: 3.386, retention test: -2.062, web-based » post-test: 1.446, retention test: -.406). Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 103.

Safety is the first step for the first aid procedures. It was a rule that, before approaching to the emergency event, the danger (for first responder, and for the casualty, and for other bystanders) should be removed. If it is not possible to remove the danger, the casualty should be transferred to the safe place and then intervened

(Handley et al., 2005). The Tests and Groups main effects and Tests by Groups Interaction effects were tested for "**checking for safety**".

Table 106

Means and Standard Deviations of Psychomotor Performance on Recovery Position

	Traditional instruction				Case-based instruction				Web-based instruction			
	Post-test		Retention		Post-test		Retention		Post-test		Retention	
Skills	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1	3.48	1.98	2.10	1.82	4.47	1.38	3.27	2.02	1.69	1.54	1.97	1.74
2	5.00	.00	4.86	.74	5.00	.00	4.97	.18	3.86	1.77	3.55	1.84
3	4.17	1.65	1.28	1.03	5.00	.00	1.40	1.22	1.69	1.54	1.83	1.65
4	3.69	1.85	3.07	2.03	4.90	.55	3.27	2.02	2.10	1.82	1.97	1.74
5	4.76	.91	4.52	1.06	5.00	.00	4.53	1.25	4.00	1.67	3.17	1.89
6	4.31	1.39	4.21	1.42	4.90	.55	4.17	1.44	3.48	1.74	2.07	1.46
7	4.31	1.42	4.59	1.09	4.90	.55	4.87	.57	2.97	1.90	2.66	1.70
8	4.28	1.49	4.55	1.18	4.90	.55	4.80	.81	2.28	1.75	2.03	1.52
9	3.90	1.82	3.76	1.79	4.90	.55	4.50	1.31	1.41	1.24	1.97	1.64
10	4.31	1.54	1.28	1.03	5.00	.00	1.80	1.63	1.97	1.74	1.83	1.65

1: Checking safety
2: Checking unresponsiveness
3: Shouting for help
4: Opening airway using head tilt-chin-lift
5: Checking breathing for no more than 10 seconds
6: Positioning the casuatly's arms
7: Positioning the casualty's legs
8: Positioning the casualty's body
9: Positioning the casualty's head
10: Calling 112

A two by three mixed factorial ANOVA on checking for safety revealed that there was a significant main effect of Groups, $F(2, 85) = 17.59$, $p < .05$, $\eta^2 = .29$; Time, $F(1, 85) = 9.60$, $p < .05$, $\eta^2 = .10$; and also interaction effect of Groups by Tests, $F(2, 85) = 4.44$, $p < .05$, $\eta^2 = .10$ (Table 104).

Table 107

Analysis of Variance Results for Psychomotor Performance on Checking for Safety

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	61.41	30.71	17.59	.00	.29
Error 1	85	148.36	1.75			
			Within Subjects			
Tests	1	25.93	25.93	9.60	.00	.10
Tests * Groups	2	20.02	12.01	4.44	.02	.10
Error 2	85	229.71	2.70			

Results suggested that students' performance scores on checking for safety were different in post-test and retention test (Figure 41).

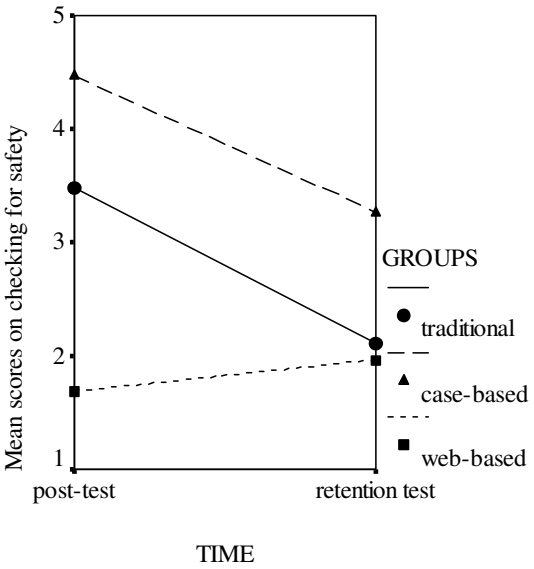

Figure 41. Scores on checking for safety by three instruction groups in two tests

To examine the effects of Tests within each group simple main effects analysis was conducted. Simple main effects analysis indicated that student's scores, who were in traditional and case-based instruction groups, were significantly different for checking for safety in post-test and retention test (Table 105). It was revealed that traditional and case-based instruction groups' scores significantly decreased after 18 weeks time interval.

Table 108

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in Terms of Checking for Safety*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Traditional Group by Tests	27.59	1	27.59	10.21	.002
Case-based Group by Tests	21.60	1	21.60	7.99	.006
Web-based Group by Tests	1.10	1	1.10	.41	.525

In order to find out the differences among instructional groups in both post-test and retention test, simple main effect analysis was conducted. Results of simple main effects analysis demonstrated that groups were significantly differed in post-test and retention test (Table 106).

Table 109

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of Checking for Safety

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Tests 1 (post-test)	116.54	2	58.27	21.45	.000
Groups by Tests 2 (retention test)	30.30	2	15.15	4.36	.016

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill reporter manikin. There was a statistically significant difference at the $p < .05$ level in percentage of correct chest compressions for the three instructional groups both in post-test [$F(2, 85) = 21.45$, $p = .00$] and retention test [$F(2, 85) = 4.36$, $p = .02$]. Parallel with the statistical

significance, the actual difference in mean scores between groups in post-test was large, and in retention test was moderate. The effect size, calculated using eta squared, was .34 for post-test and .09 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods. Results of the post hoc analysis demonstrated that student's scores on checking for safety were significantly different between traditional and web-based, and case-based and web-based instruction groups in post test. Table 103 demonstrated that the scores of traditional *(M* = 3.48) and case-based *(M* = 4.47) instruction groups were significantly higher than the web-based instruction group *(M* = 1.69). However, in retention test, score of traditional instruction group was significantly different from case-based and web-based instruction groups. Additionally, score of web-based instruction groups was significantly different from web-based instruction group. As it was shown in Table 119 score of case-based instruction group *(M* = 3.27) were significantly higher than the traditional *(M* = 2.10) and web-based *(M* = 1.97) instruction groups. It was found that skill performance of checking safety decreased after 18-weeks (Table 107).

Table 110

Post Hoc Comparisons of Differences among Checking for Safety Scores of Traditional, Case-Based, and Web-based Instruction Groups in Retention Test

	(I) GROUPS	(J) GROUPS	(I-J) *MD*	*SE*	*p*
Post-Test	Traditional Inst.	Case-Based Inst.	-.98	.43	.06
	Traditional Inst.	Web-Based Inst.	1.79	.43	.00
	Case-Based Inst.	Web-Based Inst.	2.78	.43	.00
Retention Test	Traditional Inst.	Case-Based Inst.	-1.16	.49	.05
	Traditional Inst.	Web-Based Inst.	.14	.49	.96
	Case-Based Inst.	Web-Based Inst.	1.30	.49	.02

As it was mentioned before, following action after ensuring the safety of emergency area was checking for responsiveness of casualty by shaking his/her shoulders and shouting at him/her as "are you okay". The preceding first aid actions would change according to the consciousness of the casualty. The Groups and Tests main effects and Groups by Tests interaction effects were tested for "**checking**

unresponsiveness". Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 103.

A two by three mixed factorial ANOVA on checking for unresponsiveness revealed that there was a significant main effect of Groups, $F(2, 85) = 28.23$, $p < .05$, $\eta^2 = .40$; but no significant main effect of Tests, $F(1, 85) = .90$, $p > .05$, $\eta^2 = .01$; and interaction effect of Groups by Tests, $F(2, 85) = .29$, $p > .05$, $\eta^2 = .01$ (Table 108).

Table 111

Analysis of Variance Results for Psychomotor Performance on Checking for Unresponsiveness

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	30.46	15.23	28.22	.00	.40
Error 1	85	45.86	.540			
			Within Subjects			
Tests	1	1.13	1.13	.90	.35	.01
Tests * Groups	2	.58	.29	.23	.80	.01
Error 2	85	107.31	1.26			

The main effect of Groups demonstrated that, if other variables were ignored scores of students in traditional, case-based and web-based instruction groups were significantly different in terms of checking for unresponsiveness (Figure 42).

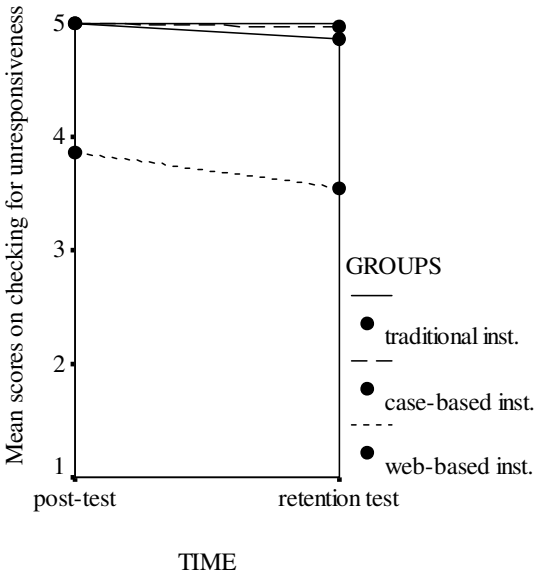

Figure 42. Scores on checking for unresponsiveness by three instruction groups in two tests

Post hoc comparisons were conducted to examine student's scores on checking for unresponsiveness. The results of the post hoc analysis demonstrated that scores of students in traditional and web-based, and also case-based and web-based instruction were significantly different (Table 109).

Table 112

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Checking for Unresponsiveness

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.05	.19	.96
Traditional Inst.	Web-Based Inst.	1.22	.19	.00
Case-Based Inst.	Web-Based Inst.	1.28	.19	.00

Results of the analysis demonstrated that students in traditional *(M* = 4.93) and case-based *(M* = 4.98) instruction groups scored significantly higher than students in web-based instruction group *(M* = 3.71) (Table 110).

Table 113

Descriptive Statistics on Psychomotor Performance of Checking for Unresponsiveness by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	4.93	.14
Case-Based Instruction	4.98	.13
Web-Based Instruction	3.71	.14

In most of the emergency events, unconscious casualties require medical help. The emergency medical service should be activated as soon as possible after checking for unresponsiveness (if the casualty is unconscious). According to ERC guidelines, it was suggested that first responder should shout for help and try to find someone heard his/her cry rather go to call emergency medical service on his/her own. At that point his/her duty as first responder is to take care of the casualty. Thus, the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"shouting for help"**. Standard deviation and mean score values for the three groups and the three tests were given in Table 103.

A two by three mixed factorial ANOVA on scores of shouting for help revealed that there was a significant main effects of Groups, $F(2, 85) = 17.74$, $p < .05$, $\eta^2 = .30$; Tests, $F(1, 85) = 120.27$, $p < .05$, $\eta^2 = .59$; and significant interaction effect of Groups by Tests, $F(2, 85) = 35.15$, $p < .05$, $\eta^2 = .45$ (Table 111).

Table 114

Analysis of Variance Results for Psychomotor Performance on Shouting for Help

	df	*SS*	*MS*	*F*	*p*	η^2
Source	Between Subjects					
Groups	2	31.69	15.84	17.743	.00	.30
Error 1	85	75.90	.893			
	Within Subjects					
Tests	1	197.62	197.62	120.27	.00	.59
Tests * Groups	2	115.51	57.76	35.15	.00	.45
Error 2	85	139.67				

Results showed that scores of students in traditional, case-based, and web-based instructional groups were significantly different in terms of shouting for help in both post-test and retention test (Figure 43).

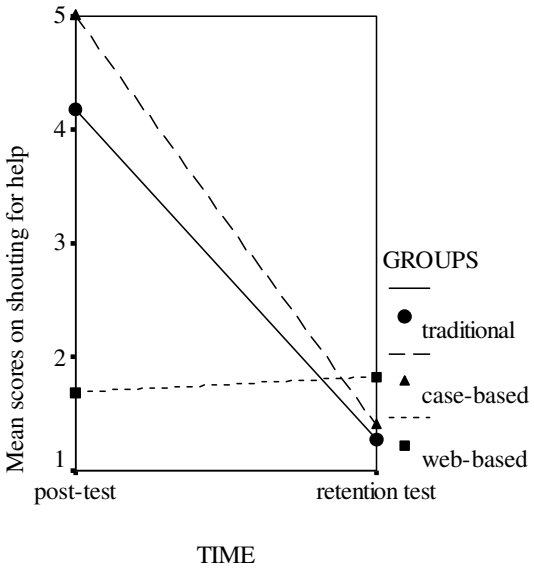

Figure 43. Scores on shouting for help by three instruction groups in two tests

To examine the effects of Tests within each group simple main effects analysis was conducted (Table 112). According to results, scores on shouting for help decreased significantly as a result of 18 weeks time interval for traditional (posttest M = 4.17, retention test M = 1.28), and case-based instruction groups (posttest M = 5.00, retention test M = 1.40). However, no significant change occurred in the scores of web-based instruction group (posttest M = 1.69, retention test M = 1.83). Their score on shouting for help in was low in post-test and also in retention test (Table 103).

Table 115

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in terms of Shouting for Help*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Traditional Group by Tests	121.66	1	121.66	74.04	.000
Case-based Group by Tests	194.40	1	194.40	118.31	.000
Web-based Group by Tests	28	1	.28	.17	.683

Additionally, in order to examine mean differences among three instruction groups of students in each test simple main effects analysis was conducted. Results indicated that students' scores, who were in traditional, case-based, and web-based instruction groups, on shouting for help were different in post-test. However, no significant difference was observed among instructional groups in retention test (Table 113).

Table 116

Simple Effect Comparison for Testing Main Effect of each Instruction Group in Each Test in terms of Shouting for Help

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Test 1 (post-test)	174.02	2	87.01	51.96	.00
Groups by Test 2 (retention test)	4.87	2	2.43	1.39	.26

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill observation checklist. There was a statistically significant difference at the $p < .05$ level student's performance on shouting for help for the three instructional groups both in post-test [$F(2, 85) = 51.96$, $p = .00$]. Parallel with the statistical significance, the actual difference in mean scores between groups was large and the effect size, calculated using eta squared, was .55 for post-test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 114). Results of the post hoc analysis demonstrated that scores of case-based instruction group ($M = 5.00$) were significantly higher than the traditional ($M = 4.17$) and the web-based instruction groups ($M = 1.69$). Additionally, scores of traditional instruction group were significantly higher than the web-based instruction group (Table 103).

Table 117

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Performance of Shouting for Help

(I) Groups	(J) Groups	(I-J) *MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.83	.34	.04
Traditional Inst.	Web-Based Inst.	2.48	.34	.00
Case-Based Inst.	Web-Based Inst.	3.31	.34	.00

Opening airway is pre-requisite action for checking for breathing. Suggested guidelines by ERC (2005) to open airway is a combination of two actions "head tilt-chin lift". It includes placing the hand on casualty's forehead and tilting it backward gently and lifting the chin with fingertips to open the airway. It is effective to remove any airway obstruction caused by the tongue or epiglottis. As it was measured by skill observation checklist, the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"opening airway".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 103.

A two by three mixed factorial ANOVA on opening airway by using head-tilt-chin-lift method showed that the Groups, $F(2, 85) = 17.09$, $p < .05$, $\eta^2 = .29$; and Tests main effects, $F(1, 85) = 11.91$, $p < .05$, $\eta^2 = .12$; as well as Groups by Tests interaction effect was statistically significant, $F(2, 85) = 3.67$, $p < .05$, $\eta^2 = .08$ (Table 115).

Table 118

Analysis of Variance Results for Psychomotor Performance on Opening airway

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	63.69	31.84	17.09	.00	.29
Error 1	85	158.34	1.86			
			Within Subjects			
Tests	1	27.96	27.91	11.91	.00	.12
Tests * Groups	2	17.24	8.62	3.67	.03	.08
Error 2	85	199.62	2.35			

Results demonstrated that scores of students in all three groups on opening airway by using head tilt-chin-lift method were different in both post-test and retention test (Figure 44)

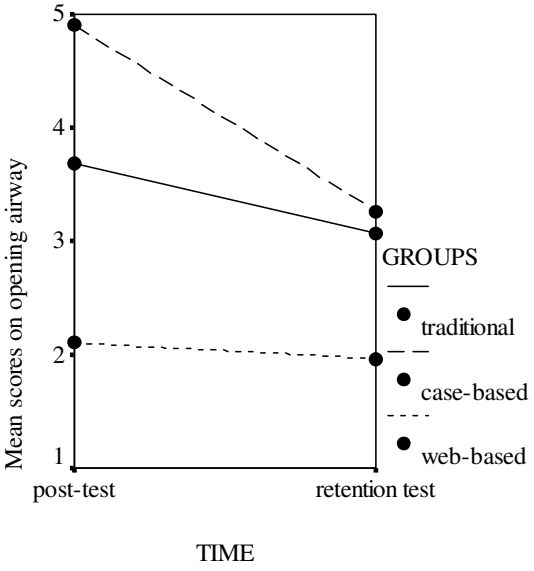

Figure 44. Scores on opening airway by three instruction groups in two tests

To examine the effects of Tests within each group simple main effects analysis was conducted. Results demonstrated that, scores of students in case-based instruction group on opening airway changed significantly from post-test to retention test (Table 116). Student's scores significantly decreased in case-based instruction group as a result of 18 weeks time interval (post-test M = 4.90, retention test M = 3.27) (Table 107).

Table 119

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in terms of Opening Airway*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Traditional Group by Tests	5.59	1	5.59	2.38	.127
Case-based Group by Tests	40.02	1	40.02	17.04	.000
Web-based Group by Tests	.28	1	.28	.12	.733

The simple main effect analysis was also conducted to find out the effects within the first (post-test) and second (retention-test) levels of the Tests variable. Results showed statistically significant difference in posttest among students in three instruction groups, similarly in retention test, groups also differed in terms of their scores on opening airway (Table 117). The source of difference was case-based instruction group.

Table 120

Simple Effect Comparison for Testing Main Effect of each Instruction Group in Each Test in terms of Opening Airway

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Test 1 (post-test)	115.85	2	57.92	24.92	.000
Groups by Test 2 (retention test)	28.76	2	14.38	3.84	.000

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill observation checklist. Subjects were divided into three groups according to instructional methods that they assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was a statistically significant difference at the $p < .05$ level in percentage of correct chest compressions for the three instructional groups both in post-test [$F(2, 85) = 24.92$, $p = .00$] and retention test [$F(2, 85) = 3.84$, $p = .03$]. Parallel with the statistical significance, the actual difference in mean scores between groups was large for post-test and moderate for the retention test. The effect size, calculated using eta squared, was .37 for post-test and .08 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 118). Results of the post hoc analysis demonstrated significant difference among three instruction groups. The scores of case-based instruction group ($M = 3.69$) were significantly higher than the traditional ($M = 4.90$) and web-based ($M = 2.10$) instruction groups. Additionally, score of students in traditional instruction groups was significantly higher than the web-based instruction group in post test. However, in retention test, significant

difference was found only between the scores of case-based *(M* = 3.27) and web-based *(M* = 1.97) instruction groups (Table 107).

Table 121

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Opening Airway in Post-test and Retention Test

	(I) GROUPS	(J) GROUPS	*(I-J) MD*	SE	*p*
Post-Test	Traditional Inst.	Case-Based Inst.	-1.21	.40	.01
	Traditional Inst.	Web-Based Inst.	1.59	.40	.00
	Case-Based Inst.	Web-Based Inst.	2.80	.40	.00
Retention Test	Traditional Inst.	Case-Based Inst.	-.20	.50	.92
	Traditional Inst.	Web-Based Inst.	1.10	.51	.08
	Case-Based Inst.	Web-Based Inst.	1.30	.50	.03

Checking for breathing is the critical action for the consequent first aid applications. If the casualty is not breathing, first responder should perform CPR, or if the casualty is breathing recovery position should be given to the casualty. In the case of incorrect diagnosis, consequences may be fatal for the casualty. It will be meaningless to give recovery position to the casualty who has no breathing, and it will also be dangerous to resume CPR to the casualty who has breathing and a pulse. It was suggested in 2005 ERC guidelines that during the checking for breathing proper position to open the airway (head tilt-chin lift) should be maintained, and checking for breathing should take no more than 10 seconds. It was also mentioned that, as soon as the breathing is detected in maximum 10 seconds, the casualty should be put into recovery position (Handley et al., 2005). For this reason the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"checking for breathing".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 107.

A two by three mixed factorial ANOVA on checking for breathing revealed that there was a statistically significant main effect of Groups, $F(2, 85) = 12.65$, $p < .05$, $\eta^2 = .23$; and Tests, $F(1, 85) = 8.64$, $p < .05$, $\eta^2 = .09$. However, there was no significant interaction effect of Groups by Tests, $F(2, 85) = .95$, $p > .05$, $\eta^2 = .02$ (Table 119).

Table 122

Analysis of Variance Results for Psychomotor Performance on Checking for Breathing

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	24.51	12.26	12.65	.00	.23
Error 1	85	82.35	.969			
			Within Subjects			
Tests	1	11.53	11.53	8.64	.00	.09
Tests * Groups	2	2.54	1.27	.95	.39	.02
Error 2	85	113.46	1.34			

The main effect of Groups and Tests demonstrated that, scores of student's on checking for breathing were different in traditional, case-based, and web-based instructional groups in post-test and retention test in terms of checking for breathing (Figure 45).

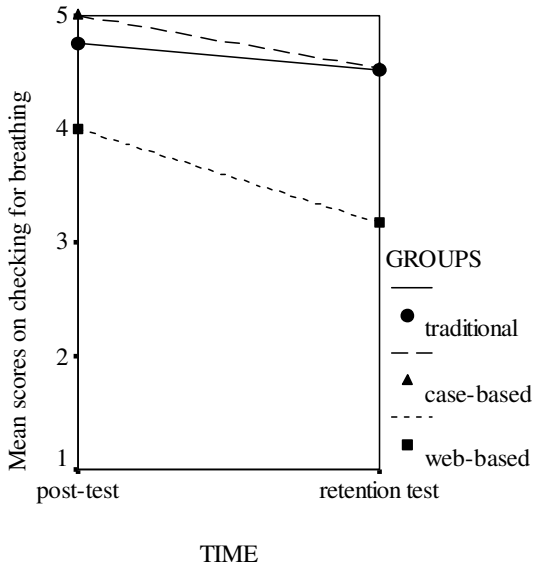

Figure 45. Scores on checking for breathing by three instruction groups in two tests

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill observation checklist. Subjects were divided into three groups according to instructional methods that they

assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was a statistically significant difference at the $p < .05$ level in scores of checking for breathing for the three instructional groups both in post-test [$F(2, 85) = 6.70$, $p = .00$] and retention test [$F(2, 85) = 8.56$, $p = .00$]. Parallel with the statistical significance, the actual difference in mean scores between groups was large. The effect size, calculated using eta squared, was .14 for post-test and .17 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 120). Results of the post hoc analysis demonstrated that scores of students in traditional and web-based, and case-based and web-based instruction groups were significantly differed in terms of checking for breathing for no more than 10 seconds both in post-test and retention test. Results demonstrated that scores of traditional (post-test M = 4.76, retention test M = 4.52) and case-based (post-test M = 5.00, retention test M = 4.53) instruction groups were significantly higher than the web-based (post-test M = 4.00, retention test M = 3.17) instruction group in both tests (Table 107).

Table 123

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Checking for Breathing in Post-test and Retention Test

	(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Post-Test	Traditional Inst.	Case-Based Inst.	-.24	.28	.67
	Traditional Inst.	Web-Based Inst.	.76	.29	.03
	Case-Based Inst.	Web-Based Inst.	1.00	.28	.00
Retention Test	Traditional Inst.	Case-Based Inst.	-.02	.38	1.00
	Traditional Inst.	Web-Based Inst.	1.34	.38	.00
	Case-Based Inst.	Web-Based Inst.	1.36	.38	.00

Additionally, a paired samples t-test was conducted to evaluate the impact of the 18 weeks time interval on student's performance scores on checking for breathing for no more than 10 seconds. Results demonstrated that student's scores in case-based (post-test M = 5.00, retention test M = 4.53) and web-based (post-test M = 4.00, retention test M = 3.17) instruction groups significantly decreased as a results of 18 weeks time interval (Table 121).

Table 124

Paired Samples T-Test for Percentage of Checking for Breathing in Post-Test and Retention Test

		M	*SD*	*SE*	*t*	*df*	*p*
Traditional	Post-Test Retention Test	.24	1.48	.27	.88	28.00	.39
Case-Based	Post-Test Retention Test	.47	1.25	.23	2.04	29.00	.05
Web-Based	Post-Test Retention Test	.83	2.07	.38	2.15	28.00	.04

Casualty's arms should be positioned in an effective way that will support the safe recovery position. According to ERC (2005) guidelines one arm supports the body and other arm and hand supports the cheek. In the study, the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"positioning the arm".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 107.

Results demonstrated that scores of students in traditional, case-based, and web-based instruction groups were different in post-test and retention test in terms of positioning arm (Figure 46).

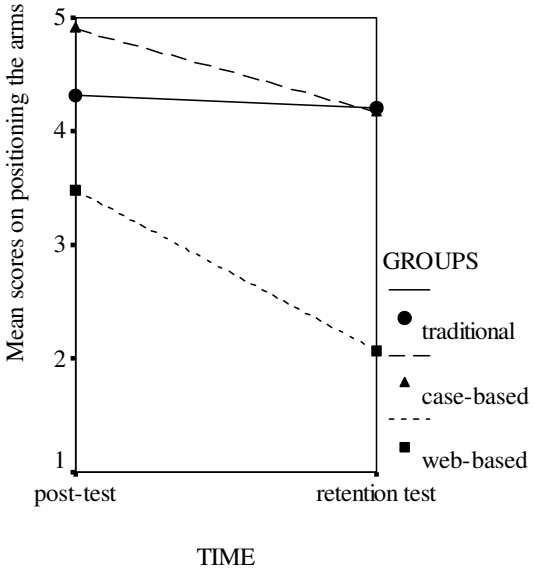

Figure 46. Scores on positioning the arms of the casualty by three instruction groups

A two by three mixed factorial ANOVA on positioning the arms of the casualty for recovery position revealed that there was a significant main effect of Groups, $F(2, 85) = 27.93$, $p < .05$, $\eta^2 = .40$; and Tests, $F(1, 85) = 12.69$, $p < .05$, $\eta^2 = .13$; also interaction effect of Groups by Tests, $F(2, 85) = 3.19$, $p < .05$, $\eta^2 = .07$ (Table 122).

Table 125

Analysis of Variance Results for Psychomotor Performance on Positioning the Arm

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	52.29	26.15	27.93	.00	.40
Error 1	85	79.57	.94			
			Within Subjects			
Tests	1	24.76	24.76	12.69	.00	.13
Tests * Groups	2	12.46	6.23	3.19	.05	.07
Error 2	85	165.80	1.95			

To examine the effects of Tests within each group simple main effects analysis was conducted (Table 123). Results demonstrated that, scores of students in case-based (post-test $M = 4.90$, retention test $M = 4.21$) and web-based (post-test $M = 3.48$, retention test $M = 2.07$) instruction groups were changed significantly from post-test to retention test. No significant difference found in scores of traditional instruction group (post-test $M = 4.31$, retention test $M = 4.21$) on positioning the victim's arms for recovery position (Table 107).

Table 126

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in Terms of Positioning the Arm*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Group 1 by Tests	.16	1	.16	.08	.78
Group 2 by Tests	8.07	1	8.07	4.14	.05
Group 3 by Tests	28.98	1	28.98	14.86	.00

Additionally, in order to examine mean differences among three instruction groups of students in each test simple main effects analysis was conducted. Results indicated

that students' scores, who were in traditional, case-based, and web-based instruction groups, on positioning the arms of the casualty for recovery position were different in post-test and in retention test (Table 124).

Table 127

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of Positioning the Arm

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Test 2 (post-test)	29.84	2	14.92	8.56	.00
Groups by Test 3 (retention test)	87.20	2	43.60	20.96	.00

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill observation checklist, both in post-test and retention test. Subjects were divided into three groups according to instructional methods that they assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was a statistically significant difference at the $p < .05$ level in scores of positioning the casualty's arms for recovery position both in post-test [$F(2, 85) = 8.56$, $p = .00$] and retention test [$F(2, 85) = 20.96$, $p = .00$]. Parallel with the statistical significance, the actual difference in mean scores between groups was large. The effect size, calculated using eta squared, was .17 for post-test and .33 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 125). Results of the post hoc analysis demonstrated that there was a significant difference between traditional and web-based instruction groups and case-based and web-based instruction groups both in post-test and retention test. Scores of traditional (post-test $M = 4.31$, retention test $M = 4.21$) and case-based (post-test $M = 4.90$, retention test $M = 4.17$) instruction group were significantly higher than the web-based (post-test $M = 3.48$, retention test $M = 2.07$) instruction group (Table 107).

Table 128

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Positioning the Arm in Post-test and Retention Test

	(I) GROUPS	(J) GROUPS	*(I-J) MD*	*SE*	*p*
Post-Test	Traditional Inst.	Case-Based Inst.	-.59	.34	.21
	Traditional Inst.	Web-Based Inst.	.83	.35	.05
	Case-Based Inst.	Web-Based Inst.	1.42	.34	.00
Retention Test	Traditional Inst.	Case-Based Inst.	.04	.38	.99
	Traditional Inst.	Web-Based Inst.	2.14	.38	.00
	Case-Based Inst.	Web-Based Inst.	2.10	.38	.00

Legs prevents casualty to roll over onto their front, provides stable and secure position for unconscious casualty who has pulse and breathing. Thus, the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"positioning the legs of the casualty".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 107.

Students' performance scores on positioning the legs showed that Groups main effect was statistically significant, $F(2, 85) = 37.79$, $p < .05$, $\eta^2 = .47$; but Tests main, $F(1, 85) = .02$, $p > .05$, $\eta^2 = .00$; and Groups by Tests interaction effect was not, $F(2, 85) = .81$, $p > .05$, $\eta^2 = .02$ (Table 126).

Table 129

Analysis of Variance Results for Psychomotor Performance on Positioning the Legs

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	1	69.99	34.99	37.79	.00	.47
Error 1	2	78.72	.926			
			Within Subjects			
Tests	1	.022	.022	.02	.90	.00
Tests * Groups	2	2.49	1.25	.81	.45	.02
Error 2	85	131.48	1.55			

Results demonstrated that if other variables ignored scores of students in traditional, case-based, and web-based instructional groups were significantly different in terms of positioning the casualty's legs during recovery position (Figure 47).

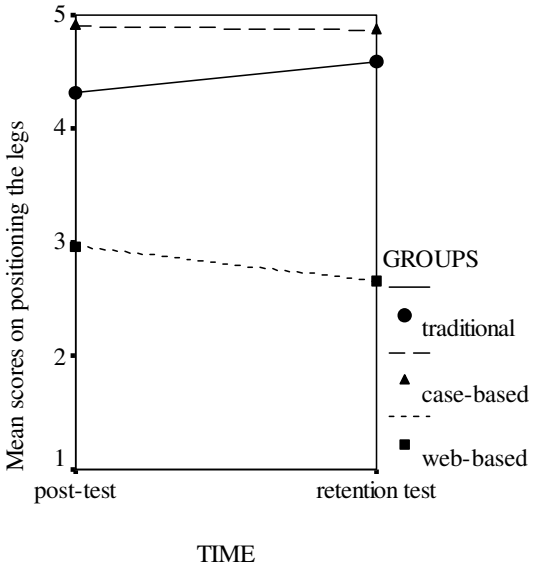

Figure 47. Scores on positioning the legs of the casualty by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of three different instructional methods on students' scores of positioning the casualty's legs (Table 127). Results demonstrated between the scores of traditional and web-based and case-based and web-based instruction groups.

Table 130

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Positioning the Legs

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.44	.25	.198
Traditional Inst.	Web-Based Inst.	1.64	.25	.000
Case-Based Inst.	Web-Based Inst.	2.07	.25	.000

Results of post hoc comparisons demonstrated that student's scores in traditional *(M* = 4.45) and case-based instruction group *(M* = 4.88) were significantly higher from the student's scores in web-based instruction group *(M* = 2.81). However, no significant difference obtained between the scores of traditional and case-based instruction groups (Table 128).

Table 131

Descriptive Statistics of Psychomotor Performance on Positioning the Legs by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	4.45	.18
Case-Based Instruction	4.88	.18
Web-Based Instruction	2.81	.18

The Tests and Groups main effect and Groups by Tests interaction effects were tested for **"positioning the casualty's body".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 107.

Body position, in which body fluids such as vomits, saliva or blood drain freely from the mouth, maintains the airway unobstructed. Results derived from the analysis of data related with positioning the casualty's body demonstrated that Groups main effect was statistically significant, $F(2, 85) = 75.78$, $p < .05$, $\eta^2 = .64$; but Tests main, $F(1, 85) = .01$, $p > .05$, $\eta^2 = .00$; and Groups by Tests interaction effects were statistically not significant, $F(2, 85) = .622$, $p > .05$, $\eta^2 = .01$ (Table 129).

Table 132

Analysis of Variance Results for Psychomotor Performance on Positioning the Body

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	122.43	61.22	75.78	.00	.64
Error 1	85	68.66	.808			
			Within Subjects			
Time	1	.021	.021	.01	.91	.00
Tests * Groups	2	2.08	1.04	.62	.54	.01
Error 2	85	141.902	1.669			

The main effect of Groups demonstrated that, if other variables ignored scores of students in traditional, case-based, and web-based instructional groups were significantly different in terms of positioning the casualty's body during recovery position (Figure 48).

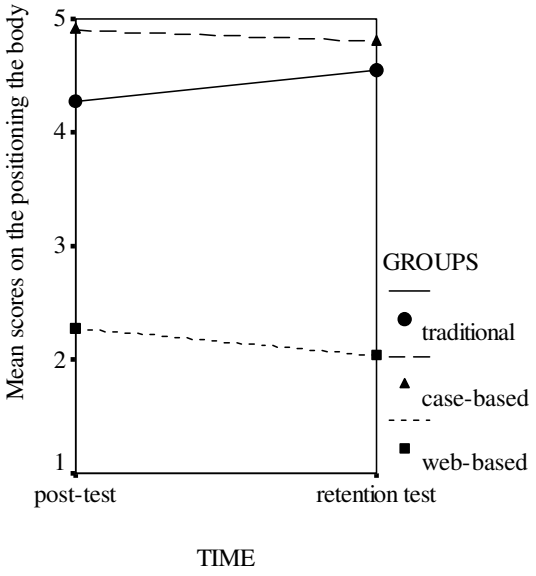

Figure 48. Scores on positioning the body of the casualty by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of three different instructional methods on students' scores of positioning the casualty's body (Table

130). Results of the analysis demonstrated significant difference between traditional and web-based and case-based and web-based instruction groups.

Table 133

Post Hoc Comparisons of Differences Among Means of Positioning the Casualty's Body of Traditional, Case-Based, and Web-based Instruction Groups

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.44	.23	.156
Traditional Inst.	Web-Based Inst.	2.26	.24	.000
Case-Based Inst.	Web-Based Inst.	2.69	.23	.000

Results of the analysis demonstrated that, student's scores in traditional *(M* = 4.41) and case-based *(M* = 4.85) instruction groups were significantly higher than the student's scores in web-based instruction group *(M* = 2.16) (Table 131). However, there was statistically no significant difference between traditional and case-based instruction groups (Table 130).

Table 134

Descriptive Statistics of Psychomotor Performance on Positioning the Body by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	4.41	.17
Case-Based Instruction	4.85	.16
Web-Based Instruction	2.16	.17

Positioning head involves tilting the casualty's head back-and lifting the chin up in order to keep the airway open. The cross hand should be positioned under the casualty's cheek to support the head. For this reason the Tests and Groups main effect and Groups by Tests interaction effects were tested for **"positioning the casualty's head".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 107.

A two by three mixed factorial ANOVA on positioning the head resulted in a statistically significant main effect of Groups, $F(2, 85) = 68.67$, $p < .05$, $\eta^2 = .62$; but nonsignificant main effect of Tests, $F(1, 85) = .00$, $p > .05$, $\eta^2 = .00$; and interaction effect of Groups by Tests, $F(2, 85) = 1.64$, $p > .05$, $\eta^2 = .37$ (Table 132).

Table 135

Analysis of Variance Results for Psychomotor Performance on Positioning the Head

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	140.80	70.40	68.67	.00	.62
Error 1	85	87.15	1.03			
			Within Subjects			
Tests	1	.00	.00	.00	.98	.00
Tests * Groups	2	7.09	3.55	1.64	.20	.04
Error 2	85	183.91	2.16			

Results showed that if other variables ignored scores of students in traditional, case-based, and web-based instructional groups were significantly different in terms of positioning the casualty's head during recovery position (Figure 49).

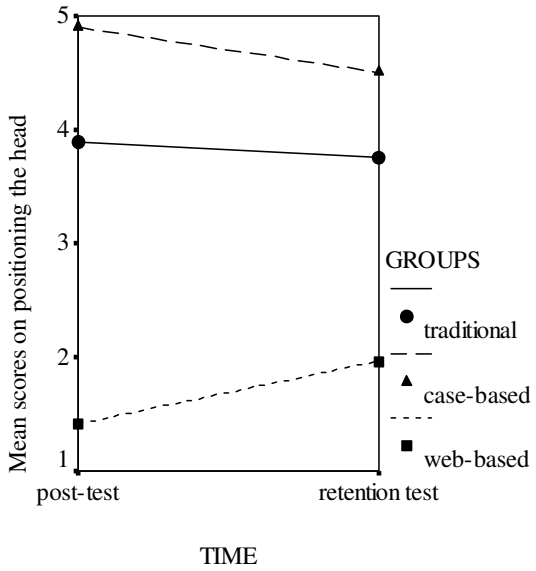

Figure 49. Scores on positioning head of the casualty by three instruction groups in two tests

Post hoc comparisons were conducted to examine further effect of three different instructional methods on student's scores of positioning the casualty's head (Table 133). Results of the analysis demonstrated statistically significant difference between traditional and case-based; traditional and web-based; and also case-based and web-based instruction groups.

Table 136

Post Hoc Comparisons of Differences among Performance Scores of Traditional, Case-Based, and Web-based Instruction Groups on Positioning the Head

(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.87	.26	.00
Traditional Inst.	Web-Based Inst.	2.14	.27	.00
Case-Based Inst.	Web-Based Inst.	3.01	.26	.00

Results of the post hoc comparisons demonstrated that scores of students in case-based instruction group *(M* = 4.70), were significantly higher than the traditional *(M* = 3.83) and web-based *(M* = 1.69) instruction group. Additionally, scores of student in traditional instruction group were significantly higher than the web-based instruction group (Table 134).

Table 137

Descriptive Statistics of Psychomotor Performance on Positioning the Head by Three Instruction Groups

Groups	*M*	*SE*
Traditional Instruction	3.83	.19
Case-Based Instruction	4.70	.18
Web-Based Instruction	1.69	.19

After positioning the casualty into safe position, first responder should call emergency medical service to transfer the casualty to hospital. The Tests and Groups main effect and Groups by Tests interaction effects were tested for **"calling emergency service".** Standard deviation and mean score values for the three groups and the two tests (post-test, and retention test) were given in Table 107.

A two by three mixed factorial ANOVA on calling emergency service showed that the instruction Groups, $F(2, 85) = 17.31$, $p < .05$, $\eta^2 = .29$; and Tests main, $F(1, 85) = 100.06$, $p < .05$, $\eta^2 = .54$; also Tests x Groups interaction effects were statistically significant, $F(2, 85) = 21.82$, $p < .05$, $\eta^2 = .34$ (Table 135).

Table 138

Analysis of Variance Results for Psychomotor Performance on Calling the Emergency Service

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	33.67	16.84	17.31	.00	.29
Error 1	85	82.65	.972			
			Within Subjects			
Tests	1	198.48	198.48	100.06	.00	.54
Tests * Groups	2	86.58	43.29	21.82	.00	.34
Error 2	85	168.61	1.98			

Results showed that student's scores on calling the emergency service were different in both post-test and retention test (Figure 50).

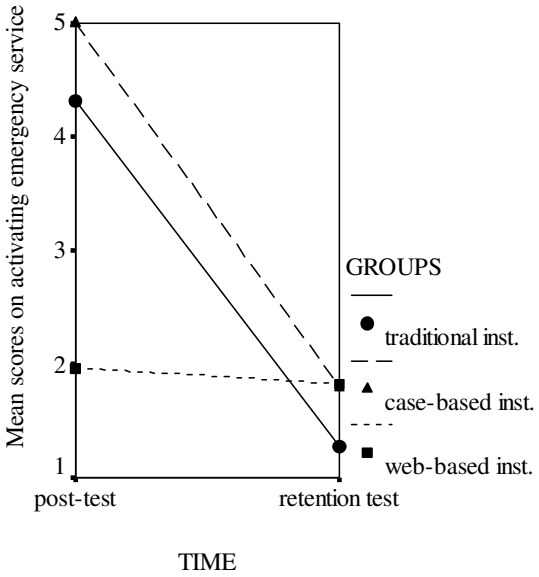

Figure 50. Scores on calling the emergency service by three instruction groups in two tests

To examine the effects of Tests within each group simple main effects analysis was conducted. Simple main effects analysis was also indicated that scores of students, who were in traditional and case-based instruction groups, on calling emergency service were significantly different in post-test and retention test (Table 136). Their scores were decreased significantly from post-test to retention test.

Table 139

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in terms of Calling the Emergency Service*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Traditional Group by Tests	133.52	1	1133.52	67.31	.000
Case-based Group by Tests	153.60	1	153.60	77.43	.000
Web-based Group by Tests	.28	1	.28	.14	.710

Additionally, in order to find out differences among instructional groups in post-test and retention test, simple main effect analysis was conducted. Results of simple main effects analysis demonstrated that there was a significant differences among students in three different instructional groups in post-test and retention test. However, no significant difference was observed among instructional groups in retention test (Table 137).

Table 140

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of Calling the Emergency Service

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Test 2 (post-test)	148.28	2	74.14	41.69	.00
Groups by Test 3 (retention test)	5.63	2	2.82	1.31	.28

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill reporter manikin. Subjects were divided into three groups according to instructional methods that they assigned into (group 1: traditional, group 2: case-based, and group 3: web-based instruction). There was a statistically significant difference at the $p < .05$ level in

scores on calling the emergency service for the three instructional groups in retention test [*F*(2, 83) = 41.69, *p*= .00]. Parallel with the statistical significance, the actual difference in mean scores between groups was large. The effect size, calculated using eta squared, was .50 for retention test. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 138). Results of the analysis demonstrated significant difference between traditional and web-based, and case-based and web-based instruction groups. Scores of students in traditional *(M* = 4.31) and case-based *(M* = 5.00) instruction groups were significantly higher than the scores of students in web-based instruction group *(M* = 1.97) in post-test.

Table 141

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Calling Emergency Service in Post-test and Retention Test

(I) Groups	(J) Groups	(I-J) *MD*	*SE*	*p*
Traditional Inst.	Case-Based Inst.	-.69	.35	.12
Traditional Inst.	Web-Based Inst.	2.34	.35	.00
Case-Based Inst.	Web-Based Inst.	3.03	.35	.00

4.4 First Aid Affective Behaviors

Student's first aid affective behaviors during emergencies were evaluated by using First Aid Affective Behavior Scale and qualitative interviews. Following parts include findings from the scale and qualitative interviews.

4.4.1 Results Derived From First Aid Affective Behavior Scale

In order to test the effects of different instructional methods and time on student's first aid affective behaviors, which collected via first aid affective behavior scale, Mixed Factorial ANOVA was conducted. The first aid affective behavior scale was consisted of items related with the characteristics of casualty (gender, age, physical

appearance), characteristics of first aider (gender, knowledge level, experience on first aid), characteristics of emergency event (clarity of event, existence of body fluids such as blood and vomits, possibility of communicable disease), social factors (existence of other bystanders, feeling of responsibility, empathy), and other factors (possibility of danger, possibility of risks, laws, location of the emergency event). These elements were analyzed independently. The within subjects factors were Tests with three levels (pre-test, post-test and retention test) and the between subject factors were Groups with three levels (traditional, case-based, and web-based).

In order to test the effect of instruction on students' first aid affective behaviors and retention of these behaviors two research questions and two related hypothesis were formulated:

Research Questions:

5. What is the effect of web-based, case-based, and traditional teaching approach on students' affective behavior?
6. What is the effect of web-based, case-based, and traditional teaching approach on students' retention of affective behavior?

Related Hypotheses:

H^{o}_{5}: There will be statistically no significant difference between students' affective behaviors of first aid according to web-based, case-based, and traditional teaching approach.

H^{o}_{6}: There will be statistically no significant difference between students' retention of affective behaviors of first aid according to web-based, case-based, and traditional teaching approach.

In order to test the above hypothesis data were subjected to a Mixed Factorial ANOVA. Before the Mixed Factorial ANOVA, the statistical tests of normality were conducted. Data screening indicated that the dependent variable was normally distributed for each of the instructional groups as defined by the different levels of the

factor. It was concluded about the normality assumptions that, the data met the assumptions for parametric statistical analysis according to values derived from the analysis of Skewness (traditional » pre-test: -.665, post-test: -.495, retention test: -1.238, case-based » pre-test: -.471, post-test: -1.209, retention test: -.858, web-based » pre-test: -.875, post-test: -1.410 retention test: .437), Kurtosis (traditional » pre-test: 1.376, post-test: -.106, retention test: 1.531, case-based » pre-test: -1.169, post-test: .913, retention test: .619, web-based » pre-test: .154, post-test: 2.007, retention test: -1.136), histograms and Normal Quantile-Quantile (QQ) Plots.

The Tests and Groups main effects and Tests by Groups interaction effects were tested for **"characteristics of the casualty".** Standard deviation and mean score values for the three groups (traditional, case-based, and web-based) and the three tests (pre-test, post-test, and retention test) were given in Table 139.

Table 142

Means and Standard Deviations of First Aid Affective Behaviors on Characteristics of the Casualty

Tests	Groups	*M*	*SD*	*N*
Pre-Test	Traditional Instruction	2.89	0.51	29
	Case-Based Instruction	2.93	0.76	29
	Web-Based Instruction	2.93	0.26	29
	Total	2.92	0.54	87
Post-Test	Traditional Instruction	2.83	0.44	29
	Case-Based Instruction	2.69	0.61	29
	Web-Based Instruction	2.73	0.57	29
	Total	2.75	0.54	87
Retention Test	Traditional Instruction	2.84	0.47	29
	Case-Based Instruction	2.78	0.57	29
	Web-Based Instruction	2.88	0.36	29
	Total	2.83	0.47	87

A three by three mixed factorial ANOVA on characteristics of the casualty revealed that there was a significant main effect of Tests, $F(2, 84) = 3.09$, $p < .05$, $\eta^2 = .04$; but no significant main effect of Groups, $F(1, 84) = .19$, $p > .05$, $\eta^2 = .04$; and no interaction effect of Groups by Tests, $F(4, 84) = .47$, $p > .05$, $\eta^2 = .01$ (Table 140).

Table 143

Analysis of Variance Results for First Aid Affective Behaviors on Characteristics of the Casualty

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	.053	.03	.19	.83	.04
Error 1	84	11.95	.14			
			Within Subjects			
Tests	2	1.23	.63	3.09	.05	.04
Tests * Groups	4	.37	.09	.47	.76	.01
Error 2	168	33.46	.20			

The main effect of Tests demonstrated that, if other variables ignored scores of students in pre-test, post-test, and retention test were significantly different in terms of affective behaviors on characteristics of the casualty (Figure 51).

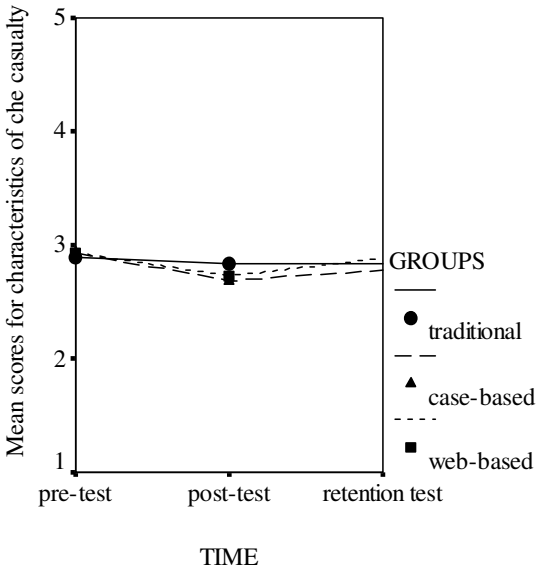

Figure 51. Scores of first aid affective behaviors on characteristics of the casualty by three instruction groups in two tests

Pair wise comparisons (at $p \leq 0.05$) were also conducted to examine further effect of Tests on the students' affective behaviors on characteristics of the casualty (Table 141).

Table 144

Pair wise Comparisons of Differences between M of Pre-test, Post-test, and Retention Test on Attitudes of Characteristics of the Casualty

(I) Tests	(J) Tests	*(I-J) MD*	*SE*	*p*
Pre-Test	Post-Test	.17	.07	.064
Pre-Test	Retention Test	.08	.07	.625
Post-Test	Retention Test	-.08	.06	.595

Although there was a significant main effect of Tests, results of the analysis demonstrated that there were no significant difference between the students' scores in pre-test, post-test, and retention test. Students' first aid test scores were not significantly changed from pre-test *(M* = 2.92) to post-test *(M* = 2.75), and from post-test to retention test *(M* = 2.83) (Table 142).

Table 145

Descriptive Statistics of First Aid Affective Behaviors on Characteristics of the Casualty

Tests	*M*	*SE*
Pre-Test	2.92	.06
Post-Test	2.75	.06
Retention Test	2.83	.05

It was proved by the literature that, people hesitate intervene to emergency conditions due to the characteristics of the casualty (Axelsson et al., 2000, Brenner et al., 1993, Brenner et al., 1996). In most of the studies people preferred to intervene to casualties that they have known (friends, family members) than strangers (Rowe et al., 1998; Smith et al., 2003). Responses from the students in all three instruction groups indicated that they were not affected by the characteristics of the casualty in the case of emergency situations (Table 141). Additionally, neither instruction methods nor 18 weeks time interval did make any difference among students first aid affective behaviors on characteristics of the casualty.

Characteristics of first aider stated as one of the possible factors that affect first aiders to perform first aid. Studies, which were mainly conducted on CPR related skills, listed the most common barriers to perform CPR as knowledge level of the first aider (Platz, 2000; Jelinek, 2001; Smith et al., 2003; Johnston et al., 2003), confidence level of the first aider to perform CPR (Shibata et al., 2000).

The Groups and Tests main effects as well as Groups by Tests interaction effects were tested for **"characteristics of the first aider".** Standard deviation and mean score values for the three groups and the three tests (pre-test, post-test, and retention test) were given in Table 143. Before the Mixed Factorial ANOVA, the statistical tests of normality were conducted. Data screening indicated that the dependent variable was normally distributed for each of the instructional groups as defined by the different levels of the factor. It was reported as a results of normality assumption check that, the data met the assumptions for parametric statistical analysis according to values derived from the analysis of Skewness (traditional » pre-test: .023, post-test: -.944, retention test: -.460; case-based » pre-test: .294, post-test: -1.336, retention test: -.911 -1.365; web-based » pre-test: .017, post-test:, retention test: -1.331), Kurtosis (traditional » pre-test: -1.071, post-test: .900, retention test: 2.138; case-based » pre-test: .579, post-test: 2.381, retention test: .829; web-based » pre-test: -1.771, post-test: 2.560, retention test: 4.030), histograms and Normal Quantile-Quantile (QQ) Plots.

Table 146

Means and Standard Deviations of First Aid Affective Behaviors on Characteristics of the First Aider

	Groups	*M*	*SD*	*N*
PRE-TEST	traditional instruction	2.79	0.34	29
	case-based instruction	2.82	0.32	29
	web-based instruction	2.82	0.43	29
	Total	2.81	0.36	87
POST-TEST	traditional instruction	2.67	0.40	29
	case-based instruction	2.47	0.54	29
	web-based instruction	2.46	0.53	29
	Total	2.53	0.50	87
RETENTION TEST	traditional instruction	2.67	0.33	29
	case-based instruction	2.61	0.45	29
	web-based instruction	2.87	0.36	29
	Total	2.72	0.40	87

Students' responses related with the characteristics of first aider demonstrated significant main effect of Tests, $F(2, 84) = 10.50$, $p < .05$, $\eta^2 = .11$; but non-significant main effect of Groups, $F(2, 84) = .96$, $p > .05$, $\eta^2 = .02$; and non-significant interaction effects for Groups by Tests, $F(4, 84) = 2.35$, $p > .05$, $\eta^2 = .05$ (Table 144).

Table 147

Analysis of Variance Results for First Aid Affective Behaviors on Characteristics of the First Aider

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	.126	.06	.96	.39	.02
Error 1	84	5.51	.07			
			Within Subjects			
Tests	2	3.43	1.72	10.50	.00	.11
Tests * Groups	4	1.54	.38	2.35	.06	.05
Error 2	168	33.46	.20			

The main effect of Tests demonstrated that, if other variables ignored scores of students in pre-test, post-test, and retention test were significantly different in terms

of first aid affective behaviors related with the characteristics of the first aider (Figure 52).

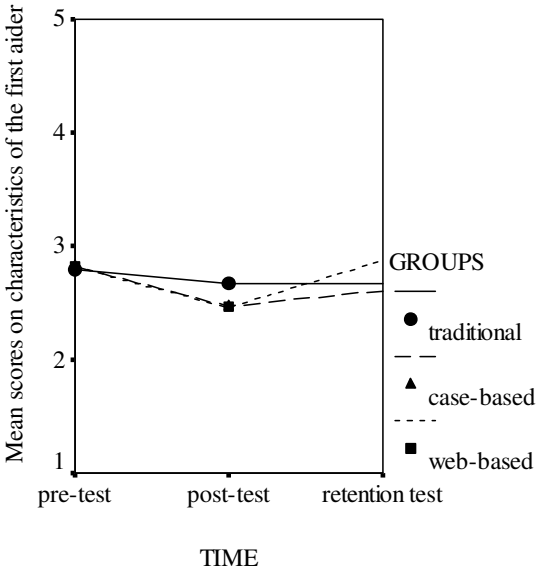

Figure 52. Scores of first aid affective behaviors on characteristics of the first aider by three instruction groups in two tests

Pair wise comparisons (at $p \leq 0.05$) were conducted to examine further effect of Tests on the students' attitude scores of characteristics of the first aider (Table 145).

Table 148

Pair wise Comparisons of Differences between Performance Scores on Characteristics of the First Aider in Post-test, and Retention Test

Tests (I)	Tests (J)	*(I-J)MD*	*SE*	*p*
pre-test	post-test	.28	0.07	0.00
pre-test	retention test	0.09	0.05	0.27
pos-test	retention test	-.18	0.06	0.01

Results of the analysis demonstrated that there was a significant difference between pre-test *(M* = 2 .81) and post-test *(M* = 2.53), and post-test and retention test *(M* = 2.72) (Table 146).

Table 149

Descriptive Statistics of First Aid Affective Behaviors on Characteristics of the First Aider

Tests	*M*	*SE*
Pre-Test	2.81	.04
Post-Test	2.53	.05
Retention Test	2.72	.04

One of the important factors affecting bystanders' reactions during emergency is characteristics of the emergency event. Each emergency condition has its own symptoms depending on the accidents. It may be a simple fainting or a cardiac arrest. Disregarding the types or characteristics, the common truth is all emergencies cause undesirable feelings. Sometimes people may hesitate intervene to urgent situations. For example, it was revealed by the research that, existence of blood around accident area or on casualty affected bystanders negatively, and resulted with nonintervention to the casualty (Smith et al., 2003; Brenner et al., 1994; Lester et al., 2000; Johnston et al., 2003).

The Groups and Tests main effects and Groups by Tests interaction effects were tested for **"characteristics of the event"**. Standard deviation and mean score values for the three groups and the three tests (pre-test, post-test, and retention test) were given in Table 147. Before the Mixed Factorial ANOVA, the statistical tests of normality were conducted. Data screening indicated that the dependent variable was normally distributed for each of the instructional groups as defined by the different levels of the factor. It was concluded that, the data met the assumptions for parametric statistical analysis according to values derived from the analysis of Skewness (traditional » pre-test: -,534, post-test: -,721, retention test: ,096; case-based » pre-test: -,442, post-test: -,241, retention test: ,134; web-based » pre-test: ,365, post-test: -,311, retention test: -,491:), Kurtosis (traditional » pre-test: ,558, post-test: ,219, retention test: -1,047; case-based » pre-test: -,868 -, post-test: -1,120, retention test: -,677; web-based » pre-test: -,828, post-test: -,697, retention test: ,045), histograms and Normal Quantile-Quantile (QQ) Plots.

Table 150

Means and Standard Deviations of First Aid Affective Behaviors on Characteristics of the Event

	GROUPS	*M*	*SD*	*N*
Pre-Test	Traditional Instruction	2.99	0.72	29.00
	Case-Based Instruction	3.18	0.53	29.00
	Web-Based Instruction	2.72	0.39	29.00
	Total	2.97	0.59	87.00
Post-Test	Traditional Instruction	3.15	0.45	29.00
	Case-Based Instruction	3.11	0.51	29.00
	Web-Based Instruction	3.14	0.47	29.00
	Total	3.13	0.47	87.00
Retention Test	Traditional Instruction	2.87	0.47	29.00
	Case-Based Instruction	2.95	0.55	29.00
	Web-Based Instruction	3.31	0.38	29.00
	Total	3.05	0.51	87.00

A three by three mixed factorial ANOVA on characteristics of the event revealed that there was a significant interaction effect of Groups by Tests; $F(4, 84) = .6.60$, $p < .05$, $\eta^2 = .14$. However, there was no significant main effect of Groups, $F(2, 84) = .46$, $p > .05$, $\eta^2 = .01$; and Tests, $F(2, 84) = 2.76$, $p > .05$, $\eta^2 = .03$ (Table 148).

Table 151

Analysis of Variance Results for First Aid Affective Behaviors on Characteristics of the Event

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	.097	.049	.46	.63	.01
Error 1	85	8.834	.105			
			Within Subjects			
Tests	2	1.237	.619	2.76	.07	.03
Tests * Groups	4	5.948	1.487	6.60	.00	.14
Error 2	168	37.852	.225			

The interaction effect of Groups by Tests demonstrated that, scores of students in traditional, case-based, and web-based instructional groups were significantly different in terms of characteristics of the event in pre-test, post-test, and retention test (Figure 53).

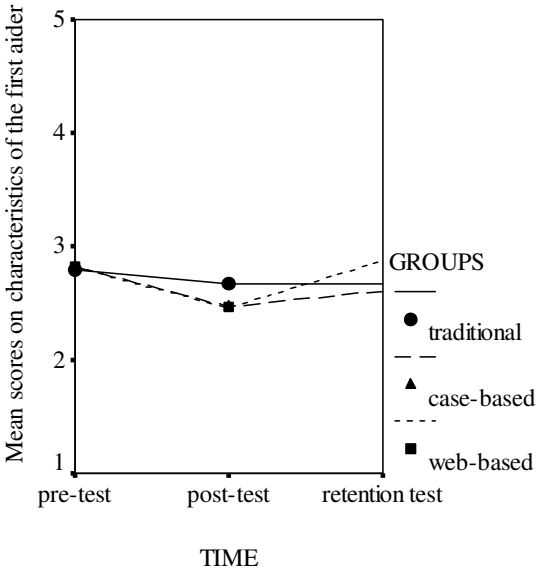

Figure 53. Scores of first aid affective behaviors on characteristics of the event by three instruction groups in two tests

To examine the effects of Tests within each group simple main effects analysis was conducted. Results demonstrated that, scores of students in web-based instruction group were significantly changed in three different testing period (pre-test, post-test, and retention test) (Table 149).

Table 152

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in Terms of Characteristics of the Event*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Group 1 (traditional) by Tests	1.11	2	.56	2.47	.09
Group 2 (case-based) by Tests	.81	2	.40	1.79	.17
Group 3 (web-based) by Tests	5.26	2	2.63	11.68	.00

A paired-samples t-test was conducted to evaluate impact of web-based instruction on students' scores on first aid affective behavior scale. Pre-test scores *(M* = 2.72, *SD*= .39) were significantly lower than posttest *(M* = 3.14, *SD*= .47) and retention test scores *(M* = 3.31, *SD*= .38).

In order to examine mean differences among three instruction groups of students in each test simple main effects analysis was conducted (Field, 2005). Results indicated that students' affective behaviors were not different in pre-test and post-test. However, significant difference was observed among instructional groups in retention test (Table 150).

Table 153

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of Characteristics of the Event

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Test 1 (pre-test)	3.09	2	1.54	4.90	.07
Groups by Test 2 (post-test)	.02	2	.01	.04	.96
Groups by Test 3 (retention test)	3.13	2	1.57	6.96	.00

A one-way between groups analysis of variance was conducted to explore the impact of tests on levels of instruction groups, as measured by skill checklist. There was a statistically significant difference at the $p < .05$ level in students first aid affective behaviors in terms of characteristics of the event in retention test [$F(2, 86) = 6.96$, $p = .00$]. Parallel with the statistical significance, the actual difference in mean scores between groups was large. Post-hoc comparisons were conducted to examine further effect of instructional methods after finding the statistically significant results (Table 151).

Table 154

Post Hoc Comparisons of Differences among Traditional, Case-Based, and Web-based Instruction Groups on Student's Attitudes of Characteristics of the Event in Post-test and Retention Test

	(I) Groups	(J) Groups	*(I-J) MD*	*SE*	*p*
Retention Test	Traditional Inst.	Case-Based Inst.	-.08	.12	.80
	Traditional Inst.	Web-Based Inst.	-.44	.12	.00
	Case-Based Inst.	Web-Based Inst.	-.36	.12	.01

Post-hoc comparisons indicated that the student's in web-based instruction group scored higher than *(M* = 3.31) than traditional *(M* = 2.87) and case-based *(M* = 2.95) instruction groups in terms of characteristics of the event (Table 147).

In emergency events bystanders' willingness to response affected by some other factors like existence of other bystanders in emergency area, feeling of responsibility, feeling of empathy. It was proved by studies that diffusion of responsibility in a crowded emergency area effects negatively to helping behavior (Schwartz & David, 1976; Latane & Darley, 1968; Worchel, Cooper, Goethals, & Olson, 2000). Empathy was also stated as another important factor effecting bystanders' actions during emergency conditions (Meyers, 2002).

The Groups and Tests main effects and Groups by Tests interaction effects were tested for **"effects of social factors"**. Descriptive data related with the student's attitude scores on social factors in pre-test, post-test and retention test was given in Table 148.

Table 155

Means and Standard Deviations of First Aid Affective Behaviors on Social Factors

	Groups	*M*	*SD*	*N*
Pre-Test	Traditional Instruction	2.73	.43	29
	Case-Based Instruction	2.65	.52	29
	Web-Based Instruction	2.77	.23	29
	Total	2.71	.41	87
Post-Test	Traditional Instruction	2.58	.39	29
	Case-Based Instruction	2.70	.52	29
	Web-Based Instruction	2.65	.48	29
	Total	2.65	.46	87
Retention Test	Traditional Instruction	2.69	.41	29
	Case-Based Instruction	2.71	.40	29
	Web-Based Instruction	2.67	.47	29
	Total	2.69	.42	87

Before the Mixed Factorial ANOVA, the statistical tests of normality were conducted. Data screening indicated that the dependent variable was normally distributed for each of the instructional groups as defined by the different levels of the factor. It was concluded about the normality assumptions that, the data met the assumptions for parametric statistical analysis according to values derived from the analysis of Skewness (traditional » pre-test: .259, post-test: .255, retention test: -.390; case-based » pre-test: 1.025, post-test: .682, retention test: 2.023; web-based » pre-test: 2.525: post-test: .690, retention test: .776), Kurtosis (traditional » pre-test: -.471, post-test: .268, retention test: 1.003; case-based » pre-test: 1.787, post-test: -.047, retention test: 5.522; web-based » pre-test: 11.061, post-test: .140, retention test: -,145), histograms and Normal Quantile-Quantile (QQ) Plots.

A 3 (Groups) x 3 (Tests) mixed factorial ANOVA revealed that there was no significant main effect of Groups; $F(2, 84) = .074$, $p>.05$, $\eta^2 = .00$; Tests, $F(2, 168) = .697$, $p>.05$, $\eta^2 = .01$; and also interaction effect of Groups by Tests, $F(4, 168) = .711$, $p>.05$, $\eta^2 = .02$ (Table 149).

Table 156

Analysis of Variance Results for First Aid Affective Behaviors on Social Factors

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	.013	.01		.93	.00
Error 1	84	7.43	.09	.07		
			Within Subjects			
Tests	2	.213	.11	.70	.50	.01
Tests * Groups	4	.433	.11	.71	.59	.02
Error 2	168	25.60	.15			

Results indicated that traditional, case- based and web-based instructional groups did not changed their responses in pre-test, post-test and retention test in terms of social factors that affect bystander intervention (Figure 54). Students' were not affected by social factors in the case of emergencies.

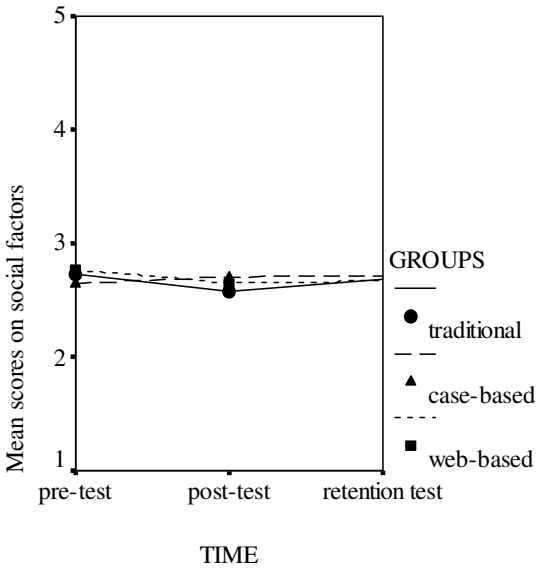

Figure 54. Scores of first aid affective behaviors on social factors by three instruction groups in two tests

Dangerous emergencies also negatively affected bystander intervention especially when other bystanders were present (Peter, Tobias, Fabian & Dieter, 2006; Johnston et al., 2003). Sometimes bystanders concerned legalities of intervention (Rowe et al., 1998).

The Groups and Tests main effects and Groups by Tests interaction effects were tested for **"effects of other factors".** Descriptive data related with the student's first aid affective behaviors in terms of other factors in pre-test, post-test and retention test was given in Table 150.

Before the Mixed Factorial ANOVA, the statistical tests of normality were conducted. Data screening indicated that the dependent variable was normally distributed for each of the instructional groups as defined by the different levels of the factor. It was concluded about the normality assumptions that, the data met the assumptions for parametric statistical analysis according to values derived from the analysis of Skewness (traditional "pre-test: -.125, post-test: -1.401, retention test: -.661"; case-based "pre-test: .136, post-test: -.606, retention test: .276"; web-based

"pre-test: 1.081, post-test: -.556, retention test: .087"), Kurtosis (traditional "pre-test: .033, post-test: 3.606, retention test: 1.522"; case-based "pre-test: -.037, post-test: -.161, retention test: -.823"; web-based "pre-test: -.571, post-test: -.481, retention test: -.426"), histograms and Normal Quantile-Quantile (QQ) Plots.

Table 157

Means and Standard Deviations of First Aid Affective Behaviors on Other Factors

	GROUPS	*M*	*SD*	*N*
Pre-Test	Traditional Instruction	2.92	.40	29
	Case-Based Instruction	3.07	.37	29
	Web-Based Instruction	3.02	.54	29
	Total	3.01	.44	87
Post-Test	Traditional Instruction	2.95	.48	29
	Case-Based Instruction	2.74	.49	29
	Web-Based Instruction	2.80	.54	29
	Total	2.83	.51	87
Retention Test	Traditional Instruction	2.82	.45	29
	Case-Based Instruction	2.81	.38	29
	Web-Based Instruction	3.26	.35	29
	Total	2.96	.44	87

A 3 (Groups) x 3 (Tests) mixed factorial ANOVA revealed that there was a significant main effect of Tests; $F(2, 168) = 3.92$, $p < .05$, $\eta^2 = .05$; and interaction effect of Groups by Tests, $F(4, 168) = 5.17$, $p < .05$, $\eta^2 = .11$; but there was no significant main effect of Groups; $F(2, 84) = 2.512$, $p > .05$, $\eta^2 = .06$ (Table 151).

Table 158

Analysis of Variance Results for First Aid Affective Behaviors on Other Factors

Source	*df*	*SS*	*MS*	*F*	*p*	η^2
			Between Subjects			
Groups	2	.40	.20	2.51	.09	.00
Error 1	84	6.69	.08			
			Within Subjects			
Tests	2	1.44	.72	3.92*	.02	.04
Tests * Groups	4	3.80	.95	5.17*	.00	.11
Error 2	168	30.84	.18			

The interaction effect of Groups by Tests demonstrated that, scores of students in traditional, case-based, and web-based instructional groups were significantly different in terms of other factors in pre-test, post-test, and retention test (Figure 55).

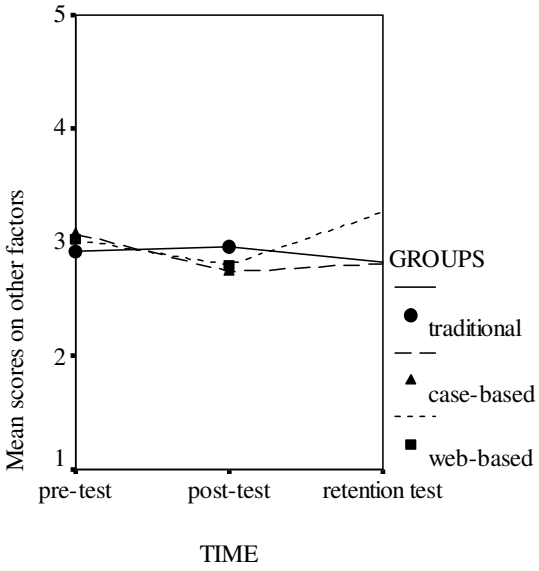

Figure 55. Scores of first aid affective behaviors on other factors by three instruction groups in two tests

To examine the effects of Tests within each group simple main effects analysis was conducted. Results demonstrated that, scores of students in all three groups significantly changed from pre-test to post-test, and post-test to retention test (Table 152).

Table 159

Simple Effect Comparison for Testing Main Effect of Tests *on Each Instruction Groups in Terms of Other Factors*

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Group 1 (traditional) by Tests	.30	2	.15	.81	.45
Group 2 (case-based) by Tests	1.80	2	.90	4.89	.01
Group 3 (web-based) by Tests	3.14	2	1.57	8.56	.00

A paired samples t-test was conducted to evaluate the difference among scores of case-based instruction group in pre-test, post-test and retention test. Results demonstrated that mean scores of web-based instruction group in pre-test *(M* = 3.07) was significantly higher than the scores in pos-test *(M* = 2.74), and retention test *(M* = 2.81), t(28) = 2.91, *p*< .05. Additionally, results of the paired-samples t-test analysis on web-based instruction group demonstrated significant difference between pos-test *(M* = 2.79) and retention test *(M* = 3.26); t(28) = 2.66, *p*< .05 (Table 152). Similarly, responses of web-based instruction group were significantly higher in retention test *(M* = 3.26) compared to post-test *(M* = 2.80) (Table 152); t(28) = -3.99, *p*< .05

In order to examine mean differences among three instruction groups of students in each test simple main effects analysis was conducted (Field, 2005). Results indicated that students' scores, who were in traditional, case-based, and web-based instruction groups, on first aid cognitive behaviors were not different in pre-test and post-test. However, significant difference was observed among instructional groups in retention test (Table 153).

Table 160

Simple Effect Comparison for Testing Main Effect of Each Instruction Group in Each Test in Terms of Other Factors

Source of Variation	*SS*	*df*	*MS*	*F*	*p*
Groups by Test 1 (pre-test)	.36	2	.18	.92	.40
Groups by Test 2 (post-test)	.70	2	.35	1.37	.26
Groups by Test 3 (retention test)	3.94	2	1.97	12.68	.00

A one-way between groups analysis of variance was conducted to explore difference among instructional groups in retention test. There was statistically significant difference in mean scores between the groups in first aid affective behaviors in terms of other factors, [*F(*2, 86) = 12.68, *p*= .00]. Scores of web-based instruction group *(M* = 3.26) were significantly higher than the traditional *(M* = 2.82) and case-based *(M* = 2.81) instruction groups (Table 150).

4.4.2 Results Derived From Qualitative Interviews [1]

This part presents the findings from the qualitative analysis of the interviews concerning student's first aid affective behaviors during emergencies. The interviews included 36 participants (12 students for each instruction group), which were selected randomly by considering their gender, grade, and CumGPA. Of the students participated in the study, 50% had first aid training in driving license course, and 10% had in their secondary school education. However all of the students indicated their perceived first aid knowledge as insufficient (Figure 56).

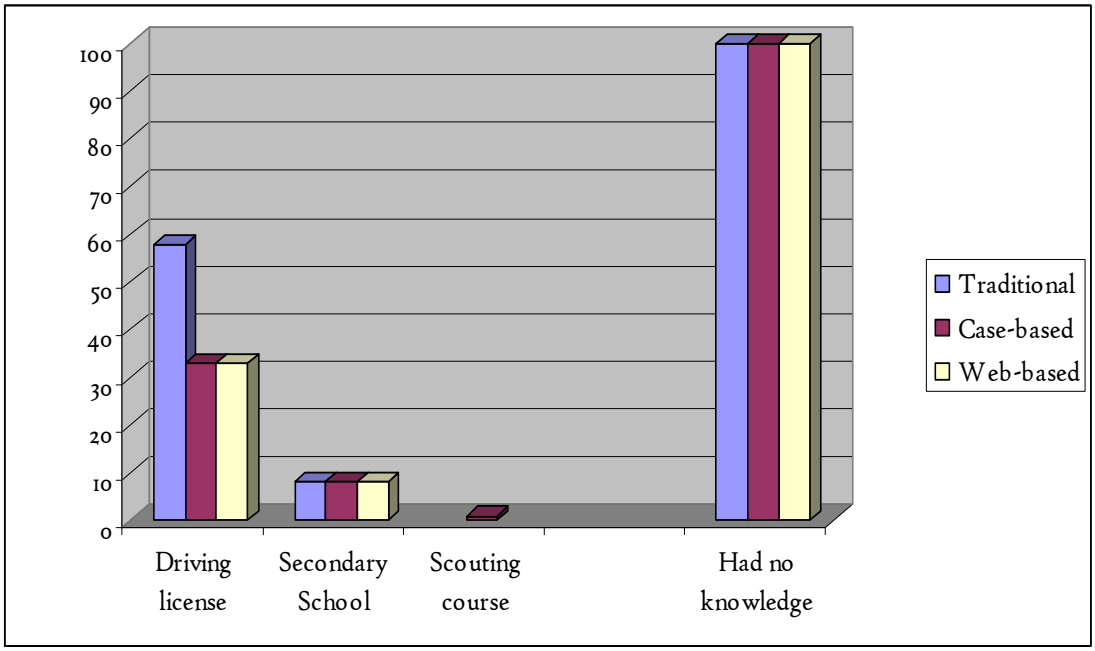

Figure 56. Demographic information on student's background knowledge of first aid

Qualitative data analysis resulted in two headings: Interviews before first aid instruction and interviews after the first aid instruction.

4.4.2.1 Interviews Before the Instruction

In order to find out student's tendency to help or not to help during emergencies, they

[1] G refers to "Group" and S refers to "Student" in quotations

asked about their willingness and ability to help in the case of emergencies. Although students reported lack of knowledge and skills on first aid, totally 53% of the interviewees (traditional= 58%, case-based= 50%, web-based= 33%) stated that they would definitely intervene to emergencies. Nevertheless, 59% of the total interviewees (traditional= 42%, case-based= 50%, web-based= 67%) pointed out that they would not intervene to emergencies. Main reasons for the nonintervention was reported as hesitation to do more harm due to misinterpretation of the emergency, fear of negative reactions from other bystanders due to negative consequences, and unwillingness to take risks. Furthermore, 14% of the interviewees emphasized that they would try to intervene as much as possible with their deficient knowledge of first aid. Moreover, 11% said that they would intervene to small wounds, 14% stated they would decide to intervene depending on the characteristics of the wound, and 8% would definitely intervene if they were alone. The following statements from students indicated their views on intervention to casualties during emergencies.

> "Perhaps you panic a little but I try to help" (G1-S3). "It depends. I mean if there is nobody around, there is nothing to do I try to do something" (G2-S8) "If I'm alone, of course I will help I have no other choice" (G2-S11). I mean if there is nobody to do something except me, I intervene because I have to" (G2-S11). "I mean if there is nobody to do something except me, I intervene because I have to" (G3-S2). "I intervene if I believe there is not something very serious such as a severe bleeding I mean if the victim's life is no at stake, I try to help" (G3-S12). "I would like to help but after serious consideration, I can't help because it would be worse if I tried to help" (G1-S1). "I would hesitate to help because I don't trust myself so much" (G1-S4). "No I can't help. I mean I would like to help but as I have got no knowledge whatsoever, I can't do anything for fear of causing harm" (G1-S6). "I certainly couldn't intervene if there was an accident, I can't do anything because I don't know anything about first aid" (G2-S3). "Of course I would like to help but I would avoid doing something because of my lack of information" (G3-S6).

Students were also required to explain the underlying reasons of bystanders' helping behavior. They emphasized that people helps intrinsically with humanistic feelings (69%), empathetic feelings (47%), and with the feeling of conscience (47%). They also indicated that people feel well when they help someone. Additionally 47% of the interviewees reported that helping behavior during emergencies was the common characteristics of Turkish people. Furthermore, 39% of the interviewees noted that

people would help during emergencies, since they give value to living organisms and human life. Moreover, helping behavior was seen as a human or civil duty by 31% of the interviewees. Students (14%) were also reported that, it would be very hard to keep impassive when someone in need. Participants also mentioned that people feel well when they helped complimentary (8%). Following statements from students similarly demonstrated their views regarding the willingness to help during emergencies:

> "For instance, if you do something without expecting anything in return, you feel very good. It's like fulfilling a moral duty or a civic duty. *Or* they identify with the other person and in this way they relieve" (G1-S1). "We do help firstly because of our common humanity, I think and also because we expect to be treated in the same way when such a thing happens to us" (G3-S12). "You know we have got some historical ties as the Turkish nation. We feel compassion if the victim is not related to us. That's why we help" (G1-S2). "This is a characteristic of the Turkish people; helpfulness or maybe heroism" (G2-S2). "Due to our conscience or the feeling of helpfulness; we help by instinct as the member of the Turkish nation" (G2-S6). "Human beings wish to be helpful instinctively because we are all human beings" (G1-S10). You ease your conscience when you help" (G1-S10) "You ease your conscience when you help" (G1-S3) "Your conscience troubles you even if the victim is not a human but an animal so you try to help" (G2-S5).

It was clearly reported in the literature that, people hesitate to intervene casualties during emergency conditions (Axelsson et al., 2000, Brenner et al., 1996; Brenner et al., 1997). The reluctance to help was observed both in medical personnel and laypersons. One of the most important factors that affect negatively to intervention of people was stated as concern about communicable diseases (Brenner et al., 1996). In the current study, factors, which possibly affect intervention behavior of participants, included characteristics of the casualty, characteristics of first aider, and characteristics of the event. Many participants acknowledged that characteristics of the casualty would not affect their intervention in the case of emergencies (56%), but they supposed other people would be affected (33%). Some participants (44%) reported that characteristics of the casualty should not effect because the important thing was human life. In addition, interviewees indicated that if the first aider was trained nothing would affect to their intervention behavior (8%). It was also pointed

out that intervention and nonintervention was dependent on the personal characteristics (8%). In addition, 47% of the students mentioned that the characteristics of the casualty would definitely affect people who would intervene to emergency events. Moreover, gender remarked as one of the most influential factor that affected first aiders' helping behavior, and 53% of the interviewees proved with their statements that gender would negatively effected to first aiders' actions during emergencies. They criticized that male/female responders would hesitate to intervene female/male casualties. The following responses from students demonstrated their views regarding the gender issues and intervention behavior:

> "Taking into account some conservatives, the females may not treat the victim if the victim is male" (G1-S1). "If you consider this as a value, a man may not treat the victim if the victim is female or vice versa. They may think it wouldn't be appropriate ethically depending on the injured area." (G1-S3). "I don't know but this might happen in the case of artificial respiration. The person may be affected by some questions such as how a man can treat a woman or what the others' reaction to this might be" (G1-S6). "It shouldn't affect but in my opinion it does. We are humans anyway and if the victim is a woman and the person who is going to give first aid is a man or vice versa, this might cause a problem. That is, if there are people around, they may even react negatively" (G1-S10). "In the case of an accident, if the victim is a female and there are two experts who can treat the victim, it would be more appropriate to give priority to the female expert" (G2-S8). "For example it's necessary to give artificial breath or a heart massage. I'm not sure whether a man would give heart massage to a woman or not" (G2-S11). "In Turkey, people may hesitate when a woman has

Characteristics of Turkish people were mentioned as one of the important factors that affect intervention behavior during emergencies. Twenty-two percent of the students indicated that Turkish people would intervene during emergencies without hesitation. Related views were metioned in following statements by students:

> "You know Turkish people are all a bit heroic, they certainly help" (G2-S2). "In Turkey they surely help. They may see it as a civic duty or there might be some people who want to be heroes" (G2-S5). "Let's say Turkish people are helpful by instinct" (G2-S7). "Helpfulness is in our soul" (G2-S9). "Our people want to do something if help is needed, they want to be helpful. They may have enough knowledge or not. They simply want to do something good so they intervene" (G3-S7).

Another factor, which would possibly affected bystanders' actions during emergencies, was physical appearance of the casualty (19%). Students clarified their views on the effects of physical appearance of the casualty in following statements:

> "People may avoid helping if the victim's clothes are dirty thinking some harm can result from them" (G1-S9). "If they see a homeless person with dirty old clothes, they wouldn't help but if the victim is someone young in nice clothes, people are more willing to help" (G3-S4). "Would I help a dirty person living in the street? That's a good question" (G3-S8).

It was also remarked by students (17%) that the negative reactions from other bystanders due to negative consequences in the case of emergencies were important for peoples' intervention behaviors. They reported their views related with the hesitation from other bystanders' negative reactions in following statements:

> "If there are others around, you might feel under pressure. You may feel as if you have committed murder" (G1-S3) "Social factors or the reactions from the people around and also the idea of doing something wrong and the possible reaction of the victim's relatives to this all affect one. Especially the fear factor" (G2-S7).

Students were also acknowledged that age of the casualty would possibly affect people who will intervene to emergency condition. They pointed out that people would hesitate intervene to babies and children because they are more fragile (8%). Additionally, an effect of religious thought was also reported as one of the factors affecting intervention behavior (6%). Student's also emphasized clarity of the event would positively affect to people during emergencies (3%).

Although 53% of the participants stated that gender of the first aider would not affect intervention behavior during emergencies, 33% mentioned that gender would effect negatively. They reported that male/female first aiders will hesitate intervene to female/male casualties. Additionally, 14% of the students told that males would help more and but 11% stated that females would help more. Some students also notified that males were stronger than females (8%). However 19% of the participants indicated that the knowledge level of the first aider would effect to their intervention

behavior rather than gender. The following statements from student's interviews illustrated some of the points regarding the effects of first aiders' gender on intervention behavior during emergencies:

> "In the Turkish society, females are a bit in the background. They may think that they shouldn't intervene if the victim is male" (G1-S2). "Artificial respiration may be needed at that time. How can a man treat a man in such a case or what might be the others' reaction to this? People can be affected by this" (G1-S6). "According to some people, gender makes a difference. A man may not help a woman due to his religious beliefs. A man treats another man or a woman treats another woman immediately, without second thoughts" (G3-S4). "It would be more difficult for a man to treat a woman due to the social norms" (G3-S5).

Emergencies are unwanted conditions (Shotland & Huston, 1979); and some characteristics of an event such as bloody victim, and existence of vomit were reported as having negative effect on bystanders' decisions on intervention. For example, Piliavin and Piliavin (1972) found bystanders' intervention slower in bloody conditions. Similarly, 83% of the interviewees in the current study emphasized that other people would negatively be influenced from occurrence of blood and vomit. In addition, 44% of the students stated that the characteristics of the event would effect negatively to their decisions about intervention. However, 39% of the students noted that they would not be affected from characteristics of the event. Furthermore, 25% of the students stated that the trained people would not be affected by any characteristics related with the emergency event, and 6% stated that the characteristics of event would positively effect to first aiders to take necessary precautions before intervention. The following statements from students demonstrated some of the points related with the characteristics of the event as a factor which would possibly affect peoples' decisions to intervene or not to intervene.

> "People may be affected due to blood fear. It affects me also. I would be disgusted if there was vomit. But if the victim is from the family, I wouldn't mind these" (G1-S11). "Some people can't stand seeing blood and then they may not help" (G2-S1). "It certainly affects negatively. Some people faint when they see blood and vomit may be disgusting for some people" (G3-S9).

It was found from the statements of students (56%) that existence of other bystanders would affect negatively to first aiders' intervention behaviors, whereas some other students (14%) indicated that crowd would affect positively to get help. Possible negative reactions from other bystanders due to negative consequences were also found as a factor (28%) that affect negatively to first aiders decisions on intervene or not to intervene. Similarly, 25% of the participants criticized that people would hesitate from being accused of negative consequences before intervention. Another significant factor on peoples' intervention behavior was specified as a seriousness of the event. Students (22%) marked that the more serious the event the less people would intervene to emergencies. For some of the students (14%) nothing would affect to peoples' decisions on intervention in the need of help due to importance of human life. Furthermore, thirty-nine percent of the students pointed out that trained people would not effected by any factors. The following statements by students indicated their views on existence of other bystanders that would possibly affect bystanders' decisions on whether to help or not to help:

> "In case of an emergency, if the victim is unconscious, while trying to help, I may hesitate from other people's negative reactions, they may think that I injured the casualty" (G1-S1) "You are taking responsibility and if you cannot save the victim's life, you will feel sorry for this for the rest of your life. You will suffer from a guilty conscience, thinking it was my fault" (G2-S5). "I think there is such a thing: if there is a case that has to be intervened, the more the people that there are around, the less is the feeling of responsibility and conscience" (G3-S7).

Students' perceived reasons for the apathetic behavior in the need of help described as escaping from responsibility (58%), having insensitive personality (39%), being illiterate on first aid (36%), hesitation of doing more harm (31%), hesitation of taking risks (31%), having apathetic personality (28%), letting other bystanders to intervene (19%), escaping from inspections by police and hospital staff *(*17%), having thought of "none of my concern/what of it" (14%), having something more important to do (14%), having thought of "let the snake that doesn't touch me live 1000 years" (8%), having selfish personality (8%), having previous negative experience (6%), being overwhelmed by blood (6%), because of gender issues and being a conservative

(6%), having personal reasons (3%), being common watchers (3%), being inexperienced with the emergency events (3%), hesitate from the contamination of their cars (3%), not considering the importance of human life (3%). The following statements from similarly demonstrate the points regarding people's reluctance to intervene emergencies:

> "There may certainly be people who do not wish to help. Some may say it is none of my business and go by. That's just human nature. Some others show a lot of compassion and some others just don't care. Perhaps they don't want to take responsibility. It's because they are afraid of responsibility that they want to run away from the area. They feel they have to help if they stay there; therefore, they go away quickly" (G1-S4). "Perhaps those kinds of people who do not help ever think that such a thing could happen to them also. They cannot sympathize with the victims. They cannot imagine the pain they might suffer if the same thing happens to them and they just say none of my business and go away" (G2-S7). "When a person witnesses an accident, they may just go away without doing anything thinking "somebody else will surely take care of the situation, anyway" (G3-S2).

4.4.2.2 Interviews After the Instruction

Following part presented the findings from the analysis of interviews which conducted after the first aid instruction in three different formats. Interview questions were mainly focused on students' perspectives related with the potential factors that possibly affects application of first aid procedures during emergency conditions.

When asked specifically about their willingness to intervene casualties during emergencies 100% of the students from traditional, 92% from case-based, and 25% from the web-based instruction groups reported that they would definitely intervene emergencies. Interestingly enough, although students deficient in first aid knowledge and skills, before the instruction totally 53% of the interviewees (traditional= 58%, case-based= 50%, web-based= 33%) had stated that they would definitely intervene to emergencies. However, 57% of students from web-based instruction group stated that they would intervene to casualties depending on the characteristics of the wound.

Additionally, 17% of the students from web-based and 8% from case-based instruction group stated that they would only intervene if they were alone and 8% of the students were also mentioned to intervene in alone condition before the instruction. Although any of the students mentioned not to intervene after the instruction, 59% of the total interviewees (traditional= 42%, case-based= 50%, web-based= 67%) had pointed out that they would not intervene to emergencies before the instruction. The following statements from student's interviews illustrated some of the points regarding their willingness to intervene to emergencies:

> "If there was an accident now, I would help. There's no such thing that everybody will have an accident one day but we may be the victim of an accident, too. It's what being a human being requires. And now that I'm more knowledgeable, I would like to help more" (G1-S1). "In order to prevent the victim's situation to get worse, I would help. It's a human being's life; the victim is a human being. I would identify with the victim in such a case. I would try to help thinking the victim is in need of help" (G2-S6). "It depends on the situation. Apart from my self confidence, it also depends on the situation of the victim. If the victim's arm or leg is torn apart, for example, I may feel sick and in that case, how can I help? And what can I do about a torn limb? Therefore, it's also related to the situation of the victim." G3-S10.

Students (traditional= 57%, case-based= 50%, web-based= 8%) agreed that one of the most impressive factors that positively affect helping behavior during emergencies was empathy. They also highlighted that during emergencies people put themselves in casualties' places and feel their pains and these empathetic feelings motivates them to help. Empathetic feelings were also stressed by 47% of the students before the instruction. For most participants (69%) intrinsic humanistic feelings were the mostly remarked reason that influences people's decision to help before the instruction. Further, students (traditional= 50%, case-based= 33%, web-based= 17%) reported that people, who were trained on first aid, help during emergencies because they want their knowledge is useful. Students (traditional= 50%, case-based= 42%, web-based= 33%) also acknowledged that one of the main reasons for people's willingness to help during emergencies that they set a value on human life. They (traditional= 42%, case-based= 57%) were also perceived conscience as an important factor that affects helping behavior of people during emergencies. Conscience was also an important factor stated by students (47%) before the instruction. Furthermore, 33% of the

students interviewed from traditional instruction group emphasized helping behavior as a human duty during emergencies. The major concern the few students (traditional= 17%, case-based= 8%) had was the embarrassing feelings following the nonintervention during emergencies. The students said they intervene to feel well. It was also indicated by 8% of the students from web-based group that, people wanted to help in emergencies because they care for living organism and human life. The proportion of students that mentioned the value of human life and living organism was 39% before the instruction. A few percent of the students (8%) mentioned that helping behavior was a common characteristic of Turkish people. It was 47% before the instruction that students noted as helping behavior as a common characteristic of Turkish people. Additionally, for some students (8%) saving lives of people was a duty of Muslims, and apathetic behavior was accepted as a sin in Islamic beliefs (8%). Similarly, before the instruction helping behavior had seen as a human or civil duty by 31% of the interviewees. Following statements from students clearly pointed out their views on the helping behavior in the need of help:

> "There are some people that I have lost in a way and there is a life that can be saved with my simple help. I know how to do that as I have had the training for it. There is a self-confidence that comes to you from having taken the training so I would help" (G1-S12). "First I would identify with the victim because such things have happened to my relatives and friends, too so I know what kind of things people go through in these situations. I would think of those people's crying at that moment. So I should do whatever I can for them" (G2-S11). "That person needs first aid and as I know how to do first aid, I must help that person in the name of humanity. You could have been in the same situation. You need help but people are running away from you" (G3-S8).

When responding to the question regarding characteristics of the casualty as a factor affecting helping behavior during emergencies, students (traditional= 50%, case-based= 92%, web-based= 25%) said they would not be influenced by the characteristics of the casualty were stated that it would not be a factor for helping behavior. Although students (44%) indicated before the instruction that characteristics of the casualty should not influence people's decisions to help or not to help, it was mentioned that other people would negatively be affected (33%). However, 56% of the students noted before the instruction that characteristics of the

casualty would not affect their decision to help. The following responses from students addressed their views on characteristics of the casualty as one of the factors that affect helping behavior:

> "No factor would affect actually. Maybe there used to be in the past. Because of our past experiences, we used to stay a bit further away from a woman just like staying away from certain parts of a man. But it's not like that any longer. When it's a matter of human life, you don't consider such things when those factors are more important" (G1-S3). "The qualities of the victim does not affect because it's the human life that matters" (G2-S4). "A human being is a human being in the end so his or her qualities do not affect" (G3-S11).

However, some of the students (traditional= 25%, web-based= 33%) indicated that gender would negatively influence helping behavior during emergencies. Additionally, they stated that males/females would hesitate intervene females/males in the case of emergencies. Gender of the casualty was also an important issue which mentioned before the instruction in terms of decisions to help or not to help during emergencies. It was noted 53% of the students that gender would negatively affect to first responder's actions. It was also stated by students before the instruction that, male or females would hesitate intervene to casualties with opposite sex. Following statements indicated students' thoughts on the intervention to casualties who were in opposite sex:

> "I wouldn't be telling the truth if I said "No, it doesn't affect". It does affect. The victim's being a man, above all. If I had to give artificial respiration, I might feel a bit shy. Getting in close contact with the opposite sex would cause the shyness but of course it's a matter of life and death. The age of the victim wouldn't affect but their sex might. It also depends on whether there are people around or not if the victim is the opposite sex. This is about our cultural and social structure, I guess" (G3-S5).

Some of the participants (web-based= 8%) remarked negative reactions from other bystanders as a disturbing and negatively influencing factor on helping behavior during emergencies. Students were also remarked that (traditional= 17%, case-based= 8%) people would hesitate to intervene babies and children due to their sensitiveness, and would hesitate to do harm during intervention. It was also mentioned before the instruction that people would negatively influenced by the children and baby as a

casualty, since they were described as more fragile. Their views on some factors that would possibly influence helping behavior were reported in the following statements:

> "It depends on the people around. I mean in a crowd it is more difficult to treat someone from the opposite sex. You need to check respiration or perhaps give artificial respiration. Those might affect a bit but then the age is important. If the person is old or very young, then it is no problem but if we are nearly the same age, it may affect a little.. I think this is because of our culture" (G3-S5). "If it was a baby, I would be more willing to help. You know the babies are much more innocent, you feel much more affection for them. They shouldn't die" (G1-S2). "Children or babies would scare me more as I would be afraid to harm them" (G2-S5). "What affects me most is the victim's being a child" (G1-S9).

A large amount of the students (traditional= 67%, case-based= 57%, web-based= 25%) reported characteristics of the first aider as not influential factor on helping behavior during emergencies. Similar statement was noted before the instruction that characteristics of the first aider would not influence to decision of help or not to help (53%). Participants were acknowledged that, rather than the characteristics of the first aider, knowledge level would influence their decisions on intervention (traditional= 8%). It was also mentioned before the instruction that the knowledge level was more influential factor than the gender of the casualty (19%). However, students (traditional= 33%, case-based= 8%, web-based= 33%) also noted that gender of the first aider would effect negatively to intervention behavior and male/female first aiders would hesitate intervene to female/male casualties in the case of emergencies. It was also mentioned by 33% of the students before the instruction that gender would effect negatively on decision to help. Furthermore, 8% of the students from traditional, 33% from case-based and 8% from web-based instruction group stated that females were more fragile and would help less than males. Additionally, 8% of the students from traditional, 8% from case- based and 25% from web-based instruction group stated that males were stronger than females and would help more.

When asked specifically about characteristics of the event as one of the factors which possibly influence bystander's reactions during emergencies, students (traditional= 75%, case-based= 33%, web-based= 33%) mentioned that body fluids such as blood

and vomit would not effect their decision of intervention during emergencies. It was indicated by 39% of the students before the instruction that characteristics of the event would not influence their decisions of to help or not to help. However, some of the students interviewed (traditional= 25%, case-based= 57%) said vomit and blood would effect negatively but they would intervene to casualties during emergency events. It had mentioned before the instruction by 83% of the students that people would negatively be affected by blood and vomit, and 44% mentioned they would negatively be influenced by such body fluids during emergency events. For some participants (traditional= 8%, case-based= 17%) blood and vomit would effect positively to take necessary precautions to prevent cross infectious diseases. Moreover, 50% of the students from web-based instruction group indicated that blood and vomit would affect their intervention negatively and would lead them not to intervene. However, 25% stated that despite the negative affect of the body fluids they would try to intervene to casualties. Students (web-based= 42%) also acknowledged that they would negatively affected by blood and vomit and they would not intervene to emergencies. The following statements from student's interviews demonstrated some of the points regarding the characteristics of the event and helping behavior:

> "Having taken the necessary precautions, you shouldn't think about such things any longer. There would be no need for these if you have the necessary hygiene equipment with you. If you have them, then it shouldn't affect. You should treat the victim. That's already the main thing about first aid. It shouldn't affect" (G1-S3). "No, it does not affect. I mean as long as I do not touch directly. Of course I have to protect myself first. I must take precautions with a glove or something like that. I mustn't touch the bodily liquids. Having taken the precautions, I would treat the victim but above all is my safety" (G3-S3).

Majority of the students commented that people would feel responsible from the casualty during emergency events (traditional= 75%, case-based= 100%, web-based= 75%) mostly because they had necessary knowledge and skills related with the first aid (traditional= 67%, case-based= 67%, web-based= 25%). However, 33% of the student in web-based instruction group mentioned that they would not feel responsible due to having deficient knowledge and skills related with first aid.

The findings from the interviews also indicated that conscience (traditional= 33%, case-based= 33%, web-based= 17%), empathy (case-based= 17%, web-based= 8%), and religious thoughts (traditional= 8%) was important factors affecting positively to people's reactions during emergencies. The following statements from students demonstrated points regarding some mentioned factors that affect helping behavior during emergencies:

> "Here is what has happened: previously I didn't know what to do in case of an accident so I could just walk away thinking this and without feeling guilty. But now that I know what do, I wouldn't have an easy conscience if I stayed away despite knowing what to do" (G1-S1). "If I came across an accident, I certainly wouldn't be able to walk away because I know some things and naturally knowing these gives one responsibility to do something. I mean I would certainly help and the reason for this is a bit related to my conscience. You know some things, a person needs your help so you can't just turn back and walk away. Your conscience wouldn't let you free" (G2-S3). "My feeling of responsibility has certainly increased. Already normally I would feel responsible in such a case and now that I have got the information, I would feel much more responsible. It would be much more nonsense to do nothing with all the information I have now" (G3-S3).

Students were required to reflect their thoughts on the crowded emergency environment as one of the factors that would possibly affect people's reactions during emergencies. Students mentioned that crowded emergency environment would not effect their intervention behavior (traditional= 67%, case-based= 50%, web-based= 17%). Further they indicated that people would not be influenced by anything if he/she was trained on and equipped with necessary first aid knowledge and skills. Some of the students (traditional= 42%, case-based= 17%, web-based= 8%) also agreed that crowded emergency environment would effect positively to responder since he/she would have a chance to get help from them if needed. They explained that, responders may use other bystanders for carrying the casualties, calling the emergency service, and stopping bleeding while he/she was intervening to other more serious and complicated injuries. However, some students indicated that crowd would effect negatively in emergencies (case-based= 33%, web-based= 67%) and responsibility would decrease in a crowded environment in the case of emergencies. It was remarked before the instruction that existence of other bystanders would

influence negatively to first aider's intervention behaviors (56%). The main reasons for that stated as fear of negative reactions from bystanders (28%), fear of being accused of negative consequences (25%). They also reported that, bystanders may disturb responders, they may try to stop them, and also they may disturb by talking chorus. It was also indicated that the crowd might affect both negatively and positively during emergencies (traditional= 8%). Their opinions about the crowded emergency conditions were proved with the following statements:

> "As I have got information and as I know what to do and how to do it, whether there are others around or not wouldn't affect but if there were people around, they might help carry the victim" (G1-S2). "There being others around wouldn't affect in any way. If they gathered around the victim, or if everybody says something, it may affect a bit in a negative way but apart from that, it would be better to have people around because while I am giving the first aid, others may call the emergency service (112)" (G2-S7). "There being others around or not wouldn't affect me at all. I would try to help as much as I can but if there were too many people trying to interfere, I may have some difficulty. Apart from that, it wouldn't affect in another way" (G3-S11). "There being a lot of people reduces my feeling of responsibility, if for example there was someone claiming to know better than me. But if there was nobody, I would feel responsible at a maximum level" (G3-S7).

Students also required to describe their thoughts on possible risks of intervention which would possible affect their decision to help or not to help during emergencies. Majority of the students (traditional= 83%, case-based= 75%, web-based= 50%) stated that risks would not affect first aiders decision. However, some of the students (traditional= 17%, case-based= 25%, web-based= 8%) said, although people would negatively influenced by possibility of risks, they would intervene to casualties. Furthermore, 42% of the students from web-based instruction group stated that risky conditions would affect negatively to their intervention behavior. It was also mentioned before the instruction that seriousness of the event and more risky conditions would negatively influence responder's decisions on to help or not to help. Their thoughts about taking risks during emergencies were clarified with following statements:

> "I wouldn't think about taking risks or not. Previously I would. I would worry about doing something wrong but now because I know things, I believe it would be better to take risks than nobody's doing anything" (G1-S5). "If that person will die unless I give that first aid help, what could be worse?" (G2-S12). "I might think of risk in terms of the security of the environment only. Apart from that, who could blame me for trying to help someone or what else could be?" (G3-S7). "I might consider the risks involved but it depends on the situation. If the case is very serious, I would like to help. I could at least have a look at the victim and then call help. I wouldn't interfere" (G3-S1). "I would think about it a bit. I have some first aid information but as I said in terms of application, there isn't much. When I'm applying CPR, I feel quite hesitant about whether I'm doing it right or not and whether I'm causing any harm to the person or not" (G3-S11).

Students listed many factors that cause peoples apathetic behavior during emergencies. These were; escaping from responsibility (traditional= 25%, case-based= 25%, web-based= 42%), escaping from taking risks (traditional= 17%, case-based= 33%, web-based= 42%), because of gender issues/conservatives (traditional= 17%, case-based= 33%, web-based= 33%), considering laws after negative consequences (case-based= 33%, web-based= 17%), nonhuman behavior (traditional= 25%, web-based= 17%), unconscionable behavior (traditional= 8%, case-based= 25%), related issue with peoples' inner world (traditional= 17%, case-based= 17%, web-based= 8%), having deficient knowledge (traditional= 33%, web-based= 25%), afraid of doing more harm to casualty (traditional= 8%, case-based= 8%, web-based= 42%), having selfish personality (traditional= 17%, case-based= 25%), hesitation from other bystanders negative reactions (web-based= 57%), having insensitive behavior (traditional= 25%, case-based= 8%, web-based= 8%), having apathetic behavior (traditional= 17%, case-based= 8%), overwhelmed by blood (traditional= 8%, case-based= 8%, web-based= 17%), letting other bystanders to intervene (web-based= 25%), having thought of none of my concern (traditional= 8%, case-based= 8%), having no previous experience with emergency conditions (traditional= 17%), hesitation from cross infectious diseases (traditional= 8%), and panicked behavior (traditional= 8%). Some of the factors that affected peoples' helping behavior negatively were noted below:

> "Not helping wouldn't be human. It would be just due to lack of personality. You know what to do and you have the necessary things and there is a life there to be saved. What could be the worst thing? Even if you're taking risks, how much risk could be involved? You will be saving someone's life. Otherwise would be just having no conscience" (G1-S1). "Such a thing must not have happened to them. If such a thing happens to anybody, they will try to do something. They will understand what an important thing it is and act accordingly, I believe" (G1-S3). "The person may not be helping because of the sex of the victim. A woman may hesitate to touch a man or you know there are some people who do not touch men because of their beliefs. I know such people. There are some of them around me" (G2-S11). "A person may not give first aid because he/she is afraid to do it as they might be worried bout whether they are doing the right thing or not. They may think if there are people around, someone else had better do it" (G3-S2). "As I said, the reason for not helping might be related to the personality of the person. Some people may think "it doesn't matter if it isn't my problem". And they may also think that somebody else will do it anyway, why should I take risks in case something bad happens" (G3-S9).

Before the instruction similar findings related with people's reluctance to help during emergencies were reported. Escaping from responsibility was the mostly mentioned behavior (58%). Then students described that people who don't help had insensitive personality (39%), were had apathetic personality (28%), let other bystanders to intervene (19%), escape from inspections by police and hospital staff *(*17%), had thought of "none of my concern/what of it" (14%), had something more important to do (14%), having thought of "let the snake that doesn't touch me live 1000 years" (8%), had selfish personality (8%), had previous negative experience (6%), were overwhelmed by blood (6%), because of gender issues and were conservatives (6%), had personal reasons (3%), were common watchers (3%), were inexperienced with the emergency events (3%), hesitated from the contamination of their cars (3%), not considered the importance of human life (3%).

CHAPTER V

DISCUSSION AND IMPLICATIONS

This chapter discusses effects of different instructional strategies on students' cognitive, affective, and psychomotor behavior of first aid and retention of these behaviors. Based on an extensive literature review two main research questions and 6 sub-questions were developed. Discussion of the research results is presented according to the six research questions and these hypotheses are discussed in detail in following chapter. Further, implications for practice and further research are presented.

5.1 First Aid Cognitive Behavior

The first research question was to examine effects of different instructional methods on student's first aid cognitive behaviors and the fourth was to examine the effect of time on these behaviors. First aid cognitive behavior of students was measured by first aid cognitive behavior test, which consisted of 50 questions five alternatives multiple choice test. The current study indicated that students in traditional, case-based and web-based instruction groups had similar background knowledge before the instruction. Additionally, their first aid cognitive behavior (knowledge) improved correspondingly following the instruction. The only statistically significant difference was found between traditional and case-based, and traditional and web-based instruction groups in terms of first aid cognitive behaviors in retention test. Scores of students in traditional instruction group was significantly higher than the students in other two instruction groups only in a retention test. However, despite statistical significance, the actual difference in mean scores between the groups and their effect size was quite small among traditional *(M* = 38.76), case-based *(M* = 34.77), and web-based *(M* = 33.24) instruction groups.

The current study revealed that traditional, case-based and web-based instruction methods significantly and correspondingly improved the first aid cognitive behavior of students. This finding showed that three instructional methods were regularly effective in terms of transferring first aid theoretical knowledge. This result supported by Madden's (2006) findings that the improvement in emergency life-saving procedures of CPR was obtained following the instruction in nurses. Other researchers (Mahony, Griffits, Larsen, & Powell, 2008) were also found that the knowledge of first aid by airline cabin crew increased following the instruction. Furthermore, research on children confirmed parallel results that knowledge on basic life support were significantly increased as a result of training (Connolly, Toner, Connoly, & McCluskey, 2007). The improvement of knowledge was also detected by Cooper, Johnston and Priscott (2006) following the immediate life support training in a primary care setting. It was noted that trained primary care professionals gathered higher scores than people who were not trained. Likewise, the study on medical personnel and medical students demonstrated increase in theoretical knowledge on basic cardiac life support after the basic cardiac life support training (Seraj & Naguib, 1990).

Different methods of instruction were also applied to estimate the effects on the improvement of first aid knowledge. For example, development of technology and the usefulness of internet in educational area directed educators to construct online first aid courses. One of the researches which evaluated the effectiveness of online first aid and resuscitation training on high school students' knowledge was conducted by Teague and Riley (2006). In their study, compared to control group (no training), students, who completed the online course, gathered higher scores in terms of theoretical knowledge of first aid and cardiopulmonary resuscitation. Further, Todd et al. (1999) found comparable influence of video self-instructional and traditional cardiopulmonary resuscitation training on development of people's theoretical knowledge of CPR.

Patient simulation was also popular instructional method in educational area (Brendel, Best, With & Vries, 2008; Kuznar, 2007). Simulations were also used in the area of first aid and resuscitation education. For example, findings of the comparative study on the effectiveness of the training with live actors and traditional training demonstrated similar level of knowledge improvement in both training groups (Miotto, Couto, Collart, Amaral, & Moreira, 2007). Additionally, the study by Fabius, Grissom, and Fuentes (1994) compared the effects of traditional and computer method of instruction on cardiopulmonary resuscitation and found no difference between knowledge levels between students in two different groups. These findings conformed to the study of Coleman, Dracup, and Moser (1991), which compared the effects of two teaching methods (didactic instruction and modular instruction) on cardiopulmonary resuscitation knowledge and skills. Their research findings suggested no difference between groups just after the instruction, and three months time interval.

Improvement of the cognitive knowledge following a training but decrease in the level of knowledge following a time interval was revealed by the comparative study on advanced trauma life support knowledge of new medical graduates and instructors who completed the course previously (Azcona, Gutierrez, Fernandez, Natera, Speare, & Ali, 2002). It was also documented by the study on the nurses that the knowledge improved at identical level but decreased after 6 months time period (O'Donnell & Skinner, 1993). Similarly, Su, Schmidt, Mann, and Zechnich (2000) conducted a study on paramedics by assigning them into four groups. In their study, first group received a knowledge examination and mock resuscitation scenarios at six months, second group received only the knowledge examination at six months, third group received the mock resuscitation scenarios only at six months, and fourth group received no intermediate testing. Researchers reassessed all groups following 12 months time interval. Findings of their study demonstrated sharp improvement in subject's knowledge due to subsequent training, but time interval caused decrease in psychomotor skills. On the contrary, no difference among knowledge scores of groups was reported. Another related study was conducted to evaluate the knowledge

and skills of two groups of newly qualified doctors (Kaye et al., 1990). One of the groups was trained in hospitals without practical resuscitation and other group was trained with a practical resuscitation. Findings indicated significant increase in the knowledge of advanced cardiac life support, and modest decrease after 5 months time interval in both of the groups.

Hammond, Saba, Simes and Cross (2000) also evaluated the retention (18 months time interval) of theoretical knowledge and clinical skills of nurses, who completed the two day advanced life support course successfully. Their study indicated that the theoretical knowledge level remained at similar level after 18 months time interval. In another study Young and King (2000) found increase in the nurse's theoretical advanced life support knowledge after 6 weeks and 12 weeks following the instruction. It was also supported in the literature that theoretical first aid as well as resuscitation knowledge improved after training and retained longer period of time (Palese, Trenti, & Sbrojavacca, 2003). These findings were in agreement with the finding of Lewis, Kee, and Minick (1993) suggesting that cognitive knowledge sufficiently retained consequently after the instruction. Reder and Quan (2003) examined the current high school CPR training, possible obstacles to providing, and strategies to increase CPR training of high school students. They collected the data via telephone and mail surveys from 279 schools. Based on the survey results, researchers suggested increasing funding, providing time in the curriculum, having more certified instructors, and making CPR student training compulsory.

As a summary, results of the current study supported the literature that student's previous first aid knowledge was poor before the instruction. They improved first aid knowledge attributable to provided instruction. Although different instructional methods (traditional, case-based, and web-based) were applied, improvement of the first aid knowledge level was not different among students. Furthermore, decrease in first aid knowledge retention was observed due to 18 weeks time interval in all three instructional groups.

5.2 First Aid Psychomotor Behavior

The second and fifth research questions were to examine effects of different instructional methods on student's first aid psychomotor behaviors and effect of time on these behaviors. It was argued in the literature that the instructor's judgments for the effectiveness of the CPR skill performance were not sufficiently reflecting the actual performance of the subjects (Lynch, Einspruch, Nichol, & Aufderheide, 2007). It was recommended to use additional devices such as manikins especially to evaluate the compression and ventilation skills. In the current study first aid psychomotor behaviors of students were measured both by Resusci Anne Skill Reporter Manikin, which is an adult CPR training manikin that focuses on student performance through printed reports on ventilation and compression compliance, and Skill Checklist, which focused on student's competency on specified and listed CPR and recovery position skills.

Measurements made by skill reporter manikin system included the data on chest compressions (average compression rate, average compression depth, average number of compressions per minute, average percent of compressions, too deep compressions, too shallow compressions, too low hand position, wrong hand position, and total number of compressions) and ventilations (average number of ventilations per minute, average volume of ventilations, minute volume of ventilations, too fast ventilations, too little ventilations, too much ventilations, total number of ventilations, average percentage of correct ventilations) which were two important components of CPR. To test the effects of different instructional methods and time on chest compressions and ventilation skills, each of the above mentioned skills were analyzed independently. Additionally, measurements made by skill checklist included psychomotor performances on checking for safety, checking for unresponsiveness, shouting for help, opening airway using head tilt-chin-lift procedure, checking breathing for no more than 10 seconds, calling 112, applying 30 chest compressions, locating compression position between every set of compressions, giving 2 rescue breaths, opening airway between every set of compressions by using head tilt-chin

lift, attempting breaths with at least 1 chest rise between every set of compressions, resuming CPR, and attempting a pulse check for the CPR. Similarly, skill checklist of recovery position included psychomotor performance measurements of checking for safety, checking for unresponsiveness, shouting for help, opening airway using head tilt-chin-lift procedure, checking breathing for no more than 10 seconds, positioning the victim's arms, positioning the victim's legs, positioning the victim's body, positioning the victim's head for recovery position, sending someone or calling for help/ambulance, and attempting a pulse check. In order to evaluate the effects of different instructional methods and time on psychomotor behaviors of "CPR" and "Recovery position", each of the elements were analyzed independently.

By gathering the results via skill reporter manikin, the current study found that neither 18 weeks time interval nor instructional methods had any effect on the psychomotor skills of average compression rate, average number of compressions per minute, and number of too deep and number of too shallow compressions. The average compression rate was suggested in the ERC guidelines (2005) to be applied at the rate of 100 compressions per minute. The current study found that students in three instructional groups compressed at the rate of suggested level, however their mean number of compressions per minute reduced to approximately 64 compressions per minute due to interruptions. Student's performances on the number of too deep compressions were also comparable. ERC suggested 4-5 cm for the full chest compression depth, and the compressions above accepted as the too deep compressions. The study demonstrated that students performed about 4 too deep chest compressions during their total CPR performance.

Additionally, the current study also demonstrated that the instructional methods had an affect on student's psychomotor performance in terms of percentage of correct chest compressions, average compression depth, number of too shallow compressions, number of too low hand positions during chest compressions, number of wrong hand positions during chest compressions, number of incomplete releases during chest compressions. According to results derived from the chest compressions

performance, it was found that students in traditional and case-based instruction groups had performed adequate compression depth, while web-based instruction groups performed insufficient depth to be accepted as an effective to provide blood flow to the body parts. Further, results revealed that students in web-based instruction group located their hands onto an incorrect spot for chest compressions both in post-test and retention test. As it was mentioned before, ERC (2005) suggested center of the chest for compressions, however upper or lower parts of the chest or sides of the chest accepted as wrong locations for the positioning hands during CPR. Similarly, performance on number of too low chest compressions was higher in web-based instruction group than the traditional and case-based instruction groups. Too low hand position was mentioned as improper performance for complete CPR, because incorrect location of the hand placement directly affects to the survival of the casualty. In terms of average percentage of correct chest compressions, traditional and case-based instruction group differed from web-based instruction group. The study revealed that the chest compressions by students in web-based instruction was poorer than the traditional and case-based instruction groups both in post-test and retention test. Although, traditional and case-based instruction groups' performance decreased from post-test to retention test, their scores were still higher than the web-based instruction group. Students in web-based instructional group performed only about 15% of their total chest compressions correctly. In addition to low percentage of correct chest compressions, students in web-based instruction group performed much more too shallow chest compressions, which lead to insufficient blood flow to vital organs, compared to traditional and case-based instruction groups.

The effects of 18 weeks time interval mainly affected to the student's psychomotor performance of correct chest compressions and total number of chest compressions. Student's performance significantly decreased as a result of time interval. A possible explanation for the poor performance on chest compressions by web-based instruction group may be because of the variation of the manikins during the training period and the evaluation period of CPR skills. As pointed out by Baubin, Gilly, Posch, Schinnerl, and Kroesen (1995) even training manikins vary in their

compression characteristics. By stressing the importance of teaching correct CPR for learners, researchers mentioned that student's should be trained on manikins with different chest resistances, which will then help for learners to be prepared for varying chest resistances of the human body.

Similar to compression performance, student's performance on ventilation skills was mainly affected by the instructional methods. The results showed that average number of ventilations, average volume of ventilations, minute volume of ventilations, number of too fast ventilations, total number of ventilations, and percentage of correct ventilations were differed significantly among groups. However, students performance scores related with above mentioned ventilation skills did not changed after 18 weeks time interval in three instruction groups. The normal ventilation rate of 12-16 breaths per minute and tidal volume of about 500 ml produces a minute volume of 6000 to 10000 ml, and the average adult's tidal volume is 700 ml (Shier, Butler, & Lewis, 1996). Minute volume of ventilation is the average number of breaths per minute multiplied by the average ventilation volume. The current study demonstrated that the students in web-based instruction group performed less ventilation, smaller volume of ventilations, and smaller minute volume of ventilations than the traditional and caseb-based instruction groups. Considering the four sets of CPR (1 set: 30 chest compressions + 2 rescue breaths) during measurement of CPR performance skills, students were required to give totally 8 rescue breaths. However, due to ineffective opening of airway and insufficient force for the effective ventilation, students in web-based instruction group performed approximately 3-4 ventilations for the total four sets of CPR. Additionally, percentage of correct ventilations by web-based instruction group was significantly lower (8%) than the traditional (32%) and case-based (31%) instruction groups. The most recent guidelines suggested by ERC (2005) that the total amount of ventilated gas that was delivered in one minute should be between 500 (minimum) to 800 (maximum) milliliters during CPR to maintain adequate oxygenation during CPR. However, it was also pointed out by the researchers that the air composed of low level or deficient oxygen and excess level of carbon dioxide (Wenzel, Idris, Banner,

Fuerst, & Tucker, 1994). Considering these characteristics of ventilations, it was notified that too many breaths and breaths with too large volume were harmful and causes reduced survival rate (ERC, 2005). The sufficient amount of tidal volume for the adult CPR was reported as 500-600 ml (6-7 ml^{-1}). Studies were also supported the usefulness of suggested tidal volume (0.5 L) (Wenzel, Lindner, & Prengel, 1997; Wenzel, Idris, Banner, Kubilis, Williams, 1998). High minute ventilation reported as causing air flow to the stomach and peak airway pressure during CPR (ERC, 2005; Wenzel et al., 1999). Simply, the latest recommendation stressed to give each breath over about 1 second with enough volume, which was indicated above, and caution was also added about not to give rapid and forceful breaths.

In the current study, the psychomotor behaviors related with CPR were also evaluated by the skill observation checklist. The significant effects of instructional methods on CPR performance was obtained in skills of checking for safety, checking for unresponsiveness, opening airway using head-tilt-chin-lift, checking for breathing, 30 chest compressions, locating hands onto a correct location during chest compressions, 2 rescue breaths, opening airway between every set of compressions and attempting breaths with effective chest rise between every set of chest compressions. A significant finding in relation to the influence of instructional methods was that web-based instruction negatively affected to the student's performance of CPR skills. This showed that the traditional and case-based instruction groups performed superior CPR skill performance compared to web-based instruction group. Additionally, the study also demonstrated that 18 weeks time interval negatively affected to the student's performance of shouting for help, opening airway by using head-tilt-chin-lift, checking for breathing, and calling for 112. Although checking for breathing was not affected much by time, students were poorly performed the skills related with the getting help.

The findings of the current study also indicated that instructional methods had a significant effect on the psychomotor performance of "recovery position". The findings conformed with the psychomotor skills of CPR that, students in web-based

instruction group performed poorer than the students in traditional and case-based instruction groups in terms of checking for safety, checking for unresponsiveness, shouting for help, opening airway, checking for breathing, positioning the arms, positioning the legs, positioning the body, positioning the head, and activating the emergency service. The current study also revealed that the 18 weeks time interval negatively affected to all groups of students in terms of their psychomotor performance on checking for safety, shouting for help, opening airway, checking for breathing, positioning the arms, and activating the emergency service. Similar to poor compression performance during CPR, reason for the poor ventilation performance by students in web-based instruction group may be caused by the difference between the training and the evaluation manikins. It was suggested by the Wenzel, Lehmkuhl, Kubilis, Idris and Pichlmayr (1997) that CPR training programs need to consider the respiratory mechanics of CPR manikin being used to assure clinically realistic and appropriate ventilation skills. Odegaard et al. (2006) also mentioned that the inadequate chest compressions were not due to lack of physical capability, rather by fear of causing patient injury such as breaking ribs during compressions.

These results related with the psychomotor performance were contradictory to the findings of the study by Batcheller et al. (2000) in which half-hour video was found as better than traditional instruction. He compared the effects of traditional CPR classes and 34-min video self-instruction. Traditional instruction was applied to the participants who were average 31 years of age; however average age of the participants in video self-instruction was 55 years. Participants in video self-instruction group performed 20.8% of all compressions and 25.1% of all ventilations correctly, but participants of traditional instruction group performed 3.4% of compressions and 1.7% of ventilations correctly. Additionally, participants of video self-instruction performed 10.1 of the total 14 CPR assessment and sequence skills correctly, compared with 4.7 for traditional instruction group. Furthermore, in terms of overall performance, 62.7% of the video self-instruction groups were rated as “competent” or “better”, but 6.1% of traditional instruction group were rated as “competent”. Besides these findings, 17.8% of subjects from video self-instruction

group were rated as “not competent” compared with 69.1% of subjects in traditional instruction group. In accordance with their results, researchers suggested video self-instruction as an effective, convenient, and inexpensive tool to use at home.

The results of the current study were also contradictory to the study by Braslow et al. (1997). As being a training method without instructor, video self-instruction was mentioned more effective than the traditional CPR instruction. Results of their study demonstrated that the subjects from video-self instruction group performed more compressions, more ventilation, and more assessment and sequence skills correctly. Besides, subjects of traditional instruction group delivered twice as many too shallow compressions, and inflated the lungs lower twice as often as the video self-instruction group.. Additionally, subjects of video self-instruction were rated as “competent” or better 80.0% of the time, but subjects in traditional instruction group were rated as “competent” 45.1% of the time. Findings also showed that subjects of traditional instruction group were rated as “not competent” nearly 10 times more often than subjects of video self-instruction group. It was also supported by the researchers that video self-instruction was superior in skill acquisition as well as skill retention compared to traditional instruction. Similarly, the findings of the study by Todd et al. (1998), who compared the 34-minute video self instruction with the standard community heart saver training by AHA, demonstrated better CPR performance executed by the attendees of the video self instruction. Similarly, Todd et al. (1999) conducted another study on the effectiveness of video-self instruction by comparing the traditional instruction and found comparable results in theoretical knowledge; but performance scores differed in favor of video self-instruction. Video self-instruction suggested as an alternative to traditional instruction as a simple, quick, consistent and inexpensive instructional method. Another study, which examined the effects of video self-instruction on older adults (285 participants with the age between 40-70 years), were evaluated by providing them with the 22-min video, inflatable training manikin, and audio prompting device (Lynch, Einspruch, Nichol, Becker, Aufderheide, & Idris, 2005). Researchers compared the video self-instruction group with the untrained people and people who trained with conventional heart saver

training. Results demonstrated that the participants who were in video self-instruction group performed better than the control group in terms of assessing unresponsiveness, calling emergency service, ventilating, placing hands properly during chest compressions, and providing adequate depth during chest compressions. Additionally video self-instruction group was better in overall performance and ventilation performance compared to conventional heart saver training group. Based on their findings researchers recommended the video self-instruction as an effective approach to train older adults in half and hour, and to reach the extensive amount of individuals in a society for CPR training. The effects of video-self instruction on retention of CPR skills were also evaluated with the sample of school children (n= 76, age 12-14 years) and adults (n= 194, age 22-51 years) (Isbye, Meyhoff, Lippert, and Rasnussen (2007). Researchers offered participants with a CPR training manikin (Mini Anne) for self-training at their home. Subjects were evaluated after 3 months for their retention of CPR skills. It was reported that adults gained higher basic life support skill retention scores compared to school children, but the "ventilation compression ratio" and "hand position" during chest compressions were not different. Additionally, the children were better than adults in terms of "total compressions" and "hands off time".

The effectiveness of the video self-instruction was also supported by program evaluation study (Starr, 1998) which suggested the video self-instruction as an effective home learning system which removes the necessity of formal instructor for teaching CPR. However, Liberman, Golberg, Mulder, and Sampalis (2000) evaluated the effects of four different instructional methods (Group1= 4 h course with the manikin student ratio of 1:4; Group2= 4 h course with the manikin student ratio of 1:1, Group 3= 2 h course with the manikin student ratio of 1:1; and Group 4=video-assisted CPR instruction with the manikin student ratio of 1:1) on junior college students' CPR skills and found no significant differences among the groups in terms of compression and ventilation skills after the instruction as well as at the end of the semester. In their study subjects performed approximately 28% percent of the total compressions (20% incomplete release, 51% insufficient depth, 36% wrong hand

position) and 34% of the total ventilations (99% under inflated) correctly. Unlike comparable skill performance on compressions and ventilations, researchers found that Group 3 and Group 4 performed better in primary survey (airway, breathing, circulation, sequences). Another study comparing the self-directed learning, a self-instructional video, access to practice manikins and learning in pairs was conducted to examine their effectiveness on basic life support skill improvement (Done & Parr, 2002). Based on the findings, which gathered by using skill checklist, researchers noted that the combination of above specified teaching approaches were effective in the acquisition of basic life support skills.

By considering the poor CPR knowledge and skills in general population, Isbye, Rasmussen, Lippert, Rudolph, and Ringsted (2006) conducted a study to evaluate the effectiveness of 24 min instruction using DVD-based self-training by comparing it conventional 6 h basic life support course. Researchers evaluated the skills after 3 months period, and found no significant difference between total basic life support scores of two groups. Participants in traditional instruction group performed more assessment of breathing. Additionally, average inflation volume and chest compression depth were significantly higher in video self-instruction group. Another study related with the effectiveness of video self-instruction was conducted by Roppolo et al. (2007). Researchers compared the effectiveness of traditional instruction and 30 min instruction in the development of CPR and AED (Automated External Defibrillator). Participants were evaluated twice (immediately after the instruction and 6 months following the instruction). Their findings demonstrated that the 30-min CPR and AED training was as effective as traditional multi-hour courses for both skill acquisition and skill retention. Researchers suggested 30-min course as an effective strategy to decrease the labor intensity, demands on resources, and time commitments for CPR courses.

For many years, different instructional methods were introduced to provide the extensive spread of CPR training. By hypothesizing the effectiveness of video self-instruction over traditional 4-h CPR classes in mass training Einspruch, Lynch,

Aufderheide, Nichol, and Becker (2007) conducted a study. Participants (285 adults between the ages of 40 and 70 who had no CPR training within the past 5 years) were randomly assigned to no-training control group, Heart saver (HS) training group, or one of three versions of brief video self-instruction group. Results demonstrated significant decrease in the performances of assessing responsiveness, calling 911, and overall performance. Additionally, significant decrease was also found in ventilation volume and correct hand placement. Researchers reported that subjects of Heart saver and self-trained groups demonstrated comparable level of decline. They also mentioned that video self-instruction was effective as much as traditional instruction in terms of CPR skill retention.

The shortest self-instructional video (8-min) and a simple inflatable training manikin were introduced by the researchers to train people on CPR (Jones, Handley, Whitfield, Newcombe & Chamberlain, 2007). Researchers evaluated the effectiveness of 8-min self-instruction DVD by comparing with the 1-h instructor-led course. Following the training, groups were evaluated for their performance on CPR. The self-training group gained comparable results with the 1-h instructor-led group. Researchers suggested short DVD based self-instruction package for the distance learning environments, and/or in other circumstances in which education opportunities and resources were limited.

Traditional 4-h CPR courses were mentioned as a barrier for the extended CPR instruction for larger populations (Braslow et al., 1997; Todd et al., 1998; Todd et al., 1999). Many inventive instructional methods were applied in first aid and mostly in cardiopulmonary resuscitation education and their effectiveness on knowledge and skill acquisition were also examined. For example, considering the importance of the increased number of bystander CPR in the community, Eisenberg et al. (1995) conducted a community project by mailing 10-min videotape of CPR instruction to 8659 households, and additionally they selected another 8659 households as a control group. Researchers observed participants from 1991 to 1993 in order to obtain information about the occurrence of cardiac arrests and application of bystander CPR.

They collected data via telephone interview. Results showed that 65 cardiac arrests occurred (31 in households that received the videotape and 34 in households that did not review the videotape). Additionally, the overall rate of bystander CPR was 47% in the videotape group and 53% in the no-videotape group. Also, in 9 cardiac arrests, an individual, who had watched the videotape, was present; and six of these nine cases had bystander CPR. According to the results derived from their study, researchers concluded that the mass mailings of CPR instructional videos were likely to be ineffective in increasing the rate of bystander CPR in a community. Clark et al. (2000) also evaluated the effectiveness of the multimedia computer-based teaching in acquisition of CPR knowledge and skills. However, unlike theoretical knowledge scores, the use of program made no significant difference in practical test scores related with the CPR. Researchers mainly suggested the best teaching method of CPR skill acquisition as the practice of skills on manikins. The findings of this study supported the significance of the practice for skill acquisition. Similarly in the current study, the poor psychomotor performance by web-based instruction group might be because of student's unwillingness to use the CPR manikins on their own.

Another instructional method, which was suggested by Monsieurs et al. (2004), was interactive CD-ROM to teach basic life support and other emergency medicine topics. Results showed that after studying the CD for a mean period of 42 min, subjects performed better than the control group, but chest compression and breathing techniques were ineffective. It was mentioned that the usage of interactive CD-ROM was an effective and positive learning tool for the behavior development, however, motor skill acquisition noted to require different learning approaches. A further study on the effectiveness of computerized training simulator on acquisition and retention of neonatal resuscitation skills was conducted by Curran, Aziz, O'Young, and Bessel (2004). After application of the training method on 60 medical students, researchers evaluated their knowledge and skills at 4 and 8 month after the initial training. Results of their evaluations demonstrated that the knowledge of computerized training group and control group decreased significantly.

Teague and Riley (2006) evaluated the college students' knowledge and skill acquisition following the online resuscitation training. Similar to other studies, their study demonstrated that the students improved their theoretical knowledge; however their practical skills did not improved. This finding conformed with the current study in which students in web-based instruction group did not improved their skills related with CPR and recovery position. Researchers reported that the online first aid courses may be useful for knowledge acquisition but do not assure the skill gain. In the same way, Vries and Handley (2007) suggested a web-based micro-simulation program for self-learning for basic life support and use of automated external defibrillator training. The program was consisted of a theory, scenario training and self-testing, but no manikin for practice. Results showed that participants correctly checked for consciousness and called for an ambulance. Additionally they correctly lifted the casualty's chin, placed their hands correctly onto the chest to apply compressions, and performed correct rate and depth during compressions. However, it was also reported that the participants poorly performed the ventilation skills mostly due to the improper airway opening before ventilation. Also the numbers of correct compressions were low, compression depth was fare off the standards, and too shallow compressions were observed by small number of participants. A comparable study, which evaluated the influence of computer method of instruction and traditional instruction, was conducted by Fabius et al. (1994). The findings on 70 subjects demonstrated no significant difference between the groups in terms of knowledge and performance scores related with CPR. Additionally, researchers found that the subjects in traditional instruction group favored the instruction more than computer method of instruction. Correspondingly, researchers conducted comparative study on teaching infant CPR to mothers of cocaine positive infants, since these children were at a greater risk of sudden death (Messmer, Meehan, Gilliam, White, & Donaldson, 1993). Researchers compared the computerized interactive video learning with the traditional instruction for teaching infant CPR. Their results suggested that the traditional instruction was more effective. The findings of this study were consistent with the current study that traditional and case-based instruction group

were more effective that web-based instruction group in terms of acquisition and retention of psychomotor skills.

The findings of the study by Dracup, Moserd, Doering and Guzy (1998), who compared the three different instructional methods (instructor-taught CPR class, an instructor-taught CPR class followed by a social support intervention, and a self-training video module) also supported the results of the current study. According to their results gathered by CPR skill checklist, 301 (63%) of the totally 480 subjects were able to demonstrate successful CPR after training. Additionally, researchers found that the amount of successful learners was significantly higher in the two instructor-taught classes than in the self-training video class. Consistent with their findings, researchers mentioned that the self-training video instruction may not be an adequate alternate for instructor-taught CPR.

Contrary to researcher's impressions on the necessity of trained people, who are effectively equipped with basic first aid knowledge and skills, general knowledge and skills regarding CPR, is poor. Many research studies on different populations demonstrated people's inability to apply CPR skills. For example; Lester, Donnely, Weston and Mogan (1996) evaluated the secondary school students' cardiopulmonary resuscitation knowledge and skills. Their findings were similar to current study that students gained knowledge of CPR after initial training, but their skill performance was poor after 9 days from the initial training. Similarly, considering the importance of CPR in saving lives of individuals, Wik et al. (1995) conducted a study on Norwegian (n= 41) factory employees. The aim of their study was to train as much people as possible. The forty-one employees trained on CPR and these 41 employees trained 311 co-workers and these employees then trained 873 family members and associates at home. Their study revealed poor outcomes, which was evaluated by skill checklist and skill reporter manikin, from the training efforts to increase the rate of bystanders in the community. Similarly, Brennan et al. (1998) conducted a study on the participants, who trained on CPR. In line with the findings, which were derived by both skill checklist and skill meter manikin, researchers reported that participants

performed approximately 17% of the compression and 27% of the ventilations correctly. Besides, skill checklist demonstrated that around 51% of the participants were rated as "not competent" or "questionably competent" and small percent of participants (2.7%) were able to perform skills effectively. Furthermore, by comparing 3 different basic life support guidelines (1992 ERC guidelines, 1997 ILCOR statements, and AHA call first version of 1997 ILCOR statements), researchers examined acquisition and retention of cardiopulmonary resuscitation (CPR) skills by lay persons (Donnely, Assar, & Lester, 2000). Results of their study showed that 51% of those trained with the 1997 ILCOR guidelines performed effectively compared with 38% trained in the ERC 1992 guidelines and 25% trained in the AHA "call first" group. It was also mentioned that even if 1992 ERC and 1997 ILCOR guidelines found to be easiest to learn, retention of performance at 6 months was poor (14% effective) in all methods. Correspondingly, Parnell and Larsen (2007) conducted a study on the New Zealand community to evaluate the effectiveness of the layperson CPR courses (n= 14). They mentioned that the courses were in poor quality in general and did not satisfy the standards. Researchers noted that the majority of courses (71%) were provided first aider although the technique was performed incorrectly, with both compression depth and compression point being corrected only 57% of the time. Researchers also suggested that the training courses in New Zealand were not effectively provide CPR knowledge and skill acquisition in the community. The latest study (Mahony et al., 2008) investigated the CPR knowledge and skill retention of the airline cabin crew. The findings of their study demonstrated that over 35 subjects 33 failed to use the bag-mask correctly, 18 performed chest compressions at the incorrect site, 13 achieved the correct compression depth following 12 months time interval. Repetitive effective training methods were suggested to maintain necessary first aid-CPR knowledge and skills for airline cabin crew.

It was mentioned that the medical staff also lacked CPR skills (Alspach, 2005). Poor performance skills by medical personnel on CPR were revealed by various studies. For example Nyman and Sihvonen (2000) conducted a study to describe the basic cardiac life-support skills of nurses and nursing students. The nurses and nursing

students tended to have insufficient basic life support skills. Additionally, 21% of the participants compressed correctly for at least half of the test, and 335 of the participants ventilated correctly at least half of the time. Likewise, Thoren, Axelsson, Holmberg, and Herlitz (2001) examined the CPR knowledge and skills of trained medical professionals (n= 10). Their study revealed that over 90% of the total inflations were "too fast", and 71% were "too much", and only 6.6% of the total inflations were correct. Further, in terms of chest compressions similar poor results were obtained. Participants performed 40% of the total compressions "too deep" and 4% "too shallow". Similarly, Grzeskowiak (2006) evaluated the 1st and 6th year medical students' performance on basic and advanced cardiopulmonary resuscitation. Findings of their study demonstrated that 1st year students had a better knowledge of CPR compared to 6th year students, however, 6th year students were better in advanced CPR than the 1st year students. It was suggested by the researchers that the skills related with ventilation and compression needed more practice to be applied effectively.

Although the studies stressed the importance of having knowledge and skills on first aid and basic life support procedures by medical personnel, results demonstrated the level of first aid and basic life support were poor and did not meet the standards (Tan, Severien, Jaap, Berden, & Biert, 2006). In the same way, Cooper et al. (2007) evaluated the immediate life support training in a primary care setting by training subjects (n= 173). In order to get information about knowledge and skill acquisition, subject's were tested twice (pre-test, post-test). Consistent with the findings of the current study, researchers found significant increase in the participants' theoretical knowledge and practical skill after initial training; but significant decrease in the knowledge and skills after 6 months time interval. Researchers implied the regular updates and renewal of the training programs.

Most of the research related with first aid and CPR demonstrated that knowledge and skills remained acceptable level following the initial training, but retention of these skills decreases dramatically due to time interval (Broomfield, 1996; Kaczorowski et

al., 1998; Lewis, 1993). It was also mentioned by Palese, Trenti and Sbrojavacca (2003) that CPR skills declined rapidly compared to the theoretical knowledge, and they suggested retraining people frequently by considering learning needs and preferences. Madden (2006) also reported the 4-h CPR training improved nurses' knowledge and skills, however none of the nurses passed the CPR skills assessment, and additionally their knowledge and skills deteriorated after 10 weeks time interval.

In order to overcome the issue of poor retention of CPR skills various studies were conducted to decide the time of refreshment courses. For example, Berden, Willems, Hendric, Pijls, and Knape (1993) evaluated the effects of different time intervals between reinstruction on the maintenance of basic CPR skills. They found that the resuscitation skills are maintained at a stable level by three or six month refresher courses and they suggested reinstruction with the interval of six months was sufficient to maintain adequate skills in cardiopulmonary resuscitation. It was also revealed by the Woollard et al. (2004) that the different components of CPR were improved after an initial training, however, declined within six months. They also noted that the following refresher training was effective for the regaining CPR skills. Simplifications of the CPR procedures were also suggested as one of the ways to provide its permanence (Handley & Handley, 1998). By comparing the 8-step and 4-step CPR procedures, researchers found that 22 out of the 24 subjects in the 4-step group performed correct sequence of CPR, in contrast to only 2 out of the 24 in the 8-step group. However, they found no difference in the quality of performance of the skills between the two groups. Likewise, in 2002, Chamberlain et al. (2002) investigated the effects of conventional CPR training and re-training on skill acquisition and retention after 6-9 months. Findings demonstrated that the conventional training was not completely effective in the skill acquisition and retention, however re-training was effective for the skill retention. They suggested that the continuous conventional re-training positively effects to skill retention. Another study was conducted a study on the retention of the life saving psychomotor and cognitive skills by comparing the effects of traditional multi-hour training and 30 min course formats (Roppolo et al., 2007). Researchers evaluated the knowledge and

performance immediately after training, and after the 6 months time interval. Based on their findings, researchers mentioned that the performance of subjects in 30-min training was either equivalent or superior to the multi-hour Heart saver training in all measurements, both immediately and 6 months after training. Additionally, it was also noted certain skills were declined due to 6 months time interval that retention of certain skills of subjects from both groups deteriorated over the 6 months, but 84% of the subjects from 30-min was reported as performing cardiopulmonary resuscitation and also 93% were performing chest compressions adequately. Based on results derived from the study, researchers suggested the 30-min training as an effective and time saving method for knowledge and skill acquisition as well as skill retention after 6 months.

In addition, Celenza et al. (2002) conducted a study, in Australian population, to assess the competence of people in CPR. Their results demonstrated knowledge and skill acquisition was better for the trained subjects compared to non-trained. Additionally, repetition (frequency) of the CPR training was mentioned as one of the most important factors that affect retention of CPR skills. Researchers reported that participants, mainly who trained infrequently and formerly, performed poor airway, breathing, and circulation maneuvers due to inadequate airway opening.

It was stated by the Hopstock (2008) that the motivation was one of the most important factors that promotes learning. She pointed out that the psychological factors and attitudes playes a crucial role in CPR education. By considering the motivation as one of the promoter of learning outcomes, she conducted a study on 361 hospital personnel who trained on CPR. Researchers applied a survey instrument to participants (Motivated Strategies for Learning Questionnaire), which measures motivation, before CPR training. Results of the analysis demonstrated that participants who had been prepared for the course, who had participated in the decision about attending the course, who were working in high-risk area for cardiac arrest or were nursing personnel working in long-time close contact with patients were more motivated to CPR training than other hospital personnel. It was suggested

by the researchers that preparedness, participation, readiness and relevance was important predictors of motivation which leads to learning, and should be considered before training people in CPR skills. Considering the findings of their study, it was rethought that the students in the current study were randomly assigned to one of the three treatment group without considering their learning style preferences. Therefore, this situation might affect to their motivation negatively and led to their poor performance outcomes.

Komelasky and Bond (1993) conducted a study to evaluate the effects of different reinforcement forms (reinforcement with hands on practice, reinforcement by observing a videotape, no reinforcement) of CPR instruction on retention skills of parents (n= 69), who had children with high risk of cardiac arrest. Findings of their research demonstrated that the parents of reinforcement with hands-on-practice retained the most skills. In the current study, students in both traditional and case-based instruction groups were trained by hands on practice and given a verbal reinforcement by the instructior and their classmates; however, it was unknown whether students in web-based instruction group practiced the skills in their own. Forthermore, it was known that they had no reinforcement by the training manikin.

The importance of repetitive practice of CPR skills in order to be remembered effectively was always stressed in the literature (Moser, Dracup, Guzy, Taylor & Breu, 1990). Moser et al. (1990) conducted a study on family members of cardiac patients by providing them CPR training and retention packets 3 and 6 months after CPR training. Findings of their study demonstrated no difference among people 7 and 12 months after initial training and also the results were poor. Researchers analyzed the data by participants, who used the retention packet and found that participants that practiced the retention packet significantly performed better than the participants who did not used the retention packed. Berden, Bierens, Willems, Hendrick, Pijls and Knape (1994) had also mentioned that psychomotor skills declined due to time interval and they also suggested to design programs that include regular frequent refresher courses. These results also supported the findings of the current study.

There is a possibility that students in web-based instruction group did not use the manikins, which were provided to develop their CPR skills in their own.

Another study on the CPR compression and ventilation skills were conducted by Thoren, Axelsson, and Herlitz (2007) who compared the DVD-based and instructor-led CPR education by assigning 71 teachers into either a DVD-based course (n= 38) or an instructor-led course (n= 33). The result of their study demonstrated differences in terms of the number of chest compressions and the number of inflations. Additionally, subjects in DVD-based instruction group performed fewer chest compressions and fewer inflations during 2 minutes of CPR compared to instructor-led group, but their scores were still closer to the optimal calculated 120 per 2 min. Based on their findings researchers stated that DVD-based CPR courses were a good alternative to instructor-led courses, however they added to larger randomized studies to confirm the results. In addition to effectiveness of the video self-instruction, instructors were mentioned important in providing motivation and enthusiasm and feedback for CPR training (Thoren, Axelsson, & Herlitz, 2007).

To sum up, various instructional methods had different effects on improvement of first aid psychomotor behaviors. On the other hand, it is difficult to specify the best method for all types of knowledge. In the current study, first aid psychomotor behaviors were improved more with traditional and case-based instructions. However, contradictory to most of the related literature web-based instruction was the least effective method for the improvement of first aid psychomotor behaviors.

5.3 First Aid Affective Behaviors

The third and sixth research questions were to examine effects of different instructional methods on student's first aid affective behaviors and effect of time on these behaviors. In the current study first aid affective behaviors of students were measured both by quantitative (by using first aid affective behavior scale) and qualitative (by conducting qualitative interviews) research methods. Measurements

were done by first aid affective behaviors scale which includes the characteristics of the casualty, characteristics of the first aider, characteristics of the emergency event, effects of social factors, and effects of other factors. During data analysis each of these elements were analyzed independently.

Based on the quantitative data collected from students, it was found that different instructional methods had statistically no significant effect on the student's responses on characteristics of the casualty, characteristics of the first aider, and social factors. Results, which were derived from the first aid affective behavior scale, showed that students in traditional *(M* = 2.85), case-based *(M* = 2.80), and web-based *(M* = 2.85) instruction groups had similar thoughts on characteristics of the casualty. Students all agree that the gender, age, and external appearance of the casualty, as well as closeness of a relationship between the casualty and the first responder would not affect their decision on helping in emergency conditions. However, qualitative interviews demonstrated that gender of the casualty was one of the influential factors on student's helping behavior. According to results, which were derived before the instruction, it was found that the gender of the casualty would negatively affect to the intervention of first responders. Students stated that male bystanders would hesitate to intervene, even touch, to female casualties in emergency conditions; likewise, female bystanders would hesitate intervene to male casualties. Students stated that the inhibition was mostly caused by social and cultural norms. Additionally they mentioned that the other bystanders may possibly react in a negative way when first responders of a opposite sex intervene to casualties. After instructed on first aid knowledge and skills, most of the students stated that they would not be affected by the gender of the casualties but other people would definitely be affected. Additionally, some students still noted that the gender would negatively affect on helping behavior in an emergencies. Following statements, which were gathered after instruction via qualitative interviews, from students clearly pointed out their opinions about the effects of gender on their helping behavior:

> "I would be more careful when treating a woman. To tell you the truth, treating a woman and treating a man are a bit different. And also when you're treating the opposite sex, their reaction might be different" (G1-S2). "The matter of sex would cause a problem for me but it could for others. Considering the general structure of the Turkish society, the girls may be shy to help boys or vice versa" (G2-S5). "There shouldn't be such a thing but there is. I mean a female may not want to help a man or vice versa. The reason for this could be people's religious beliefs. If it's a woman with a turban, a man may not be willing to help her and vice versa" (G3-S1). "Of course the victim's being the opposite sex affects. Maybe it's due to our nature or because of the society. But of course it depends on whether there are people around or not especially when checking if the victim is breathing or not or during the artificial respiration" (G3-S5).

Unlike findings of the current study, most of the research studies on gender related issuees suggested that the women were helped more by male bystanders (Eagly & Crowley, 1986). These contradictory findings among other countries and the Turkey were mostly due to the variation of the social and cultural norms. These norms are a part of a social life. In some situations people change their desired behavior according to these social norms. In social cognitive science this behavior change due to real or imagined influence of other people called as conformity (Aronson, Wilson, & Akert, 2005). Brewer and Crano (1994) mentioned that people aware of price if they do not behave in a normatively appropriate way. Researchers mentioned that people will conform to social influences when they unsure about the correct action in ambiguous situations. Also it was added that in crisis people often do not have time stop and think about the correct action to be taken, and they use other people as a source of information. Another variable for the conformity was reported as existence of experts, who has necessary and correct knowledge and skills in crisis situations (Aronson, Wilson, & Akert, 2005). Baron and Byrne (1997) defined social influence as "efforts by one or more individuals to change the attitudes, beliefs, perceptions, or behaviors of one or more others". Additionally, Chekroun and Brauer (2002) described it as a social control. In the current study the influence of social norms was clearly revealed by qualitative interviews. Interaction among men and women was controlled by social norms even in emergency situations. People hesitate to apply life supporting first aid procedures to opposite sex, even human life was an issue being talked about. Results suggested that, even students were trained on frst aid and cardiopulmonary

resuscitation, they would possibly be influenced by other bystanders if the casualty is in opposite sex, and they would change their helping behavior in line with the expected social norms. Although it would be so dangerous and be cost to human life, they would prefer to behave in an expected way (non-intervention to casualties in opposite sex) in emergency situations. Although social norms essential and beneficial for the consistency of social life, conformity was found as harmful for the human life in an emergencies.

Unlike the quantitative findings, in which students stated they would not be affected by the physical appearance of the casualties, it was mentioned by some students from web-based instructional group that the physical appearance of the casualty would affect people's interventions negatively. They stated that first responders would hesitate to intervene people in a dirty clothes, or to people living in streets in the case of emergency conditions. Following statements from students demonstrated their views regarding the effects of physical appearance of the casualty during emergency conditions:

> "I would hesitate to help a drunken person. I would be nervous in such a case" (G3-S4). "Actually I wouldn't want the appearance to affect me but if the victim is dirty, I would have difficulty helping him/her" (G3-S6). "The appearance might affect. If I saw someone dirty in rags, I might think that he is lying in a drunken stupor" (G3-S12). "If I saw a very dirty person in old and torn clothes, I might think different things. We might just walk away thinking they are drunk or they are tramps. But if it was someone in decent clothes, we wouldn't think of such things but conclude that something bad such as an accident has happened to them and help" (G3-S12).

One of the most famous studies on helping behavior was conducted by Piliavin, Rodin, and Piliavin in 1969 and they pointed out that an individual who appears to be ill is more likely to receive aid than is one who appears to be drunk in the need of help. Additionally, Axelsson et al. (2000) found supportive findings to the current study that people mostly hesitate to perform CPR on a stranger. They also stated that the people would not start CPR on a young drug addict and unkempt man. Most of the people, in their study would perform CPR on a relatives and a known person.

Furthermore, in quantitave findings students stated that they would not affected by the age of the casualty, however, in qualitative interviews age of the casualty was reported as one of the factors that affect helping behavior. Students stated that people would hesitate intervene to babies and children because of their sensitiveness. The main reason for the hesitation to intervene babies and children was noted as a fear of doing more harm and performing incorrect first aid procedures.

Additionally, students in all three instruction groups also mentioned that their gender (being a male or female) would not affect negatively or positively to their intervention during emergencies (traditional M = 2.71; case-based M = 2.63; and web-based M = 2.64). The quantitative findings of the study had shown that the gender of the first aider (being a male or female) would not effect positively or negatively to interventions of students during emergency events. This result supported the study of Stem and Spence (1986), who found statistically no significant relation between the gender and helping behavior. However, in their meta-analytic review on gender and helping behavior, Eagly and Crowley (1986) stated according to the social role theory that the male gender role encourages helping that is brave and courteous; however the female gender role encourages helping that is nurturing and compassionate. Furthermore, although sex differences in helping were inconsistent across studies, researchers indicated that men helped more than women, and women were given more help than men. The results of the study by Laner, Benin, and Ventrone (2001) on 700 college students showed significant interaction between the sex of the bystander and also the type of the victim. Additionally, it was mentioned that women were most likely to help children; however men were most likely to intervene to women. It was also reported in the study that women helped less compared to men in the condition of injured person who had arterial bleeding (Shotland & Heinhold, 1985). Comparatively, students indicated in qualitative interviews that gender of the first aider would affect helping behavior negatively. They reported that the first responders would hesitate intervene to casualties who were in opposite sex. Similar effects of social norms, which were also observed previously with the issue of gender of the casualty, were observed when the first

responder was in opposite sex. Contrary to the literature related with the gender and helping behavior, the current study revealed that women and men would most likely be helped by same sex in Turkish community. The following statements from student's interviews showed their opinions regarding the effects of first aider's gender on helping behavior during emergencies:

> "I believe that there would be differences between males and females as first aid workers. As we have witnessed in the course, everybody was shy. Actually towards the end of the term, we were able to overcome this problem a bit but I still believe that there might be such a problem with some friends but not with everybody I guess. The females may not want to do it if the victim is male. Especially the males have a feeling that they shouldn't administer artificial respiration to females. The females are more relaxed in this way, I mean it's easier for them with males. The males are shyer. This might be due to sexual matters, I think. Males may have difficulty especially with the CPR" (G1-S5). "It depends on a person's outlook on life. Some people have a very closed mind. There might be women who would say "No, I would never touch a man" or vice versa" (G2-S4). "I think it's because of the cultural heritage of some places in Turkey. Imagine a woman administering CPR . That type of things may not be tolerated especially in some places" (G3-S8). "If you want to administer CPR, would the people around let you? I don't think so. Previously, I wouldn't have let a man administer CPR to a female friend of mine if it was needed" (G3-S8).

Furthermore, students mentioned in their interviews before the instruction that males would help more due to their physical strength, but some other students mentioned that females would help more. After the instruction, some of the students were pointed out that females were more fragile and would help less than males, and males were stronger than females and would help more.

Clark and Word (1974) studied the situational characteristics of the emergency and helping behavior. According the findings of their study, researchers suggested that bystanders, who were capable to overcome the emergency situation were considered to help more in the need of help. Bickman (1971) was also suggested that people would provide help when other bystanders perceived as incapable to cope with the emergency situation.

Shotland and Heinold (1985) also conducted a study investigate the bystander responses to casualties with arterial bleeding. One of their findings were a reduction of helping behavior in emergency situations with greater uncertainty. They also found a lesser amount of helping behavior by women compared to men. Diffusion of responsibility were also observed in their study and less people helped when other bystanders were present. Researchers were also mentioned that although they were ineffective, more interventions occurred in alone conditions.

Similarly, students indicated that social factors including existence of other bystanders, feeling of responsibility, empathy, possibility of being punished due to negative consequences of intervention, possibility of being praised as a result of positive consequences of the intervention, possibility of being popular, and possibility of being remembered as a guilty would not affect their decision about to help or not to help (traditional $M = 2.67$; case-based $M = 2.69$; and web-based $M = 2.70$). Before the instruction, more than half of the students stated that number of other bystanders would affected negatively by other bystanders, but small number of students stated that existence of other bystanders would affect positively. They mentioned that, other bystanders would be helpful in the case of emergencies to share the intervention procedures and to get help if needed. However after the first aid instruction negative effects of other bystanders on student's helping behavior decreased dramatically. They stated that presence of other bystanders would be beneficial to get help during first aid applications, but still some students reported that existence of other bystanders would decrease the feeling of responsibility and people will not intervene. After the instruction student's mostly concerned about the interruptions caused by other bystanders. They mentioned that people may interfere to their first aid applications verbally and physically.

> "If it was very crowded around and if there were a lot of people trying to do thing even without knowing anything, it would affect badly" (G1-S5). "If there were a lot of ignorant people around, it is bad of course because they limit your potential to help also. Or everybody says something and everybody tries to do" something without the necessary training or knowledge, it's not a nice situation (G2-S2). "If the people around intervene, I mean a lot of people at once, I may have difficulty" (G4-S11).

Most of the students mentioned in qualitative interviews before the instruction that the presence of other bystanders would negatively affect helping behavior. They were mostly concerned about the negative reactions from other bystanders due to possible negative consequences. Students also hesitate from possible negative reactions by other bystanders in the case of negative consequences. This finding supported by the study which mentioned that people anticipate being assigned more responsibility for negative consequences in the presence of other bystanders than in alone conditions (Cacioppo, Petty, & Losch, 1986).

Findings of the study by Latane and Dabbs (1975) supported results of the current study that both males and females were less likely to help when the number of bystanders increased. Additionally, in their review on helping behavior and presence of other bystanders, researchers noted that, the social inhibition was occur consistently in presence of other bystanders, however, people most likely to help in alone conditions (Latane & Nida, 1981).

> "If there was an accident now, I would try to help if I had to. I mean if there was nobody except me" (G3-S6). "If there was nobody other than me to help, I would intervene" (G3-S3). "If you were alone, you would be more courageous because nobody would see what you were doing but if there were others around; one may get into a panic. I mean you can do some things more easily when you're alone but when it comes to grading, it's not so easy" (G3-S8).

These findings derived from the review on helping supported the current study that students will certainly help when they are alone in the case of emergency conditions. It was suggested in the literature that people fail to intervene to casualties if other bystanders are present. One of these studies was conducted by Shotland and Heinold (1985) that fewer people helped in the presence of other bystanders. However, the current study had shown that students would not affected by existence of other bystanders and they would intervene to casualties in the case of emergencies. It was concluded that the perceived danger of the situation were one of the determinants of helping behavior even in emergency events which include number of bystanders. Morgan (1978) was also stated that the more people present, the longer it takes before anyone intervenes. It was also mentioned by Bickman (1971) that if another

bystander is seen as not being able to help, then there will be no effect on the speed with which subject helps. The current study suggested that most of the students hesitate intervene to emergency events due to lack of knowledge and skills. However, after the instruction all of the students in traditional and case-based instruction groups stated that they would definitely intervene to casualties in emergency conditions. However, students in web-based instruction group stated that many factors would effect their decision to intervene such as characteristics of the casualty, characteristics of the event, and social factors. Following statements demonstrated student's views:

Fischer, Greitemeyer, Pollozek, and Frey (2006) also revealed that alone individual helps more in situations with low potential danger, however, in situations with high potential danger, participants confronted with an emergency alone or in the presence of another bystander were similarly likely to help the victim. Findings of the current study also demonstrated that the students in web-based instruction group hesitate intervene to life threatening emergencies.

> "If it's the first level or so, I may help but if the victim is about to die, I may not . I may not be courageous enough. The reason is perhaps a person's losing his life. I may not stand it. Yes, perhaps we know first aid but in such a situation, I refuse that" (G3-S3). "That person's life is in your hands. In some cases, I may refuse to take risks and do nothing but in some cases, I may also try to do my best thinking I should so what I can" (G3-S4). "If I had to help, I would try to I mean if there's nobody but me. But if there was someone else and if they know better than me, I would let them" (G3-S6). "In a very urgent situation, I try not to intervene if possible. I don't know how good I am at CPR so I may avoid it" (G3-S11).

The effects of the instructional methods were observed in the characteristics of the event, including clarity of the event, existence of body fluids (blood or vomit), risk of cross infectious diseases; and other factors like dangerous emergency events, possible risks, having time to intervene to casualty, ambiguity of laws for rights of the casualties and first aiders; and other factors including possible life threatening risks, possible risks resulted from first aid applications, location of the emergency event. Although students in web-based instruction group significantly differed in terms of their affective behaviors in post-test and retention test, scores indicated that students

did not affected negatively or positively by the characteristics of the event (pre-test *M* = 2.72, post-test *M* = 3.15, retention test *M* = 3.31). Similarly, students in traditional (pre-test *M* = 2.99, post-test *M* = 3.15, retention test *M* = 2.87), and case-based (pre-test *M* = 3.18, post-test *M* = 3.11, retention test *M* = 2.95) instruction groups stated that they would not affected by the characteristics of the event during emergency situations. Qualitative interviews before the instruction revealed that most of the students in all three instructional groups were negatively affected by characteristics of the event. Especially existence of blood and vomit would negatively be affect student's decisions to help or not to help. Students were overwhelmed by blood and vomit. They stated that they cannot resist and intervene to bloody conditions. Some students stated that they will feel dizziness because of blood and vomit. However, after first aid instruction most students in traditional and case-based instruction groups stated that they would not affected by vomit and blood. Some other students stated that they would be affected by vomit and blood but would intervene to casualties. However, half of the students in web-based instruction group stated that they would be negatively affected by blood and vomit which will lead them not to intervene to casualties. Students mostly stated that there was no need for hesitation to intervene when necessary precautions for cross infectious diseases were taken. Piliavin and Piliavin (1972) proposed that people are less likely to help a victim if they feel helping may place them in danger. Additionally, they were also reported according to their research findings that participants would respond more slowly and would less likely to help casualties with bleeding without considering the number of other bystanders.

Comparable results were also found in effects of other factors on student's responses during emergency conditions. Although statistically significant interaction effect found between time and instructional groups; student's scores indicated that the other factors would not affect positively or negatively to the intervention behavior of students during emergency conditions (traditional instruction, pre-test *M* = 2.92, post-test *M* = 2.95, retention test *M* = 2.82; case-based instruction, pre-test *M* = 3.07, post-test *M* = 2.74, retention test *M* = 2.81; web-based instruction, pre-test *M* = 3.02,

post-test M = 2.80, retention test M = 3.26). Results of the qualitative analysis demonstrated that existence of body fluids would negatively affect to approximately half of the student's helping behavior during emergency conditions, but some other students stated blood and vomit as ineffective factors for their decision to help or not to help. Additionally, students declared that other people would be affected negatively by the existence of body fluids during emergency situations. Although number of students, who were negatively affected by existence of body fluids, decreased after the instruction, most of them stated that other people would negatively be affected by the existence of body fluids during emergencies. Additionally, approximately half of the students from web-based instruction group stated that they would be affected negatively by the existence of blood and vomit. Small number of students stated that existence of body fluids would affect positively to take necessary precautions before intervention. It was mentioned by some of the students that the seriousness of the event negatively related with the helping behavior. They indicated that the when the seriousness of the event increases, number of people who attempt to intervene decreases. Additionally, students mentioned that most of the people consider about the possible risks about the emergency event and the intervention to casualty, however they all intervene to casualties in the need of help. Approximately half of the students in web-based instruction groups mentioned that the risks related with the emergency event and condition of the casualty would affect negatively on their intervention behavior. The effects of instructional methods were observed in students from web-based instruction group, in which students were mostly affected by characteristics of the casualty during emergency situations.

Results of the current study demonstrated significant effects of time on student's response of characteristics of the casualty, characteristics of the first aider, characteristics of the event, and other factors. Despite statistically significant effect of time, students responses demonstrated that they would not affected by the characteristics of the casualty (traditional instruction, pre-test M = 2.89, post-test M = 2.83, retention test M = 2.84; case-based instruction, pre-test M = 2.93, post-test M = 2.69, retention test M = 2.73; web-based instruction, pre-test M = 2.93, post-test M =

2.73, retention test M = 8.88), characteristics of the first aider (traditional instruction, pre-test M = 2.79, post-test M = 2.67, retention test M = 2.67; case-based instruction, pre-test M = 2.82, post-test M = 2.47, retention test M = 2.61; web-based instruction, pre-test M = 2.82, post-test M = 2.46, retention test M = 2.87), characteristics of the event (traditional instruction, pre-test M = 2.99, post-test M = 3.15, retention test M = 2.87; case-based instruction, pre-test M = 3.18, post-test M = 3.11, retention test M = 2.95; web-based instruction, pre-test M = 2.72, post-test M = 3.14, retention test M = 3.31), and other factors (traditional instruction, pre-test M = 2.92, post-test M = 2.95, retention test M = 2.82; case-based instruction, pre-test M = 3.07, post-test M = 2.74, retention test M = 2.81; web-based instruction, pre-test M = 3.02, post-test M = 2.80, retention test M = 3.26).

It was also revealed by the findings of the quantitative part that possibility of communicable diseases would also not affect to the student's affective behaviors during emergency events. This finding consistent with Taniguchi, Omi, and Ineba (2007), who found about 10-30% of the participants were willing to perform CPR especially on a stranger or trauma victim. Most of the people (70-100%) in their study reported as being ready to perform chest compressions only rather that CPR (combination of chest compressions and ventilations). Additionally, lay people in their study reported possible reasons for their reluctance to apply CPR as having insufficient knowledge, and being unsure about whether they can perform CPR techniques efficiently.

Consistent with the findings of other studies (Axelsson et al., 2000; Brenner et al., 1996) Horowitz and Matheny (1997) found that people were willing to do a mouth to mouth resuscitation on victims known to them such as their neighbors, children at a pool, spouses, and parents. Additionally, they mentioned that the fear of HIV infection was negatively affect people's willingness to do a mouth-to-mouth resuscitation. One of the recent studies by Donohoe, Haefeli, and Moore (2006) mentioned that the willingness to perform CPR in an emergency situation is greater if the procedure does not involve mouth to mouth resuscitation. They also mentioned

that even trained people prefer to apply chest compression only CPR. Additionally, Chu, May, Clark and Breeze (2003) was also found that people reluctant to apply CPR and mostly due to fear of infectious diseases and unknown casualty. Lester, Donnely, and Assar (2000) as well indicated with his study that most of the participants (more than 80%) were willing to perform CPR on unknown person. However, rate of the people, who were willing to respond, decreased dramatically when the casualty had facial injuries with blood and where the victim was a gay man.

Apart from HIV, severe acute respiratory syndrome (SARS) was also an important illness which affected 1755 people in Hong Kong (Caves & Irvin, 2006). It was reported that 386 healthcare professionals infected by SARS while performing resuscitation to affected patients. Researchers examined the willingness of medical students to perform basic life support and mouth-to-mouth ventilation during out of hospital cardiac arrest in Hong Kong. Students were concerned about disease transmission during resuscitation; however, they were significantly more likely to perform mouth-to-mouth ventilation for a family member compared with a stranger. Additionally, they stated to perform mouth-to-mouth ventilation if either vomit or blood were present in the victim's mouth. Findings of the current study were to some extent consistent with the current study that the characteristics of the event such as existence of blood or vomit, also possibility of HIV infection would not affect to the student's interventions during emergency events. The difference in the current study was the consideration of the level of acquaintance of the casualty. They stated that they would intervene to casualties without discriminating their acquaintance level. It was also supported by Donohoe, Haefeli, and Moore (2006) that people were more enthusiastic to perform CPR, which includes only chest compressions, since people prefer not to apply mouth-to-mouth resuscitation, in the case of cardiac arrest.

Another study on was conducted by Shibata, Taniguchi, Yoshida and Yamamoto (2000) to evaluate people's willingness to perform CPR. Results of their study demonstrated that 2% of the high school students, 3% of teachers, 26% of emergency medical technicians, 3% of medical nurses and 16% of medical students stated to

definitely perform CPR (combination of chest compressions and ventilations) on a stranger. However, 21–72% stated to perform chest compressions alone. Participants mentioned reasons for their unwillingness to perform mouth-to-mouth ventilation as lack of confidence in their ability to perform CPR rather than fear of contracting a communicable disease. An additional study, which, was conducted by Locke et al. (1995) on 975 participants to evaluate people's willingness to perform CPR. Similar to other studies, researchers found that 15% of the participants stated to definitely perform CPR on strangers, but 68% would definitely perform chest compressions only on strangers. Additionally, 74% of the participants stated that they would definitely provide CPR, but 88% would perform chest compressions only. Eighty-two percent of the participants were somewhat concerned about disease transmission.

It was proved by many studies that even medical personnel reluctant to perform mouth-to-mouth resuscitation mostly because of their concerns of contracting infectious diseases, especially HIV (Brenner & Kauffman, 1993; Brenner et al., 1994; Brenner et al., 1997; Hew, Brenner, & Kaufman, 1997; Brenner et al., 2000). Similarly Gross, Reisman, and Schwartz (1998) conducted a study on internists to determine their willingness to respond in given five scenarios. Participants emphasized to help a man complaining of chest pain in a restaurant (69%) and a call for help on an airplane (54%). Additionally, they were reluctant to help disheveled man lying on the sidewalk (2%). Similar to other studies, the study revealed that, internists were reluctant to help in some emergency situations. Their concerns were necessity to perform mouth-to-mouth resuscitation, infectious diseases, and not feeling responsible.

It was also reported by Hubble, Bachman, Price, Martin, and Huie (2003) that most of the high school students were willing to intervene to a child or family member, and existence of blood and vomits negatively affected to their willingness to respond. Additionally, they were also reluctant to intervene to drug user. The current study was not consistent with the above findings since students were nor affected by positively or negatively affected by blood and vomit during emergencies and in all conditions

they would intervene to casualties without hesitation. The research in Australian community was as well demonstrated that , people were reluctant to apply mouth-to-mouth resuscitation, except to a friend or relative (Jelinek, Gennat, Celenza, O'Brien, Jacobs, & Lynch, 2001), and it was additionally mentioned that training and practice was found to decrease this unwillingness. Lin and Wang (2004) was listed the people's reluctance to perform CPR with mouth to mouth ventilation as possible unpleasant lawsuits, wonder in the degree of authorization, lack of self confidence and worry about possible disease transmission.

Although in the current study acquaintance was not found as an effect for the first aid affective behaviors of students, Horowitz (1971) mentioned that individuals who were members of a service group, regardless of the circumstances, than were social group members. He suggested that if one is a member, and hence a representative of a group which has specific norms relative to helping people in distress, the greater number of people involved.

It was known that people will more likely to help in emergency situations when they know what to do (Tedeschi, Lindskold, & Roselfeld, 1985; Nolan et al., 1999). For example, Crider (1996) mentioned that having training (certification) was found as positively affecting to people's willingness to intervene in the need of help. Additionally, Clark and Word (1974) found that the people who were competent were likely to help with less risk to themselves. However, students in the current study mentioned that having or not having knowledge about what to do during emergencies would not affect positively or negatively affect to their interventions. In other words they stated to intervene to casualties without considering their knowledge and skill levels related with the illness or the injury.

Clark and Word (1974) stated that the characteristics of the emergency situation were important determinants of bystander helping behavior. They found that the subjects helped in spite of the potential danger but they helped in ways that they perceived to be safe. Their findings were consistent with the current study that students would not be affected positively or negatively by the characteristics of the casualty during

emergencies. Besides the ambiguity and seriousness of the consequences to the victim and/or bystanders was mentioned as important determinants of helping behavior (Clark & Word, 1972). Researchers reported that, individuals confronted with an ambiguous emergency situation, particularly when in the presence of others, are less likely to help a victim than are individuals who are exposed to a nonambiguous situation. It was also supported by Fritzsche, Finkelstein, and Penner (2000) that the least helping occurred in the one where the costs of helping were the lowest and the costs of not helping were the highest. They were also found no difference between males and females in terms of helping behavior in the need of help.

Above findings were used as an reference for many years in the area of social psychology and many other fields. In the area of first aid and cardiopulmonary resuscitation, one of the studies on helping behavior was conducted by Axelsson et al. (2000). Researchers were conducted qualitative interviews on 19 bystanders who had performed CPR. Their study was aimed to examine the bystanders' perceptions of initial phase of their CPR intervention. Analysis of the interviews brought about the classification of 5 main categories and related 14 sub-categories relating the bystander's perception of the initial phase of their CPR intervention. These main and sub-categories were: to have a sense of humanity(to wish to save lives, to wish to help, to act intuitively), to have competence (to have knowledge, to feel prepared), to feel an obligation (to take responsibility, to do one's duty), to have courage (to dare, to have an intrinsic power) and to feel exposed (to feel deserted, to feel powerless, to feel ambivalent, to feel uncertainty, to feel repugnance). According to their findings, researchers stressed the importance of the awareness about the bystander's perceptions to clarify their needs during their interventions, and to integrate the counseling to training programs. Furthermore researchers suggested that the sensitivity of personal responsibility and courage necessary to intervene should be developed during training programs. It was also mentioned that the bystanders should be trained to cope with common as well as unexpected emergency conditions.

At the very last, the results on the effects of instructional methods and time on the student's first aid affective behaviors demonstrated similar responses from students in all three groups, and in all three testing time periods. They stated that characteristics of the casualty, characteristics of the first aider, characteristics of the event, social factors and other factors would not affect their first aid intervention during emergency situations. These findings conformed to the statement that the individuals who trained on first aid and CPR and become proficient to apply skills will respond emergencies (Nolan et al., 1999). In the current study, even students who were not trained on first aid and CPR stated to intervene to emergencies without hesitation. Any of the specified factors, which were included in the study, found as producing no affect on the student's interventions during emergency events.

In sum, although quantitative results of the present study demonstrated that the student's first aid affective behaviors would not be affected by factors such as characteristics of the casualty, characteristics of the first aider, characteristics of the event, social factors and some other factors, qualitative interviews indicated that students would be affected by many factors during emergency events. Thus, these factors that inhibit student's actions in an emergency situations should be considered, and possible precautions should be taken, and necessary issues should be included in first aid education programs.

5.4 Implications of the Study

The main goal of this thesis was to find out effects of different instructional strategies on students' cognitive, affective, and psychomotor behavior of first aid and retention of these behaviors.

5.4.1 Implications to the Literature

This study has contributed to the first aid literature by highlighting the importance of examining effects of different instructional methods on acquisition and retention of

cognitive behaviors. One of the major outcomes from this study was to introduce the deficiency of life saving first aid knowledge and skills among university level students. As a prospective teachers, engineers, administrators, and scientists, it is important for them to be equipped with first aid knowledge and skills. It is well known that the proper application of these skills may mean the difference between life and death. They may need these knowledge and skills to save lives in their workplace, at home, and also in their daily life. The necessity to increase the number of university students, who were trained in first aid, was revealed and emphasized in the current study. Although the deficiency of first aid knowledge was previously exposed in other studies, the present study was also provided the recent data on the first aid related knowledge level of university students.

There was also a lack of research on the effects of different instructional methods on first aid cognitive behaviors in Turkey. The present study also provided a literature support the effects of various instructional methods on acquisition and retention of first aid knowledge. The effects of traditional, case-based and web-based instructional methods on first aid cognitive, affective and psychomotor behaviors, as well as retention of these behaviors were examined. This information will provide source for the researchers and program developers for transferring first aid knowledge by using various instructional methods. It will also provide literature support for the web-based education.

Similarly, there was a lack literature on the effects of different instructional methods on acquisition and retention of first aid psychomotor behaviors. The current study provided the contributions for the literature on the effectiveness of the various instructional methods in the area of first aid and cardiopulmonary resuscitation. Additionally, the current stud was included the examination of the recovery position as one of the psychomotor behaviors of first aid. There was alack of literature in the world as well as in the Turkey related with the recovery position. Likewise, the study will provide insight about the strengths and weaknesses of transferring psychomotor behaviors via distance education sources.

5.4.2 Implications to the Practice

The implications of the present study for first aid instruction are found in insights into the first aid cognitive, psychomotor and affective behaviors. This study showed that web-based instruction was not effective in acquisition and retention of psychomotor behaviors.

Second, the study focused on the effects of different instructional methods on cognitive behaviors. Most of the research from the literature supported the findings of the current study that the traditional, case-based, and web-based instruction had comparable effect on the theoretical knowledge acquisition of first aid. Three types of instructional methods were equally effective in the improvement of first aid cognitive behaviors. All three methods were suggested to be used for the knowledge acquisition related with first aid.

Third, the research had provided crucial finding on the first aid psychomotor behaviors. It was revealed that the web-based instruction performed considerably poor than the traditional and case-based instruction groups in first aid psychomotor behaviors including CPR and Recovery Position. Although provided by scientifically approved self-directed CPR learning kit, student's performance on compression and ventilation performance was lower in web-based instruction group compared to student's performance in traditional and case-based instructional methods. This finding was contradictory to literature which mostly supported the self-instruction method for CPR skill acquisition. It was proved in the current study that web-based instruction was not appropriate for acquisition of first aid psychomotor behaviors. It was already supported by some researches that not all types of courses were suitable for all types of instructional methods. It was also supported in the literature that first aid skill acquisition requires different instructional methods rather that web-based instruction or self-directed learning. The weakness of web-based instruction and self-directed instruction in the first aid skill acquisition was highlighted in the current

study. Additionally, correspondence and usefulness of traditional and case-based instructionn in the first aid skill acquisition was exposed.

Forth, the major implication of the study on the first aid affective behaviors revealed that the type of instructional method had no effect, and students were willing to apply first aid knowledge and skills in the need of help without hesitation from any factors. It was mostly caused by the characteristics of the nation. It was planned to find out possible factors that would possibly inhibit student's helping behavior in the case of emergency events; however, the findings were mostly encouraging that the students already prepared to intervene casualties. It may still be useful to strengthen their current positive first aid affective behaviors by embracing some chapters into complete first aid course.

Fifth, in addition to effects on student's first aid cognitive, psychomotor, and affective behaviors, the present study also focused on the question of whether instructional methods had an effect on retention of cognitive, psychomotor, and affective behaviors. It was already proved by many studies that the time interval causes knowledge decay. The findings of the current study were in line with the literature that student's first aid theoretical knowledge decreased due to time interval. Similarly, first aid psychomotor skills were decayed after 18 weeks time interval, however, cognitive knowledge retained better than the psychomotor skills. The necessity of refreshment courses for the retention of first aid cognitive knowledge and psychomotor skills were highlighted. Affective behaviors of students were not affected by any of the instructional methods as well as by the time interval. Findings on retention of first aid affective behaviors revealed inherent characteristics of affective behaviors which affected by any external factors. It was suggested to strengthen the affective behaviors rather than to change them.

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APPENDICES

APPENDIX A

SAMPLE FOR TRADITIONAL INSTRUCTION

The information related with the basic life support (CPR) was taught in line with teh European Resuscitation Council (ERC)[2].

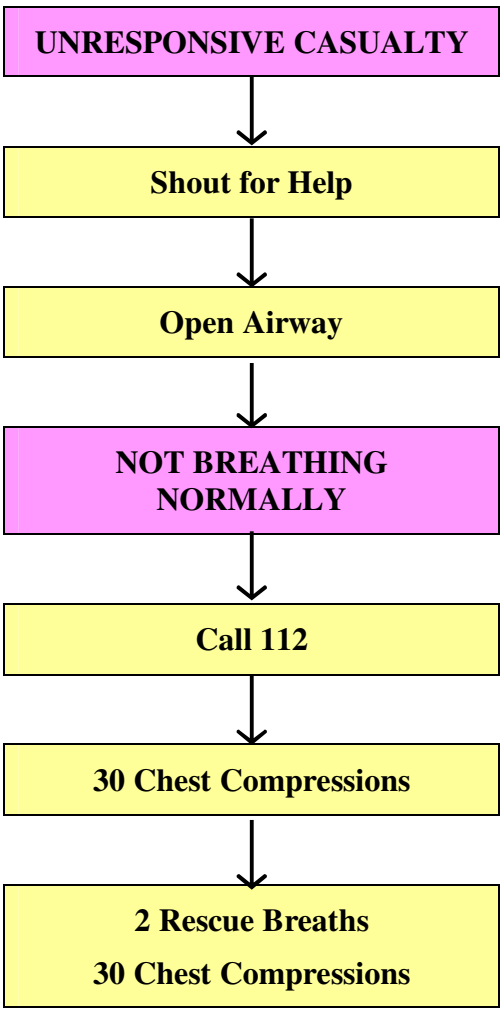


Figure 1. Adult Basic Life Support Algorithm (Handley et al., 2005)

[2] The Basic Life Support Algorithm, and related information including pictures were taken from ERC web-site for educational, non-commercial purposes.

ADULT BASIC LIFE SUPPORT

This chapter contains the guidelines, which was updated in 2005, for adult basic life support. The following sequence of actions should followed and applied for successful basic life support.

1. Make sure you, the victim and any bystanders are safe.

2. Check the victim for a response.
gently shake his shoulders and ask loudly: ‘‘Are you all right?’’

3. a) If he responds;

- leave him in the position in which you find him provided there is no further danger.
- try to find out what is wrong with him and get help if needed.
- reassess him regularly.

3. b) If he does not respond;

- shout for help

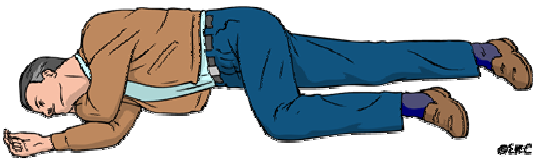
- turn the victim onto his back and then open the airway using head tilt and chin lift
- place your hand on his forehead and gently
- tilt his head back keeping your thumb and index finger free to close his nose if rescue breathing is required.
- with your fingertips under the point of the victim’s chin, lift the chin to open the airway

4. Keeping the airway open, look, listen and feel for normal breathing.

- Look for chest movement
- Listen at the victim’s mouth for breath sounds.
- Feel for air on your cheek.

- In the first few minutes after cardiac arrest, a victim may be barely breathing, or taking infrequent, noisy gasps.
- Do not confuse this with normal breathing. Look, listen, and feel for no more than 10 s to determine whether the victim is breathing normally.
- If you have any doubt whether breathing is normal, act as if it is not normal.

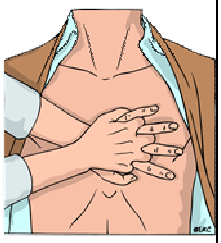
5. a) If he is breathing normally;



- turn him into the recovery position
- send or go for help/call for an ambulance
- check for continued breathing

5. b) If he is not breathing normally;

- send someone for help or, if you are on your own, leave the victim and alert the ambulance service; return and start chest compression as follows:
- kneel by the side of the victim place the heel of one hand in the centre of the victim's chest.
- place the heel of your other hand on top of the first hand
- interlock the fingers of your hands and ensure that pressure is not applied over the victim's ribs.



- Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone)
- position yourself vertically above the victim's chest and, with your arms straight, press down on the sternum 4—5 cm.
- after each compression, release all the pressure on the chest without losing contact between your hands and the sternum; repeat at a rate of about 100 min−1 (a little less than 2 compressions s−1)
- compression and release should take equal amounts of time

6. Combine chest compression with rescue breaths.

- After 30 compressions open the airway again using head tilt and chin lift.
- Pinch the soft part of the nose closed, using the index finger and thumb of your hand on the forehead.
- Allow the mouth to open, but maintain chin lift.
- Take a normal breath and place your lips around his the mouth, making sure that you have a good seal.
- Blow steadily into the mouth while watching for the chest to rise, taking about 1 s as in normal breathing; this is an effective rescue breath.

- Maintaining head tilt and chin lift, take your mouth away from the victim and watch for the chest to fall as air passes out.
- Take another normal breath and blow into the victim's mouth once more, to achieve a total of two effective rescue breaths. Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions.
- Continue with chest compressions and rescue breaths in a ratio of 30:2.
- Stop to recheck the victim only if he starts breathing normally; otherwise do not interrupt resuscitation.
- If your initial rescue breath does not make the chest rise as in normal breathing, then before your next attempt:
    - check the victim's mouth and remove any obstruction
    - recheck that there is adequate head tilt and chin lift
    - do not attempt more than two breaths each time before returning to chest compressions
- If there is more than one rescuer present, another should take over CPR every 1—2 min to prevent fatigue.
- Ensure the minimum of delay during the changeover of rescuers.

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Practice Manikin

Notes:
Ventilation
During CPR the purpose of ventilation is to maintain adequate oxygenation.
Chest compression
Chest compressions produce blood flow by increasing the intrathoracic pressure and by directly compressing the heart.
Compression—ventilation ratio
A ratio of 30 compressions to two ventilations is recommended for the single rescuer attempting resuscitation on an adult or child out of hospital.

APPENDIX B

SAMPLE FOR CASE-BASED INSTRUCTION

Case Scenario 1: Action at an emergency conditions

Step 1: You came to the first meeting of calculus class early in the morning. Before having a tea you decided to put your books in the classroom. You saw someone lying on the ground as soon as you entered the classroom. You are the only present around the classroom due to the earliness of the time. What would be your action(s) for this case

Step 2. What would you do if the casualty is breathing?

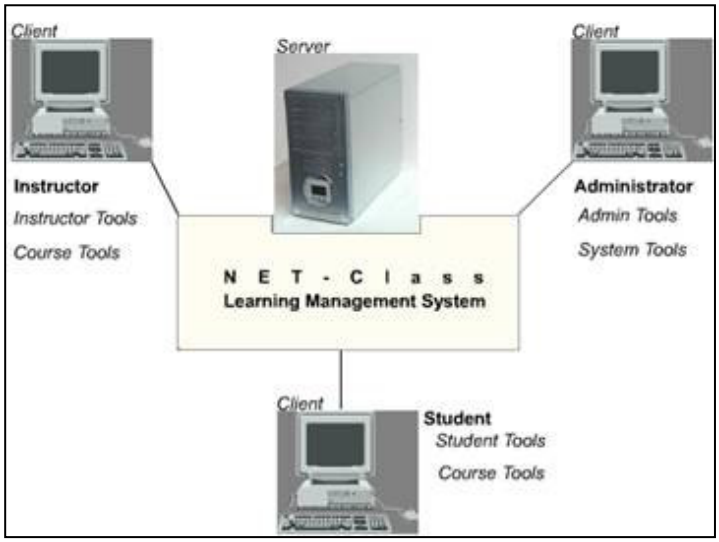
- Recovery Position

Step 3. What would you do if the casualty is not breathing?

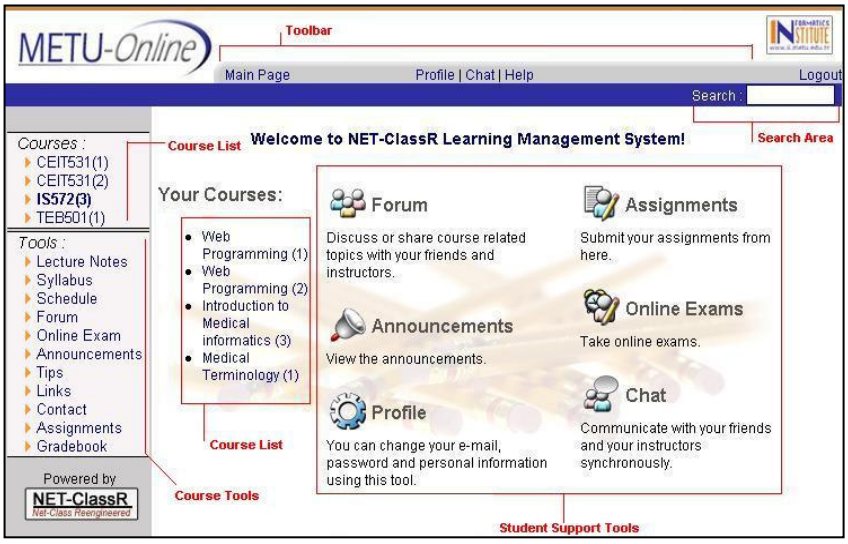
- Cardiopulmonary Resuscitation

APPENDIX C

NET-ClassR: Learning Management System: Reengineered (METU Informatics Institute)

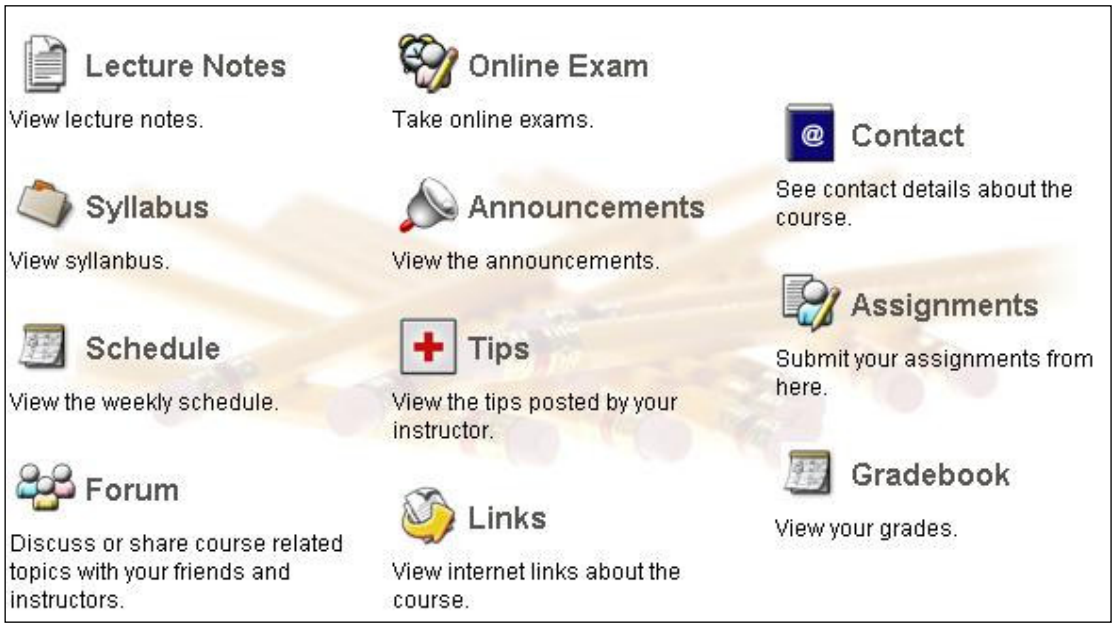


Overview of Net-ClassR Interface

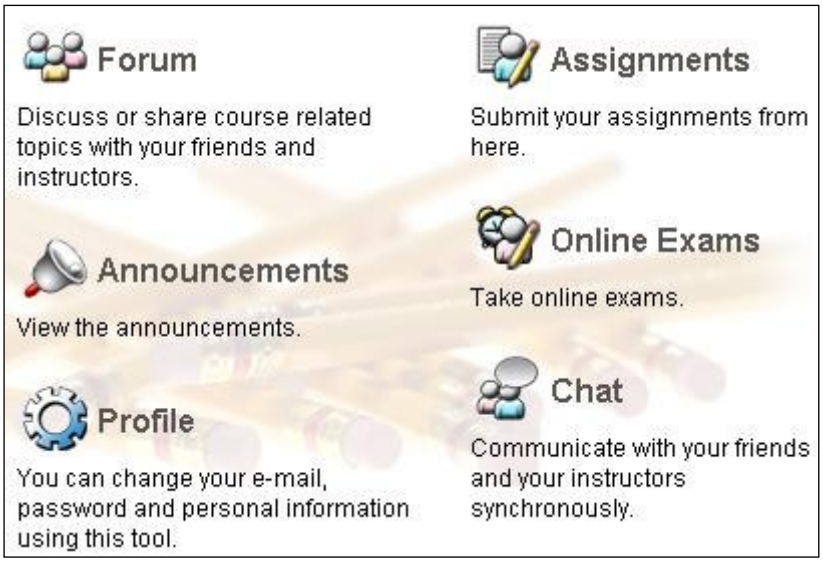


APPENDIX D

NET-ClassR Course Tools

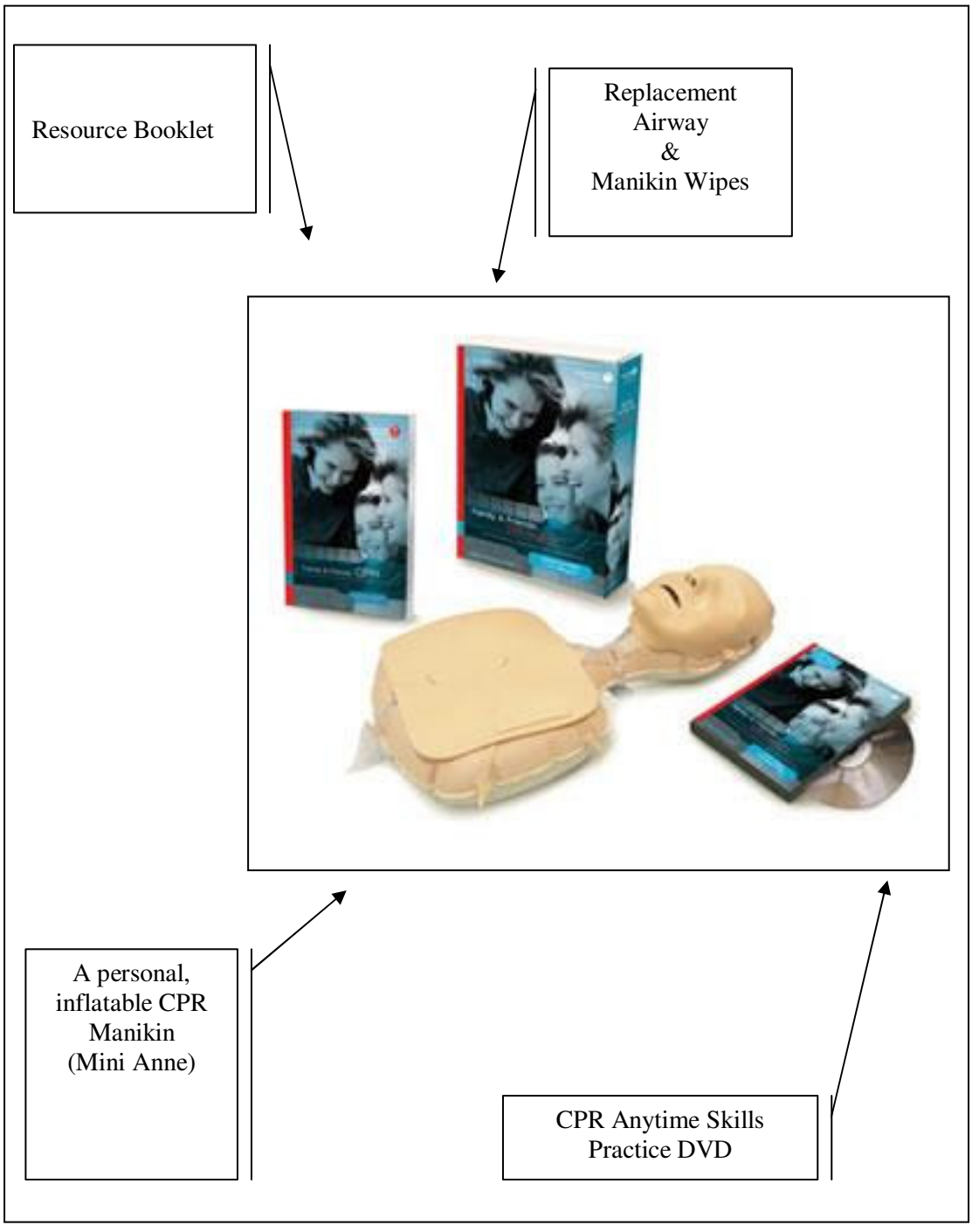


NET-ClassR Student Support Tools



APPENDIX E

Mini Anne CPR Kit



APPENDIX F

Perceived Computer Literacy Skills Test

BİLGİSAYAR BİLGİSİ
Ad-Soyad:
Öğrenci no:
YÖNERGE: Lütfen aşağıdaki soruların her birini cevaplayınız. Her bir yeterlik için, yeterlik ile ilgili bilginiz varsa **EVET**'i işaretledikten sonra, söz konusu yeterlikle ilgili tüm soruları cevaplayınız. Yeterlikle ilgili hiçbir bilginiz yoksa **HAYIR**'ı işaretledikten sonra o alandaki soruları boş bırakıp, diğer yeterlik alanına geçiniz.
Her bir yeterlik alanı başlığının altında o alanla ilgili bazı işlemler verilmekte ve her bir işlem için kendi yeterlik derecenizi belirlemeniz istenmektedir. **Yeterlik derecesi 1'den 4'e kadardır ve "1" en az yeterliliğe, "4" ise en çok yeterliliğe karşılık gelmektedir.** Kendinizi her bir işlem için, yeterlik derecelendirmesinin hangi aşamasında görüyorsanız, o sayıyı işaretlemeniz gerekmektedir. "1": Hiç Yeterli Değilim "2": Biraz Yeterliyim "3": Oldukça Yeterliyim "4": Tam Anlamıyla Yeterliyim

Yeterlik 1A: KELİME İŞLEMCİ PROGRAMLARI (MS Word gibi):

Bu programlar elektronik/bilgisayarlı daktilo makineleri gibi çalışır ve dokümanınızı kaydetmeden / basmadan önce düzeltme ve değişiklik yapmanıza izin verir.

Kelime işlemcilere karşı aşinalığınız var mı?

( ) Evet (Birinci soruya devam edin) ( ) Hayır (Bir sonraki bölüme geçin)

		Yeterlik seviyeniz			
		Hiç yeterli değilim	**Biraz yeterliyim**	**Oldukça yeterliyim**	**Tam anlamıyla yeterliyim**
1.	Bir doküman açabilme veya oluşturabilme.	**1**	**2**	**3**	**4**
2.	Basit komutları kullanabilme (kes, kopyala, yapıştır vb.)	**1**	**2**	**3**	**4**
3.	Yazı karakterleri (koyu, italik, altı çizili, yazı karakteri değiştirme, yazı rengini değiştirme vb.) ve hizalama gibi basit formatlama işlemlerini yapabilme.	**1**	**2**	**3**	**4**
4.	Nesne ekleme nesne boyutunu değiştirme ve nesnenin yerini değiştirme gibi biraz daha karmaşık işlemleri yapabilme.	**1**	**2**	**3**	**4**
5.	Dosya birleştirme, dosya transfer etme, tablo oluşturma veya düzeltme gibi ileri düzey kelime işlemci fonksiyonlarını kullanabilme.	**1**	**2**	**3**	**4**

Yeterlik 1B: VERİTABANI UYGULAMALARI (MS Access gibi):

Bu programlar, isimler, adresler, telefon numaraları gibi verileri düzenlemenizi ve bilgiyi çeşitli şekillerde yeniden düzenlemenizi sağlar.

Veritabanı uygulamalarına aşinalığınız var mı?

( ) Evet (Birinci soruya devam edin) ( ) Hayır (Bir sonraki bölüme geçin)

Yeterlik seviyeniz

		Hiç yeterli değilim	**Biraz yeterliyim**	**Oldukça yeterliyim**	**Tam anlamıyla yeterliyim**
1	Bir veritabanı dosyası açabilme veya oluşturabilme.	**1**	**2**	**3**	**4**
2	Veritabanında alan oluşturabilme veya varolan alanda düzeltme yapabilme.	**1**	**2**	**3**	**4**
3	Veritabanına veri girebilme.	**1**	**2**	**3**	**4**
4	Veritabanı raporu oluşturabilme.	**1**	**2**	**3**	**4**
5	Bir tablo işlemci dosyasını veritabanıyla birleştirebilme.	**1**	**2**	**3**	**4**

Yeterlik 1C: TABLO İŞLEMCİ UYGULAMALARI (MS Excel gibi):

Bu programlar, bir çalışma sayfası oluşturmanız için içine metin, sayı veya formül girebileceğiniz hücreleri oluşturan satır ve sütunlardan oluşacak şekilde tasarlanmıştır.

Tablo işlemci uygulamalarına aşinalığınız var mı?

( ) Evet (Birinci soruya devam edin) ( ) Hayır (Bir sonraki bölüme geçin)

Yeterlik seviyeniz

		Hiç yeterli değilim	**Biraz yeterliyim**	**Oldukça yeterliyim**	**Tam anlamıyla yeterliyim**
1	Bir çalışma sayfası açabilme veya oluşturabilme.	**1**	**2**	**3**	**4**
2	Satır ya da sütunların boyutunu değiştirmek, veya satır ya da sütun ekleyip silmek suretiyle çalışma sayfasının formatını değiştirebilme.	**1**	**2**	**3**	**4**
3	Formüller ve ileri düzeyde hesaplama işlevlerini kullanabilme.	**1**	**2**	**3**	**4**
4	Verilerin grafiklerini oluşturabilme	**1**	**2**	**3**	**4**
5	Rapor oluşturabilme ve çıktı alabilme.	**1**	**2**	**3**	**4**

Yeterlik 1D: YAZILIM UYGULAMALARI/INTERNET:

Burada, Internet Servis Sağlayıcıları ve arama motorları kullanmak suretiyla WWW üzerinde araştırma yapma veya metinler, görsel, görsel-işitsel, senkronize ya da asenkronize yollarla diğer bilgisayarlarla iletişim kurmanızı sağlayan programları kullanma yeterliği söz konusudur.

Telekomünikasyona aşinalığınız var mı?

( ) Evet (Birinci soruya devam edin) ( ) Hayır (Bir sonraki bölüme geçin)

		Yeterlik seviyeniz			
		Hiç yeterli değilim	**Biraz yeterliyim**	**Oldukça yeterliyim**	**Tam anlamıyla yeterliyim**
1	E-posta işlemlerini gerçekleştirebilme. (e-posta alma ve gonderme, e-postayla dosya eklentisi alma ve gonderme vb.)	**1**	**2**	**3**	**4**
2	Internetten dosya yükleme ve açma.	**1**	**2**	**3**	**4**
3	FTP (Dosya Transfer Protokolü) yoluyla dosya transfer etme.	**1**	**2**	**3**	**4**
4	Internet üzerinde etkileşimli görsel veya işitsel iletişim araçlarını kullanma.	**1**	**2**	**3**	**4**
5	Bir Internet Servis Sağlayıcının (Ttnet, Superonline vb.) seçimi.	**1**	**2**	**3**	**4**
6	Internet erişiminin nasıl yapıldığı.	**1**	**2**	**3**	**4**
7	Tartışma siteleri, arama motorları ve benzeri Internet araçlarının kullanımı.	**1**	**2**	**3**	**4**
8	Sık kullanılanların (Favorites) oluşturulması ve bunların kullanılması.	**1**	**2**	**3**	**4**
9	Göz Gezdirici (Internet Explorer, Netscape Navigator vb.) seçeneklerini değiştirebilme.	**1**	**2**	**3**	**4**
10	Görsel veya işitsel plug-in'lerin (Flash animasyonu, video dosyası vb.) yüklenip kullanılabilmesi.	**1**	**2**	**3**	**4**

APPENDIX G

FIRST AID TEST

The purpose of this test is to check information about your knowledge about first aid. There are totally 50 questions in the test. The test will take about 75 minutes to complete. The first aid test will count for 1 point for each item on the test.

Thank you very much

Res. Assist. Leyla Saraç

Name:

Surname:

Id Number:

Mobile Phone:

e-mail:

Directions: Please read each question carefully before you provide your answer. Choose the appropriate choice and circle its letter on the test sheet. If you do not know the answers leave it blank.

1. In order to prevent cross infection when giving first aid, what should you do?

a. Never treat a casualty without wearing gloves
b. Avoid direct contact with body fluid
c. Always select hygienic casualties to treat
d. Stay clear of casualties who are bleeding

2. What are the ABC's of first aid?

a. Approach, Bleeding, Check
b. Airway, Breathing, Circulation
c. Assess, Bleeding, Circulation
d. Approach, Breathing, Circulation

3. Which first aid procedure is usually considered only as a last resort?

a. to use a splint
b. to apply a tourniquet
c. to start artificial respiration
d. to employ the Heimlich maneuver

4. You find a casualty lying on the ground. You survey the scene and decide it is safe to help the victim. What should you do first?

a. Check for pulse
b. Check for breathing
c. Check for bleeding
d. Check for responsiveness

5. What is the proper way to determine unresponsiveness?

a. to pinch their nose
b. to pour cold water on the person
c. to shake and shout at the person
d. to look at eye movements

6. What is the preferred way to check for breathing?

a. Place your hand on the chest and see if it moves with respiration
b. Tickle them and see if they laugh
c. Look, listen and feel for breathing
d. Put a mirror in front of the mouth and nose to see if it evaporates

7. Where is the best place to check for a pulse in an emergency on adult casualty?

a. At the wrist (over the radial artery)
b. Midway between the shoulder and the elbow
c. In the neck lover the carotid artery
d. Listen over the chest for the heart beat

8. When should you put a casualty in the coma position?

a. He is conscious, has no breathing
b. He is unconscious, has breathing, but no pulse
c. He is unconscious, have a pulse and breathing
d. When there is no pulse but has breathing

9. How long does it take for brain damage to occur due to lack of oxygen?

a. 1-2 minute b. 5-6 minutes c. 3-4 minutes d. 10-11 minutes

10. When performing resuscitation on an **adult** casualty, what is the ratio of compressions of the chest and inflations of the lung?

a. 1 compression to 5 inflation
b. 2 compressions to 15 inflations
c. 15 compressions to 2 inflation
d. 30 compressions to 2 inflation

11. When performing resuscitation on an **infant** casualty, what is the ratio of compressions of the chest and inflations of the lung?

a. 1 compression to 5 inflation
b. 2 compressions to 15 inflations
c. 15 compressions to 2 inflation
d. 30 compressions to 2 inflation

12. The order of performance for proper CPR technique for an **adult** casualty is:

a. Check for response, (no response), have someone call 112, open airway, check breathing, (no breathing) give 2 breaths, 15 compressions and 2 breaths (until 112 comes)
b. Check for response, (no response), open airway, check breathing, (no breathing) have someone call 112, give 2 breaths, check pulse (no pulse), 30 compressions and 2 breaths (until 112 comes)
c. Check for response, (no response), have someone call 112, open airway, check breathing, (no breathing), 30 compressions and 2 breaths (until 112 comes)
d. Check for response, (no response), have someone call 112, check breathing, (no breathing), open airway, give 2 breaths, check pulse, (no pulse), 15 compressions and 2 breaths (until 112 comes)

13. What is the first step to control severe bleeding?

a. Elevate body part
b. Apply direct pressure
c. Bandage the wound
d. Apply pressure on a pressure point

14. What advise should the first aider give to someone with nosebleed?

a. Push a narrow bandage into the nose
b. Lean head back, and put ice in the back of the neck
c. Lean head forward, and pinch the soft part of the nose
d. Lean head forward, and put ice in the back of the neck

15. Which of the following is the correct treatment for serious bleeding?

a. Pressure point application, elevation above the heart, multiple dressings, direct pressure
b. Direct pressure, multiple dressings, elevation above the heart, pressure point application
c. Multiple dressings, pressure point application, direct pressure, elevation above heart
d. Elevation above heart, pressure point application, direct pressure, multiple dressings

16. Which one of the following is one of the characteristics of cardiac arrest?

a. A sudden ceasing of heart function
b. A sudden ceasing of brain function
c. A sudden decrease in the blood sugar level
d. A sudden coma due to poisoning with chemicals

17. What should be done in the case of cardiac arrest?

a. put the casualty into coma position
b. put the casualty into long sitting position
c. put the casualty into shock position
d. commence CPR (cardiopulmonary resuscitation)

18. What is the first thing you should do if a person tells that he/she is choking?

a. Encourage them to cough up the obstruction
b. Perform abdominal thrust
c. Slap them on the back
d. Perform chest thrust

19. What is the proper first aid for the unconscious casualty with **complete** airway obstruction?

a. Commence CPR (cardiopulmonary resuscitation)
b. Commence abdominal thrusts
c. Give recovery position
d. Apply Heimlich Maneuver

20. In what direction do you give abdominal thrusts for a conscious choking person?

a. With a quick downward thrusts
b. Straight toward the ground
c. Inward and upward
d. Upward

21. What is the first thing you should do if you see a swimmer drowning in the water?

a. Go in the water after the person
b. Try to calm the person by talking
c. Look for a device with which to reach
d. Call for help

22. Which condition is most often associated with hyperventilation?

a. Severe cold
b. Acute anxiety
c. Improper nutrition
d. Chronic bacterial infection

23. What is the proper first aid for hyperventilation?

a. Having the victim breathe into paper bag
b. Diverting the victim's attention to other problems
c. Calming the person by talking
d. Move casualty to cool place, wait 10 minutes and give your first aid

24. Which condition is most associated with asthma?

a. Severe cold
b. Bacterial infection
c. Acute anxiety
d. Tightening of the airways of lungs

25. Which of the following should be done in the treatment of asthma?

a. Phone immediately for an ambulance
b. Put the casualty into coma position
c. Put the casualty into shock position
d. Allow the casualty to take their inhaler

26. Which of the following should be done in the treatment of fractures?

a. Give massage to affected area
b. Try to strengthen the broken limb
c. Move the joints above and below the fracture
d. Immobilize the fractured limb

27. Which of the following positions is a conscious casualty with a broken left clavicle (collar bone) most likely to adopt?

a. Supporting his left arm, head inclined to the right
b. Left arm fallen forward, head inclined to the left
c. Supporting his left arm, head inclined to the left
d. Left arm fallen forward, head inclined to the right

28. How would you position the **unconscious** casualty with broken ribs?

a. In the coma position, on the uninjured side
b. In the coma position, on the injured side
c. In the half sitting position, leaning towards uninjured side
d. In the half sitting position, leaning towards injured side

29. What is the proper treatment procedure for **conscious** casualty with broken ribs?

a. Place the casualty into a coma position
b. Place the casualty into a shock position
c. Place the casualty into a lying position
d. Place the casualty into a half sitting position

30. What is the proper treatment procedure for conscious casualty with fractured pelvis?

a. Place the casualty into a coma position
b. Place the casualty into a shock position
c. Place the casualty into a lying position
d. Place the casualty into a half sitting position

31. If you suspect a victim with a neck injury, what should you do?

a. Elevate the head above the heart level
b. Advise the casualty to roll over
c. Massage the injured neck to promote circulation
d. Do not move the casualty

32. What are the proper treatment procedures for strains and sprains?

a. Raise injured part, apply hot water, apply elastic bandage, rest injured part
b. Raise injured part, apply heat, apply elastic bandage, rest injured part
c. Lower injured part, apply elastic bandage, rest injured part, apply ice
d. Rest injured part, apply ice pack, apply elastic bandage, raise injured part

33. What is the proper treatment procedure for **conscious** casualty with dislocated shoulder?

a. Place the dislocated joint into its socket carefully
b. Lay down the casualty until 112 comes
c. Immobilize the joint with bandages or slings
d. Place the casualty into long sitting position until 112 comes

34. What should be done to relieve a cramp?

a. Continue to work
b. Apply lotions, ointments or alcohol
c. Stretch the muscle
d. Insert a needle to the affected muscle

35. Which one of the following is one of the characteristics of 1st degree burn?

a. Red color
b. Yellow color
c. Green color
d. Brown color

36. Which one of the following classifications of burns destroys skin tissue down to the fatty layer?

a. 1st degree
b. 2nd degree
c. 3rd degree
d. 2nd and 3rd degree

37. Which one of the following should be done in the treatment of 1st and 2nd degree burns?

a. Apply lotions, ointments, or fat to the injury
b. Break blisters, remove any loose skin
c. Apply cold water or cold compress
d. Try to remove any material which is sticking to the skin

38. Hypothermia develops when the body temperature drops to…

a. 32°C
b. 33°C
c. 34°C
d. 35°C

39. At what temperature does heart failure occur?

a. 29°C
b. 28°C
c. 27°C
d. 26°C

40. In which condition does frostbite occur?

a. When the body's control mechanisms fail to maintain a normal body temperature
b. When the skin tissue or blood vessels are damaged from exposure to intense cold
c. When the body parts contact with ice for 3-5 minutes
d. When the body temperature drops below $32^{o}C$

41. Which one of the following should be done in treatment of frostbite?

a. Give the casualty alcohol
b. Apply ointments or medications to the injured area
c. Let the casualty walk on a frosted area
d. Rewarm the affected parts by application of warm compress

42. Which one of the following is one of the characteristics of anaphylactic shock?

a. It is usually caused by a fluid loss
b. It is usually caused by an extreme cold
c. It is usually caused by an extreme hot
d. It is usually caused by an allergen

43. Which one of the following should be done in the treatment of poisoning by swallowing?

a. Induce vomiting by sticking fingers into casualty's mouth
b. Neutralize the a poison by giving the salt water to casualty
c. Neutralize the a poison by giving the vinegar to casualty
d. Call poison control center and emergency care

44. Which one of the following should not be done in the treatment of snake bites?

a. Keep the bitten part below the heart level
b. Do not move the casualty unnecessarily
c. Wash the wound with soap and water
d. Apply tourniquet

45. Which one of the following should be done in the treatment of the bee stings?

a. Squeeze the sting carefully
b. Rub the wound with yoghurt
c. Rub with mud as soon as possible
d. Scrape the sting out with credit card, or edge of a knife

46. If the object in the eye cannot be moved, what should be done as a first aid?

a. Wait 10 minutes and try first aid again
b. Cover both eyes and transport victim to a doctor
c. Cover the affected eye only and transport victim to a doctor
d. Transport the victim to a doctor without covering any eye

47. How can you attempt to remove a foreign body from inside the nose?

a. Probe the foreign body with a sterile cotton swabs
b. Pick it out with tweezers
c. Direct the casualty to breathe sharply to swallow the foreign body
d. Have the casualty blow gently through the affected nostril

48. You are the only one present when your friend falls to the ground and has convulsions due to an epileptic attack. What should you do first?

a. Place something like a pillow under his head
b. Go of the call an ambulance
c. Restrain them so that s/he do not injure her/himself
d. Place something between his teeth so that they do not bite his tongue

49. Which of the following can be used to successfully move a patient with a spinal injury?

a. Clothes or blanket drag
b. Human Crutch
c. Fireman's carry
d. Pick a back

50. What is not usually advisable to do for a victim of a serious automobile accident?

a. to clear the airway
b. to deal with bleeding
c. to loosen tight clothing
d. to remove the victim from the car

APPENDIX H

FIRST AID AFFECTIVE BEHAVIOR SCALE

İLKYARDIM UYGULAMALARINI ETKİLEYEN FAKTÖRLERİN BELİRLENMESİ

Sevgili katılımcılar, bu form acil yardım gerektiren durumlarda, insan yaşamının devam ettirilmesinde ve hasta veya yaralının durumunun kötüye gitmesinin engellenmesinde büyük önem taşıyan ilkyardım bilgi ve becerilerinin uygulanmasını olumlu ya da olumsuz etkileyen ya da etkisi bulunmayan faktörlerin belirlenmesi amacı ile hazırlanmıştır.

Yönerge: Yardım gereken durumlarda **sizin** ilkyardım uygulamanızı olumlu ya da olumsuz etkileyeceğini veya etkilemeyeceğini düşündüğünüz ifadelere çarpı işareti koyunuz.

Katkılarınız için teşekkür ederim
Leyla Saraç

Ad-Soyad: Cinsiyet: Bayan Erkek Bölüm: Sınıf: Yaş: Sürücü Belgeniz var mı?: Evet Hayır			**Olumsuz Etkiler**		**Etkilemez**		**Olumlu Etkiler**
			1	**2**	**3**	**4**	**5**
Hasta/Yaralının özellikleri							
1	Hasta/Yaralının erkek olması	**acil yardım durumunda müdahale etmemi**					
2	Hasta/Yaralının bayan olması						
3	Hasta/Yaralının bebek olması						
4	Hasta/Yaralının çocuk olması						
5	Hasta/Yaralının yetişkin olması (18-60 yaş arası)						
6	Hasta/Yaralının yaşlı olması (60 yaş ve üzeri)						
7	Hasta/Yaralının dış görüntüsünün temiz/düzgün olması						
8	Hasta/Yaralının tanıdık olması						

			Olumsuz Etkiler		Etkilemez		Olumlu Etkiler
			1	2	3	4	5
İlkyardımcının özellikleri							
	Erkek olmam	**acil yardım durumunda müdahale etmemi**					
	Bayan olmam						
	İlkyardım hakkında bilgim olması						
	İlkyardım gerektiren hastalık/yaralanma ile ilk defa karşılaşıyor olmam						
Kaza ortamının ve yaralanmanın özellikleri							
13	Kazaya/yaralanmaya neden olan olayın açık ve anlaşılır olması	**acil yardım durumunda müdahale etmemi**					
14	Hastalık/yaralanma sonucunda vücut dışına çıkan sıvıların varlığı (kan-kusmuk vb.)						
15	Müdahale esnasında bulaşıcı hastalığa yakalanma riski olması						
Sosyal Etkenler							
16	Çevrede başkalarının olması	**acil yardım durumunda müdahale etmemi**					
17	Sorumluluk hissi duymam						
18	Kendimi hasta/yaralının yerine koymam						
19	İlkyardım uygulaması sonucunda ödüllendirilme olasılığı						
20	İlkyardım uygulaması sonucunda cezalandırılma olasılığı						
21	İlkyardım uygulaması sonucunda adımın kötüye çıkma olasılığı						
22	İlkyardım uygulaması sonucunda popüler olma olasılığı						
Diğer Faktörler							
23	İlkyardım uygulaması gerektiren durumun benim yaşantım için de tehlike oluşturması	**acil yardım durumunda müdahale etmemi**					
24	Yapacağım ilkyardım sonucunda risk alma olasılığı						
25	Hasta/Yaralı ile ilgilenecek vaktimin olması						
26	Yasaların/kanunların hasta yaralıya müdahale konusunda belirsiz olması						
27	İlkyardım gerektiren olayın yerleşim merkezinde olması						
28	Acil yardım ekiplerinin (112) kısa sürede geleceklerini düşünmem						

APPENDIX I

ASSESSEMENT OF AFFECTIVE BEHAVIORS INTERVIEW QUESTIONS

Değerli katılımcı,

Bu çalışmanın amacı sizin ilkyardım uygulamaları konusundaki deneyimleriniz hakkında bilgi edinmek, ve ilkyardım uygulamalarını olumlu ya da olumsuz etkileyen faktörler hakkında fikirlerinizi almaktır. Çalışma sonucunda ortaya çıkacak olan bilginin, ilkyardım eğitim programlarının yeniden düzenlenmesinde faydalı olması beklenmektedir.

Bu amaçla yaklaşık 20 dakika sürmesini beklediğim bir görüşme yapmayı planlamaktayım. Bu görüşmede sizin ilkyardım deneyimleriniz hakkında bilgi edinecek ve ilkyardım uygulamalarını etkilemesi muhtemel faktörler hakkında fikirlerinize başvuracağım.

Görüşme esnasında izin verdiğiniz takdirde ses kaydı alınacaktır. Ses kayıtları çözümlendikten sonra isteğiniz doğrultusunda bir kopyası size verilecektir. Onayınız alındıktan sonra veriler analiz edilecektir.

Veriler ve kimliğiniz tarafımdan gizli tutulacaktır. Çalışmada bireysel kimliğiniz ile ilgili bilgiler yer almayacaktır.

Bu çalışmaya katılmayı kabul ettiğiniz ve zaman ayırdığınız için çok teşekkür ederim.

Arş. Gör. Leyla Saraç

Bu çalışmanın içeriğini anladım ve gönüllü olarak katılmayı kabul ediyorum

İsim: .....

Tarih: .... / .... / ....

İmza: .....

INTERVIEW QUESTIONS

Öğrenci Görüşme Formu

Görüşmeyi Yapan: Leyla Saraç

Tarih:	Saat:
Yer:	Kişi:

Görüşme soruları

Demografik Bilgiler

- Yaş
- Bölüm

Araştırma Soruları

1. İlkyardım eğitimi aldınız mı?
    a. Eğitim aldıysanız nerde aldınız?
    b. Eğitimin içeriği neydi?
    c. Genel anlamda aldığınız eğitimi nasıl değerlendirirsiniz?
    d. Sürücü belgeniz var mı?
2. İlkyardım bilginizi nasıl değerlendirirsiniz?
    - Prompt: Şu an kaza olsa müdahale eder misiniz?
    - Prompt: Ne tür yaralanmalara müdahale edebilirsiniz

4. İlkyardım size neyi çağrıştırıyor?
5. İlkyardım gerektiren durumlar neler olabilir?
6. İlkyardım gerektiren bir olaya tanık oldunuz mu?
    - Prompt: Kazanın tarihi
    - Prompt: Ailenizde
    - Prompt: Sokakta
    - Prompt: Kazanın çeşidi
    - Prompt: Kazanın özellikleri
    - Prompt: Hasta/yaralının özellikleri
    - Prompt: Yardım eden kişi/lerin özellikleri
7. Müdahale ettiniz mi?
    - Prompt: Müdahale ettiyseniz neden?
    - Prompt: Müdahale etmediyseniz neden?
8. Çevredekiler neler yaptı?
    - Prompt: Müdahale ettilerse sizce neden?
    - Prompt: Müdahale etmedilerse sizce neden?
9. Sizce ilkyardım gerektiren durumlarda müdahale edilmesi ne gibi faydalar sağlar?
10. Sizce ilkyardım gerektiren durumlarda müdahale edilmesi ne gibi riskler taşır?
    a. Prompt: İlkyardımcı için ne gibi riskler taşır ?
    b. Prompt: Hasta/yaralı için ne gibi riskler taşır?

10. Sizce insanlar ilkyardım gerektiren durumlarda neden yardım ederler?
    - Prompt: Hasta/yaralının özellikleri etkiler mi (yaş, cinsiyet, dış görüntü)

      *Sizi etkiler mi?

      *Başkalarını etkiler mi?
    - Prompt: İlkyardım yapan kişinin özellikleri etkiler mi (yaş, cinsiyet)

      *Sizi etkiler mi?

      *Başkalarını etkiler mi?
    - Hastalık/yaralanmanın özellikleri etkiler mi (kan, kusmuk, aciliyet)

      *Sizi etkiler mi?

      *Başkalarını etkiler mi?
    - Sosyal etkenler (sorumluluk hissi, başkalarının olup olmaması, risk alma olasılığı)

      *Sizi etkiler mi?

      *Başkalarını etkiler mi?
11. Sizce ilkyardım gerektiren durumlarda müdahale edilmediği oluyor mu?

    *Prompt: Neden müdahale edilmiyor?
12. Görüşme sona ermiştir.
13. Eklemek istedikleriniz var mı?

Verdiğiniz bilgiler için teşekkür ederim.

APPENDIX J

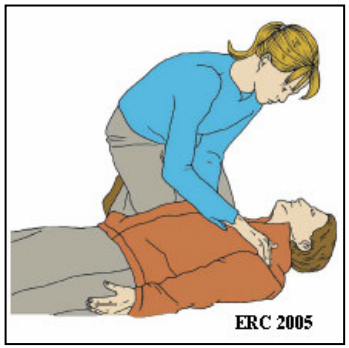
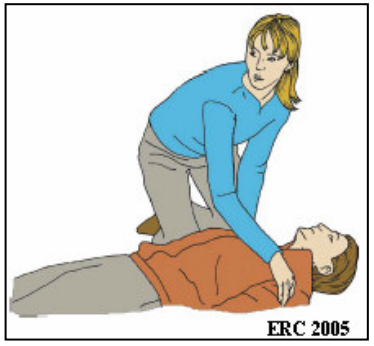
CPR SKILL ASSESSMENT TOOL

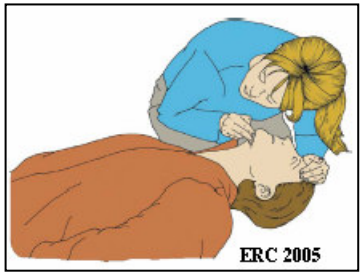
Subject Name:						
Subject ID:						
	Skills	**Not competent**	**Questionably competent**	**Competent**	**Very good**	**Outstanding**
1	Checks safety					
2	Checks unresponsiveness					
3	Shouts for help					
4	Opens airway using head tilt-chin-lift					
5	Checks breathing for no more than 10 seconds					
6	Calls 112					
7	30 chest compressions					
8	Locates compression position between every set of compressions					
9	2 rescue breaths					
10	Opens airway between every set of compressions using head tilt-chin lift					
11	Attempts breaths with at least 1 chest rise between every set of compressions					
12	Resumes CPR					
13	Attempts a pulse check					

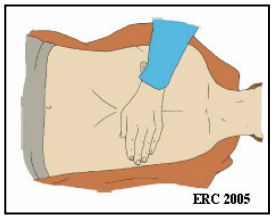
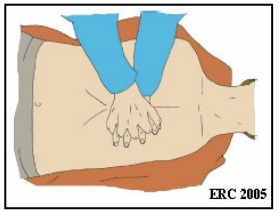
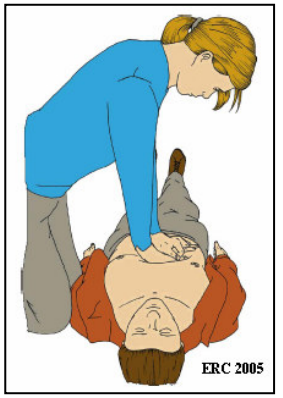
SCORING GUIDE FOR CPR SKILL ASSESSMENT TOOL

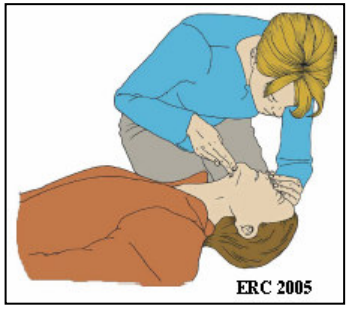
Not competent	**1 points**	Skills were performed poorly or not at all; errors might seriously endanger a victim. CPR may not have been performed. Efforts, if any, did not result in BOTH chest rise and compression of chest. CPR performed in this way would probably not be effective and/or the safety of the victim would be endangered.
Questionably competent	**2 points**	Skills were crude and often failed to meet the standard and/or serious errors were left uncorrected. There may have been serious errors in sequence or delays. The chest was compressed and some ventilation resulted in chest rise. CPR performed this way might be effective. Errors might endanger the victim.
Competent	**3 points**	Skills were crude and sometimes failed to meet standards; several steps may have been out of sequence or were skipped, and/or some errors went uncorrected, although any serious errors were corrected. CPR performed in this way would probably be effective and the victim would not be endangered.
Very good	**4 points**	All skills were performed competently, although improvement is possible. Errors may be minor; most were corrected. No serious errors in technique or sequence were made. CPR performed in this way is likely to be effective and the victim would not be endangered.
Outstanding	**5 points**	All skills were performed very well with no errors and almost exactly as described in the standards. CPR performed in this way is likely to be effective and the victim would not be endangered

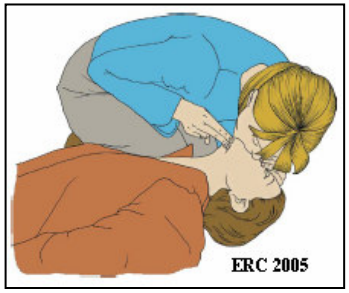
CATEGORY DESCRIPTIONS FOR CPR SKILL ASSESSMENT TOOL

1. Check Safety	*Subject checks safety* • Subject either simulates assessing the scene for dangers. Sequence: The safety check must precede any intervention.
2. Check Response	*Subject checks unresponsiveness* . • Subject is close to manikin. • Subject gently shakes the casualty's shoulders. • Subject asks loudly ''Are you all right? (Or a similar phrase). Sequence: The unresponsiveness check must precede any intervention, including opening the airway. 
3. Shout for help	*Subject shouts for help or sends someone to call or phone for help* • Subject either simulates shouting loughly for help; or • Tells "bystander" to phone 112 (or other emergency response number); phone for an ambulance, or another clear instruction. Sequence: This must occur after a check of unresponsiveness. If there is no check for unresponsiveness, the call for help must precede all other steps. 

4. Open Airway	*Subject opens airway* • Subject kneels beside the casualty near shoulders • Subject places the palm of one hand onto casualty's forehand to apply firm backward pressure • Subject uses the fingertips of other hand to lift the bony part of the lower jaw near the chin to open the airway • Subject gently tilts the casualty's head back keeping your thumb and index finger free to close his nose if rescue breathing is required There is obvious movement of the head from the neutral position. The nose may or may not be pinched. Sequence: This must precede checking for breathing. 
5. Check Breathing	*Subject checks breathing* by *keeping the airway open* • Subject looks at casualty's chest for movement. • Subject places his or her ear near casualty's mouth to listen for breath sounds. • Subject feels for air on cheek. • The breathing check should take no more than 10 seconds. Do not count breathing check if the subject has not opened the airway. Sequence: This must occur after opening the airway. 
6. Call for Help	*Subject sends someone for help or, if he is alone, leaves the victim and alerts the ambulance service* • Subject either simulates a phone call or tells "bystander" to phone 112 (or other emergency response number), phone for an ambulance, or another clear instruction. Sequence: This must occur after a checking of breathing and before starting chest compressions.

7. Chest Compressions	*Subject starts chest compressions* Subject: • kneels by the side of the victim; • places the heel of one hand in the centre of the victim's chest;  • places the heel of your other hand on top of the first hand; • interlocks the fingers of your hands and ensure that pressure is not applied over the victim's ribs; • does not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone);  • positions himself/herself vertically above the victim's chest and, with his/her arms straight presses down on the sternum 4-5 cm; • after each compression, releases all the pressure on the chest without losing contact between his/her hands and the sternum; • repeats at a rate of about 100 min−1 (a little less than 2 compressions s−1) • compression and release should take equal amounts of time. 

<table>
<tr><td>8. Rescue Breaths</td><td>Subject combines chest compression with rescue breaths
Subject:
• After 30 compressions opens the airway again using head tilt and chin lift;
• pinches the soft part of the nose closed, using his/her index finger and thumb of his/her hand on the forehead;
• allows the mouth open, but maintains chin lift;
 

• takes a normal breath and places his/her lips around the victim’s mouth, making sure that he/she has a good seal;
• blows steadily into the mouth while watching for the chest to rise, taking about 1 s as in normal breathing; this is an effective rescue breath;
• maintaining head tilt and chin lift, takes his/her mouth away from the victim and watch for the chest to fall as air passes out;
• takes another normal breath and blow into the victim’s mouth once more, to achieve a total of two effective rescue breaths;
• The manikin chest rises visibly at least once and no more than twice.
 

Do not count breaths if subject has not opened airway.

Sequence: Must precede 30 chest compressions.</td></tr>
<tr><td>9. CPR</td><td>Subject resumes CPR, including both compression and ventilations.
• Subject returns his/her hands without delay to the correct position on the sternum and gives a further 30 chest compressions.
• Continues with chest compressions and rescue breaths in a ratio of 30:2.
• Stops to recheck the victim only if he starts breathing normally; otherwise does not interrupt resuscitation.</td></tr>
<tr><td>Notes</td><td>Subject checks pulse:
• Pulse check is not part of the BLS standards for lay subjects; we are recording it to see if subjects carry the skill over from previous CPR training or other experience. Give a check for any effort to check pulse.)</td></tr>
</table>

APPENDIX K

RESUSCI ANNE SKILL REPORTER (LAERDAL MEDICAL)

RESUSCI ANNE SKILL REPORTER – PRINTED INFORMATION

Student name: _____
Instructor name: _____
Duration of the session: (min : sec) ___

Ventilations:
Average volume (ml) ___
Average number per min. (#/min) ___
Minute volume (ml/min) ___
Total number (#) ___
Number correct (#) ___
Percent correct (%) ___
Too much (#) ___
Too little (#) ___
Too fast (#) ___

Compr. / Vent. ratio ___

Compressions
Average depth (mm) ___
Average number per min. (#/min) ___
Average compression rate (#/min) ___
Total number (#) ___
Number correct (#) ___
Percent correct (%) ___
Too deep (#) ___
Too shallow (#) ___
Wrong hand position (#) ___
Hand position too low (#) ___
Incomplete release (#) ___

Defibrillation *(CPR-D models only)*
Time from scenario start to first shock (min : sec) ___ ___
Time from call for help to first shock (min : sec) ___ ___
Time from arrival of defibrillator to first shock (min : sec) ___ ___

APPENDIX L

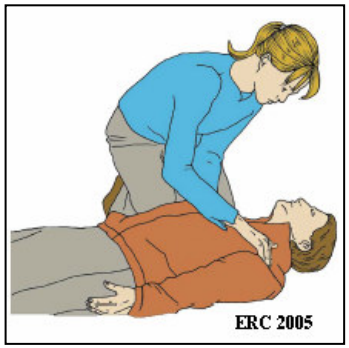
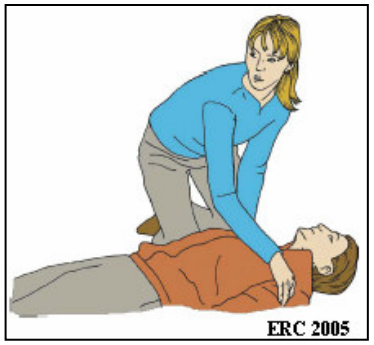
RECOVERY POSITION SKILL ASSESSMENT TOOL

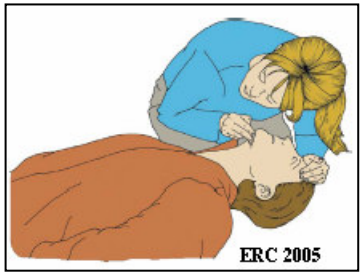
Subject Name:						
Subject ID:						
	Skills	**Not competent**	**Questionably competent**	**Competent**	**Very good**	**Outstanding**
1	Checks safety					
2	Checks unresponsiveness					
3	Shouts for help					
4	Opens airway using head tilt-chin-lift					
5	Checks breathing for no more than 10 seconds					
6	Positions the victim's arms for recovery position					
7	Positions the victim's legs for recovery position					
8	Positions the victim's body for recovery position					
9	Positions the victim's head for recovery position					
10	Sends or goes for help/calls ambulance					
11	Attempts a pulse check					

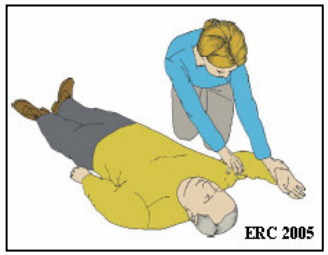
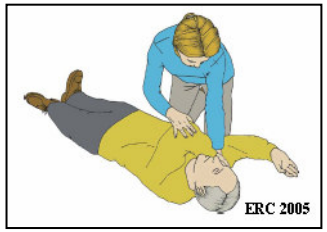
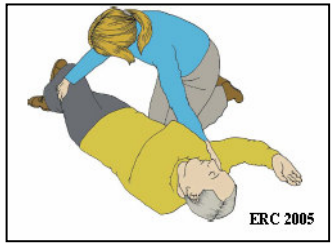
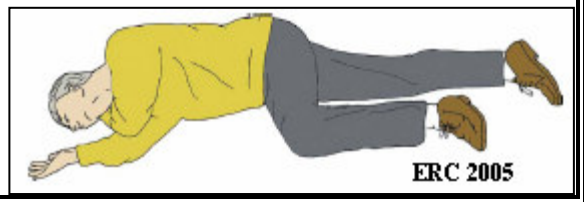
SCORING GUIDE FOR RECOVERY POSITION SKILL ASSESSMENT TOOL

Not competent	**1 points**	Skills were performed poorly or not at all; errors might seriously endanger a victim. Recovery position may not have been performed. Efforts, if any, did not result in appropriate arm, leg, body, and head position of the victim. Recovery position performed in this way would probably not be effective and/or the safety of the victim would be endangered.
Questionably competent	**2 points**	Skills were crude and often failed to meet the standard and/or serious errors were left uncorrected. There may have been serious errors in sequence or delays. The recovery position applied without appropriate arm, leg, body, and head position. Recovery position performed this way might be effective. Errors might endanger the victim.
Competent	**3 points**	Skills were crude and sometimes failed to meet standards; several steps may have been out of sequence or were skipped, and/or some errors went uncorrected, although any serious errors were corrected. Recovery position performed in this way would probably be effective and the victim would not be endangered.
Very good	**4 points**	All skills were performed competently, although improvement is possible. Errors may be minor; most were corrected. No serious errors in technique or sequence were made. Recovery position performed in this way is likely to be effective and the victim would not be endangered.
Outstanding	**5 points**	All skills were performed very well with no errors and almost exactly as described in the standards. Recovery position performed in this way is likely to be effective and the victim would not be endangered

CATEGORY DESCRIPTIONS FOR RECOVERY POSITION SKILL ASSESSMENT TOOL

1. Check Safety	*Subject checks safety* • Subject either simulates assessing the scene for dangers. Sequence: The safety check must precede any intervention.
2. Check Response	*Subject checks unresponsiveness* . • Subject is close to manikin. • Subject gently shakes the casualty's shoulders. • Subject asks loudly ''Are you all right? (Or a similar phrase). Sequence: The unresponsiveness check must precede any intervention, including opening the airway. 
3. Shout for help	*Subject shouts for help or sends someone to call or phone for help* • Subject either simulates shouting loughly for help; or • Tells "bystander" to phone 112 (or other emergency response number); phone for an ambulance, or another clear instruction. Sequence: This must occur after a check of unresponsiveness. If there is no check for unresponsiveness, the call for help must precede all other steps. 

4. Open Airway	*Subject opens airway* • Subject kneels beside the casualty near shoulders • Subject places the palm of one hand onto casualty's forehand to apply firm backward pressure • Subject uses the fingertips of other hand to lift the bony part of the lower jaw near the chin to open the airway • Subject gently tilts the casualty's head back keeping your thumb and index finger free to close his nose if rescue breathing is required There is obvious movement of the head from the neutral position. The nose may or may not be pinched. Sequence: This must precede checking for breathing. 
5. Check Breathing	*Subject checks breathing* by *keeping the airway open* • Subject looks at casualty's chest for movement. • Subject places his or her ear near casualty's mouth to listen for breath sounds. • Subject feels for air on cheek. • The breathing check should take no more than 10 seconds. Do not count breathing check if the subject has not opened the airway. Sequence: This must occur after opening the airway. 

6. Recovery Position	*Subject turns the victim into the recovery position if he/she is breathing normally* • Remove the victim's spectacles. • Kneel beside the victim and make sure that both legs are straight. • Place the arm nearest to you out at right angles to the body, elbow bent with the hand palm uppermost.  • Bring the far arm across the chest, and hold the back of the hand against the victim's cheek nearest to you.  • With your other hand, grasp the far leg just above the knee and pull it up, keeping the foot on the ground. • Keeping his hand pressed against his cheek, pull on the far leg to roll the victim towards you onto his side.  • Adjust the upper leg so that both hip and knee are bent at right angles. • Tilt the head back to make sure the airway remains open. • Adjust the hand under the cheek, if necessary, to keep the head tilted. • Check breathing regularly. 

APPENDIX M

SUMMARY IN TURKISH

TÜRKÇE ÖZET

Giriş

İnsan yaşamını tehdit eden faktörler arasında kalp rahatsızlıkları, trafik kazaları, iş kazaları, doğal afetler, intiharlar, terörist saldırılar ve savaşlar sayılabilir. Özellikle trafik kazaları dünyada insan yaşamına son veren ve çeşitli sakatlıklara yol açan büyük bir toplumsal sorun olarak göze çarpmaktadır. Dünya sağlık örgütü (WHO) verilerine göre trafik kazaları her yıl 1.2 milyon ölüm ve 50 milyon sakatlığa yol açan küresel bir sorun olarak rapor edilmiştir (WHO, 2008). Benzer biçimde Türkiye'de her yıl binlerce insan trafik kazaları ile karşı karşıya kalmaktadır. Karayolları Genel Müdürlüğü (KGM) raporlarında, 2006 yılında 728.756 trafik kazasına bağlı olarak 4.633 kişinin öldüğü ve 168.550 kişinin yaralandığı belirtilmiştir (KGM, 2007). Gerek yayalar gerekse sürücüler trafik kazaları ile sık sık karşı karşıya kalmaktadır. Tıbbi yardım ekiplerinin kaza mahalline gelmesi zaman aldığından ve trafik kazalarında, kaza ortamında bulunan kişilerin ilk müdahaleyi yapma imkanları bulunduğundan, ilkyardım uygulamaları yaralıların hayatlarının devam ettirilmesinde büyük önem taşımaktadırlar.

Kalp rahatsızlıkları da her yıl dünyada yaklaşık 17 milyon kişinin hayatını tehdit eden önemli bir etken olarak karşımıza çıkmaktadır (Mackay & Mensah, 2004). Türkiye İstatistik Enstitüsü raporlarına göre Türkiye'de de 2006 yılında 99.072 kişi (51.689 erkek, 47383 kadın) kalp rahatsızlıkları nedeni ile hayatını kaybetmiştir (TURKSTAT, 2007). Bu ölüm oranı Türkiye'de çeşitli sebeplerden meydana gelen tüm ölümlerin (116.923 kişi) %85'ini oluşturmaktadır.

Doğal afetlerin bir çeşidi olan depremler de büyük oranda ölümlere neden olan önemli bir faktör olarak bilinmektedir. Pek çok ülkede depremler yüzünden binlerce yaşam kaybedilmektedir. Ülkemizde de benzer biçimde depremler insan yaşamına olumsuz etki etmektedir. Örneğin 1939 yılında meydana gelen Erzincan depreminde 32.700 kişi, ve 1999 yılında meydana gelen İzmit depreminde de 17.118 kişi hayatını kaybetmiştir (USGS, 2007; Jalali, 2002; Kale-Kostuvali, 2007).

İnsan yaşamını tehdit eden acil durumlarda yaralılara doğru zamanda doğru müdahalenin yapılması, tıbbi yardım ekiplerinin olay yerine gelmesi vakit aldığından, büyük önem taşımaktadır. Tıbbi desteğin beklenmesi esnasında yaralılara olay yerinde bulunanlar tarafından doğru ilkyardım müdahalesinin uygulanması insan yaşamının kurtarılmasında önemli rol oynar. Hava yolunun açılması, kanamanın durdurulması, temel yaşam desteği gibi ilkyardım uygulamaları zaman zaman yaşam ile ölüm arasındaki ince çizginin belirlenmesinde etkili olmaktadır (Thoren, Axelsson, Herlitz, 2004). Hasta ya da yaralılara yapılan acil müdahalelere ilkyardım adı verilmektedir (Van De Velde et al., 2007). Bununla birlikte kişilerin ilkyardımcı olarak adlandırılabilmeleri için ilkyardım konusunda eğitilmeleri gerekliliği de vurgulanmaktadır. İlkyardım içerik olarak teorik bilgi yanı sıra beceri uygulamaları da içermektedir. Bununla birlikte ilkyardımcıların gerekli durumlarda sahip oldukları bilgi ve becerileri uygulamak için istekli olmaları da önemlidir.

Toplumda ilkyardım bilgi ve becerisine sahip bireylerin arttırılması, çeşitli kazalara bağlı olarak insan yaşamının kaybedilmesinin önlenmesinde önemli bir faktördür. İlkyardım bilgi ve becerilerinin en etkin öğretim yöntemleri ile bireylere aktarılması, bilgi ve becerilerin kazanımı ve gerekli durumlarda hatırlanıp etkin bir biçimde uygulanması açısından önemlidir. Çeşitli araştırmalarda, ilkyardım öğretimi konusunda farklı öğretim yöntemleri denenmiş ve etkinliği araştırılmıştır. Ancak en etkin öğretim yönteminin hangisi olduğu kesinlik kazanmamıştır. Bunun en büyük nedeni ise, farklı öğretim yöntemlerinin, farklı ortam ve katılımcı grupları üzerindeki etkilerinin değişkenlik göstermesidir. Amerika Kalp Birliği (AHA) 2005 yılında, geleneksel öğretim yöntemlerinin özellikle temel yaşam desteği konusunda beceri

kazanımı ve bu becerilerin hatırlanması konusunda etkin olmadığını belirtmiştir. Bunun nedenleri olarak da becerilerin karmaşık ve zor olmasını, yetersiz hazırlanmış ders içeriği ve eğitmen eğitimini, uygun olmayan materyaller kullanılmasını, beceri öğrenimine yetersiz zaman harcanmasını ve yetersiz geribildirim ve gözetim gibi konuları göstermiştir. Geleneksel yöntemlerin etkin olmamasından yola çıkılarak çeşitli öğretim yöntemleri önerilmiştir. Bu öğretim yöntemlerinden biri de, daha çok kişiye ulaşılmasını mümkün kılan, basit, hızlı ve ucuz olması nedeni ile geleneksel öğretim yöntemine alternatif olarak gösterilen video ile kendi kendine öğrenme yöntemidir (Batcheller, Brennan, Braslow, Urrutia, & Kaye, 2000; Braslow, et al., 1997; Todd et al., 1998). Bilim ve teknolojinin gelişmesi, özellikle internet kaynaklarının işlevselliği ve kullanılabilirliğinin artmasına bağlı olarak web-tabanlı öğretim yöntemleri eğitim alanında sıklıkla kullanılır hale gelmiştir. Benzer şekilde, ilkyardım eğitimi alanında da web-tabanlı öğretim yöntemleri, yine çok sayıda kişiye ulaşılmasını sağlayan bir yöntem olarak önerilmiştir (Umlauf, 1990; Teauge & Riley, 2006). Özellikle beceri uygulamaları içeren ilkyardım eğitimi göz önünde bulundurulduğunda, vaka-destekli öğretim yöntemi de sıklıkla kullanılan bir yöntem olarak göze çarpmaktadır. Gerçek kaza ortamında becerilerin uygunmasının imkansızlığı nedeni ile, vaka-destekli öğretim yöntemi özellikle tıp alanında kullanılmakta ve öğrencilere gerçek kaza ortamı ya da hastalıklardan kesitler sunmaktadır (Delpier, 2006; Hamilton, 2005; ERC, 1999).

Amaç

İlkyardım eğitiminin insan yaşamını kurtarmadaki önemi pek çok çalışmada vurgulanmasına rağmen, toplumda düzeyinde sahip olunan ilkyardım bilgi ve becerileri yetersiz düzeydedir. İlkyardım bilgi ve becerilerine sahip kişi sayısını arttırmak için literatürde pek çok öğretim yöntemi önerilmiştir. Ancak, ilkyardım öğretimi konusunda en etkin yöntemin hangisi olduğu hala tartışılmaktadır. Bu yüzden, bu tez çeşitli öğretim yöntemlerinin (geleneksel, vaka-destekli, web-tabanlı) ilkyardım konusunda bilişsel, duyuşsal ve psikomotor davranışların kazanılması ve bu davranışların hatırlanması üzerindeki etkilerini incelemeyi amaçlamıştır.

Yöntem

Çalışmaya katılan 90 kişi (52 bayan, 48 erkek) Ortadoğu Teknik Üniversitesi'nde ilkyardım dersini seçmeli olarak alan 2.nci (n=3), 3.üncü (n=44), ve 4.üncü (n=43) sınıf öğrencilerinden oluşmaktadır. Çalışmanın amacı kapsamında 3 ayrı öğretim yöntemi uygulanmak üzere her biri 30 öğrenci kapasiteli 3 grup ilkyardım dersi seçmeli olarak açılmıştır. Her grupta 30 kişilik öğrenci (her grup eşit sayıda farklı cinsiyette öğrenci içerecek biçimde) listesi oluşturulduktan sonra hangi grubun hangi öğretim yöntemi ile eğitim göreceği rastgele seçme yöntemi kullanılarak seçilmiştir. Gruplar ve öğretim yöntemleri; Grup I - Geleneksel (30 öğrenci), Grup II – Vaka-destekli (30 öğrenci) ve Grup III - Web-tabanlı (30 öğrenci) olarak belirlenmiştir. Geleneksel öğretim yönteminde öğrenciler dersin yaklaşık %70'inde öğretmenin konuştuğu ve öğrencilerin dinlediği yüz yüze öğretim biçimi ile eğitim almışlardır. Geleneksel yöntemde ders içeriği teorik ders anlatımı yanında pratik uygulamalar ile birleştirilerek öğrencilerin ilkyardım bilgi ve becerilerini uygulama ortamı sağlanmıştır. Vaka-destekli öğretim yönteminde öğrenciler çoğunlukla vaka senaryoları ile desteklenmiş eğitim almışlardır. Öğrenciler senaryoların hazırlanmasında ve uygulanmasında bireysel olarak ya da grup dahilinde görev almışlardır. Web-tabanlı ilkyardım grubu ODTÜ Enformatik Enstitüsü tarafından hazırlanan ve çeşitli sertifika ve derecelendirme programları, ve dersler hazırlayıp sunan web-tabanlı bir öğrenme projesi kapsamındaki online ders aracılığı ile eğitim almışlardır. Web-tabanlı ders kapsamında öğretmen ve öğrenci arasında iletişimin etkinliğini arttırmak amacı ile ders notları, dönem müfredatı, ders programı, forum, online sınav, duyurular, tavsiyeler, bağlantılar, iletişim adresleri, ödevler, ve not bildirimi ile ilgili araçlar öğrencilere ve öğretmenlere sağlanmıştır. Buna ek olarak öğrencilere kalp masajı ve suni solunum konularında uygulama yapabilmeleri amacı ile kardiyopulmonar resustasyon (CPR) mankeni, DVD ve uygulama kitapçığından oluşan CPR seti verilmiştir. Geleneksel, vaka-destekli ve web-tabanlı öğretim yöntemi uygulanan üç grupta da aynı ders içeriği kullanılmıştır.

Çalışmada ilkyardım bilişsel, duyuşsal ve psikomotor davranışların belirlenmesi amacı ile veri toplama araçları olarak "İlkyardım Bilişsel Davranış Testi", "İlkyardım Duyuşsal Davranış Skalası ve Nitel Görüşmeler", ve "İlkyardım Psikomotor Davranış Testleri (temel yaşam desteği beceri simülatörü ve beceri gözlem formu)" kullanılmıştır.

Tüm katılımcılara ilkyardım dersi uygulamasından hemen önce bilişsel, duyuşsal ve psikomotor davranışlarının belirlenmesi amacı ile ön-testler uygulanmıştır. Öntest sonrasında öğrenciler atandıkları öğretim yöntemi ile 12 hafta süre ile ilkyardım eğitimi almışlardır. Eğitim sürecini takiben son-testler uygulanmış ve öğrenciler hatırlama testi öncesinde 18 haftalık bekleme sürecine bırakılmışlardır. On sekiz hafta sonunda öğrenciler üçüncü ve son kez bilişsel, duyuşsal ve psikomotor davranışların hatırlanma düzeyinin belirlenmesi amacı ile test edilmişlerdir.

Bağımsız değişkenlerin (öğretim yöntemleri ve testler) bağımlı değişkenler (ilkyardım bilişsel, duyuşsal ve psikomotor davranışları) üzerindeki etkisini incelemek amacı ile veriler karışık faktöriyel ANOVA kullanılarak analiz edilmiştir.

Bulgular

Bilişsel Davranışlar

Geleneksel, vaka-destekli ve web-tabanlı öğretim yöntemlerinin ilkyardım bilgilerinin kazanılması ve hatırlanması üzerine olan etkisinin araştırılması için karışık faktoriyel ANOVA kullanılmıştır. Analiz sonuçları doğrultusunda elde edilen ortalama ve standart sapma verileri Tablo 14'de gösterilmiştir.

Tablo 14

Öğrencilerin İlkyardım Bilişsel Davranışlarının Ortalama ve Standart Sapma Değerleri

	GRUPLAR	*Ort.*	*SS*	*N*
ÖN-TEST	Geleneksel eğitim	11.66	4.36	29
	Vaka-destekli eğitim	10.47	6.28	30
	Web-tabanlı eğitim	11.38	4.07	29
	Toplam	11.16	4.98	88
SON-TEST	Geleneksel eğitim	43.69	3.79	29
	Vaka-destekli eğitim	43.07	3.77	30
	Web-tabanlı eğitim	41.38	4.62	29
	Toplam	42.72	4.14	88
HATIRLAMA TESTİ	Geleneksel eğitim	38.76	5.58	29
	Vaka-destekli eğitim	34.77	5.46	30
	Web-tabanlı eğitim	33.24	5.13	29
	Toplam	35.58	5.82	88

ANOVA sonuçlarına göre farklı öğretim yöntemlerinin; F(2, 85)=4.61, p<.05, Eta-squared=.10; zamanın; F(2, 85)=1404.13, p<.05, Eta-squared=.94; ve bunlara ek olarak öğretim yöntemleri ve zaman etkileşiminin; F(4, 85)=3.50, p<.05, Eta-squared=.08, öğrencilerin ilkyardım bilgilerinin kazanımında ve hatırlanmasında etkisinin olduğu bulunmuştur (Figure 11).

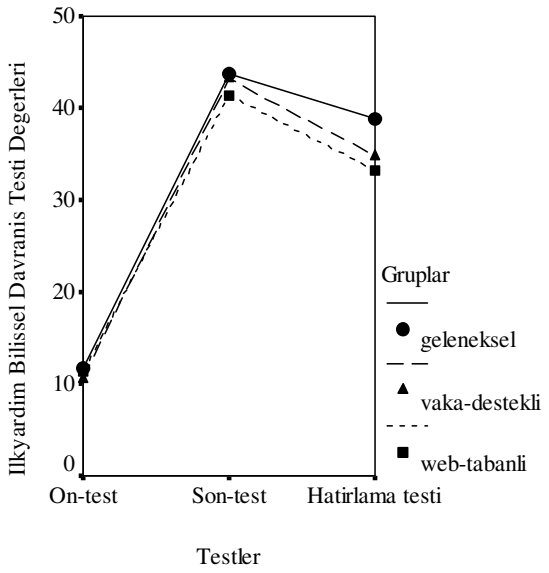


Figure 11. Öğrencilerin ilkyardım bilişsel davranışları

Öğretim yöntemlerinin öğrencilerin ilkyardım bilgi kazanımı üzerindeki etkisinin araştırılması amacı ile temel etki analizi yapılmıştır. Temel etki analizi sonucunda hatırlama testinde gruplar arasında fark olduğunun ortaya çıkmasını takiben tek yönlü varyans analizi uygulanmıştır; $F(2, 432)=8.09$, $p=.001$. Analiz sonuçlarına gore öğretim yöntemlerinin ilkyardım bilgilerinin kazanımı üzerinde bir fark yaratmadığı ortaya çıkmıştır. Her üç öğretim yöntemi ile eğitim alan öğrencilerin benzer oranda ilkyardım bilgilerinde artış gözlenmiştir. Bununla birlikte, tüm öğrencilerin ilkyardım bilgilerini hatırlama düzeyi 18 haftalık zaman aralığına bağlı olarak azalmasına rağmen, geleneksel öğretim yönteminin (M =38.76, SD=5.58) ilkyardım bilgilerinin hatırlanması üzerine vaka-destekli (M =34.77, SD=5.46) ve web-tabanlı (M =33.24, SD=5.14) öğretim yöntemlerine oranla daha etkin olduğu bulunmuştur.

Psikomotor Davranışlar

İlkyardım kapsamındaki tüm konular psikomotor beceri gerektirmektedir. Kaza ya da hastalık anında basit bir burun kanamasından kalp durmasına kadar beceri gerektiren pek çok durum söz konusudur. Bu çalışmada iki farklı ilkyardım becerisi gerektiren acil durum seçilmiştir. Bunlardan bir tanesi; yaralının bilinçsiz olduğu ve solunumunun olmadığı, bir diğeri de yaralının bilinçsiz olduğu ve solunumunun olduğu durumdur. Bilincin ve solunumun olmadığı durumlarda uygulanan ilkyardım becerisi temel yaşam desteği ya da kardiyopulmonar resustasyon (CPR) olarak adlandırılmaktadır. Bilincin yerinde olmadığı ancak solunumun var olduğu durumlarda ise koma pozisyonu önerilmektedir. CPR ve koma pozisyonu ile ilgili analiz sonuçları takip eden bölümlerde açıklanmıştır.

Temel Yaşam Desteği (CPR)

CPR, kalp ve solunum durması halinde yapılan ve kalp masajı ve suni solunum ile birlikte uygulanan yeniden canlandırma işlemidir. İlkyardım psikomotor davranışlarından biri olarak seçilen temel yaşam desteği (CPR) becerisi 2 farklı ölçme yöntemi kullanılarak belirlenmiştir. İlk yöntemde, eğitim amaçlı kullanılan, kalp masajı ve suni solunum becerilerini yazıcıdan raporlayabilen bir simulatör manken

kullanılmıştır. Kalp masajı ve suni solunum verileri ayrı ayrı açıklanmıştır. İkinci yöntemde ise video kayıtları ve gözlem formu kullanılmıştır.

Kalp Masajı Simülatör Verileri

Kalp masajı ve suni solunum çeşitli parametrelerden oluşmaktadır. Bu parametreler ve ilgili parametrelerin ortalama ve standart sapma değerleri Tablo 21'de verilmiştir. Bu değerler doğrultusunda ortalama göğüs basısı oranı, çok derin göğüs basısı sayısı ve dakikadaki ortalama göğüs basısı sayısı üzerinde öğretim yöntemlerinin ve zaman aralığının bir etkisinin olmadığı görülmüştür. Bununla birlikte, ortalama göğüs basısı derinliği, yapılan göğüs basısı doğruluk yüzdesi, göğüs basısı noktasının alt kısmına yapılan masaj sayısı ve uygulanan tamamlanmamış göğüs basısı (ilk göğüs basısı uygulandıktan sonra, ikinci bası için göğüs kafesinin tekrar eski haline dönmesi beklenir) sayısı gruplar arasında farklılık göstermiştir. Zaman aralığının ise doğru uygulanan göğüs basısı yüzdesi ve toplam göğüs basısı sayısı üzerinde etkisinin olduğu bulunmuştur. Öğretim yöntemleri ve zaman aralığının etkileşimi yüzeysel (sığ) göğüs basısı sayısı üzerinde görülmüştür.

Tablo 21

Temel Yaşam Desteği Göğüs Basısı Psikomotor Becerilerinin Ortalama ve Standart Sapma Değerleri

	Geleneksel		Vaka-destekli		Web-tabanlı	
	Posttest (m)	Hatırlama (m)	Posttest (m)	Hatırlama (m)	Posttest (m)	Hatırlama (m)
Ortalama bası sayısı	106.32	105.25	105.83	108.37	94.64	91.29
Ortalama bası derinliği[a]	42.82	43.18	42.47	41.80	31.36	33.14
Dakikada ortalama bası sayısı	63.82	63.11	66.30	62.30	63.00	62.00
Doğru uygulanan bası yüzdesi[a, b]	79.96	67.68	82.70	68.93	18.04	13.71
Derin bası sayısı	5.57	10.68	4.47	5.17	4.68	10.43
Sığ basısı sayısı[c]	11.36	20.82	12.60	26.27	90.61	73.32
Aşağı uygulanan bası sayısı[a]	.04	2.86	.37	2.30	11.93	11.79
Toplam bası sayısı[b]	119.57	120.29	121.70	119.10	122.64	117.25
Yanlış el pozisyonu sayısı[a]	7.68	10.46	2.87	5.03	37.68	47.07
Tamamlanmamış bası sayısı[a]	.04	.00	.93	.33	.14	.04

a: Grup ana etkisi
b: Test ana etkisi
c: Grup – Test etkileşim etkisi

Suni Solunum Simülatör Verileri

Temel yaşam desteğinin bir diğer önemli parçası da suni solunumdur. Etkin bir CPR uygulamasında kalp masajı ve suni solunumun birlikte kesintisiz bir biçimde uygulanması gereklidir. Yine simülatör manken kullanımı doğrultusunda elde edilen nefes verileri analiz edilmiştir ve grupların iki ayrı testte gösterdikleri suni solunum becerileri ortalama ve standart sapma değerleri Tablo 1'de gösterilmiştir. Analiz sonuçlarına göre ortalama nefes sayısı, ortalama nefes volümü, hızlı nefes sayısı, verilen toplam nefes sayısı ve doğru nefes yüzdesinde farklı öğretim yöntemleri uygulanmasından dolayı grup etkisi gözlenmiştir (Tablo 47). Verilen fazla nefes sayısında ise grup ve test etkileşimi bulunmuştur. Özellikle doğru nefes yüzdesi değerleri göz önüne alındığında web-tabanlı eğitim alan gruptaki öğrencilerin, geleneksel ve vaka-destekli eğitim alan gruptaki öğrencilere oranla daha düşük performans gösterdikleri ortaya çıkmıştır.

Tablo 47

Temel Yaşam Desteği Suni Solunum Becerilerinin Ortalama ve Standart Sapma Değerleri

	Geleneksel		Vaka-destekli		Web-tabanlı	
	Posttest *M*	Hatırlama *M*	Posttest *M*	Hatırlama *M*	Posttest *M*	Hatırlama *M*
Ortalama nefes sayısı[a]	3.79	3.82	3.90	3.83	1.64	1.82
Ortalama nefes volümü[a]	1005.00	946.79	1058.33	967.67	486.43	541.43
Dakikadaki nefes volümü[a]	3804.29	3663.93	4087.33	3774.67	1577.14	1809.29
Hızlı nefes sayısı[a]	3.43	3.04	3.30	4.33	1.50	1.79
Yetersiz nefes sayısı	1.36	1.46	.73	.93	1.54	1.21
Fazla nefes sayısı[c]	1.36	3.68	1.70	3.33	1.04	1.74
Toplam nefes sayısı[a]	7.96	8.11	8.07	8.10	3.68	3.96
Doğru nefes yüzdesi[a]	36.07	28.43	38.40	22.90	7.14	9.54

a: Grup ana etkisi
b: Test ana etkisi
c: Grup – Test etkileşim etkisi

Temel Yaşam Desteği Gözlem Formu Verileri

Öğrencilerin, bilinci yerinde olmayan ve nefes almayan yaralılar için kullanılan temel yaşam desteği performansları videoya kayıt edilmiş ve gözlem formu aracılığı ile analiz edilmiştir. Tablo 1'de görüldüğü üzere web-tabanlı eğitim alan öğrenciler, geleneksel ve vaka-destekli eğitim alan öğrencilere oranla daha düşük performans

sergilemişlerdir. Bununla birlikte 18 haftalık sürenin tüm gruplarda öğrencilerin performanslarına olumsuz yönde etki ettikleri bulunmuştur. Farklı öğretim yöntemlerinin etkileri tehlike kontrolü, bilinç kontrolü, hava yolunun açılması, 30 göğüs basısının uygulanması, göğüs basısı esnasında ellerin doğru noktaya yerleştirilmesi, 2 kurtarıcı nefesin verilmesi, her sette hava yolunun etkin bir biçimde açılması ve her 2 nefeslik sette en az bir kez göğüs kafesinin yükseltilmesi becerilerinde anlamlı etkisinin olduğu bulunmuştur. Özellikle 18 haftalık sürenin tehlike kontrolü, havayolunun açılması, her sette hava yolunun etkin bir biçimde açılması, yardım için seslenilmesi ve 112'nin çağırılması konusundaki becerilerinde anlamlı fark yarattığı da ortaya çıkmıştır. Grup ve zamanın etkileşimi ise sadece nefes kontrolü becerisinde etkili olmuştur (Tablo 70).

Tablo 70

Temel Yaşam Desteği Gözlem Formu Ortalama ve Standart Sapma Değerleri

	Geleneksel Yöntem				Vaka-destekli Yöntem				Web-tabanlı Yöntem			
	Son-test		Hatırlama Testi		Son-test		Hatırlama Testi		Son-test		Hatırlama Testi	
*Beceriler	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
1[a, b]	4.31	1.54	2.52	1.96	5.00	.00	3.53	1.96	2.28	1.87	1.83	1.65
2[a]	4.52	1.27	4.66	1.04	4.60	1.22	4.60	1.22	4.38	1.29	3.55	1.78
3[b]	3.90	1.82	1.59	1.40	3.13	2.03	2.17	1.82	3.34	2.00	1.97	1.74
4[a, b]	4.59	1.24	3.28	1.96	4.60	1.22	4.07	1.72	2.41	1.80	1.93	1.62
5[c]	4.59	1.24	4.38	1.21	4.73	1.01	4.63	1.13	4.55	1.18	3.34	1.70
6[b]	3.90	1.82	1.62	1.40	3.13	2.03	2.33	1.92	3.34	2.00	1.97	1.74
7[a]	4.90	.56	4.83	.66	5.00	.00	4.80	.81	3.38	1.68	2.79	1.54
8[a]	5.00	.00	5.00	.00	5.00	.00	4.83	.75	3.93	1.56	3.86	1.51
9[a]	4.76	.91	4.14	1.57	4.73	.91	4.50	1.31	2.28	1.77	2.24	1.70
10[a, b]	4.79	.78	4.00	1.73	4.80	.76	4.57	1.14	2.41	1.82	2.31	1.75
11[a]	4.79	.77	4.17	1.51	4.83	.65	4.37	1.40	2.52	1.81	2.62	1.84
12	5.00	.00	5.00	.00	5.00	.00	4.87	.73	4.86	.74	5.00	.00

*1: Tehlike kontrolü
2: Bilinç Kontrolü
3: Yardım için seslenme
4: Havayolunun açılması
5: Nefes kontrolü
6: 112'nin aranması
7: 30 göğüs basısı uygulaması
8: Her sette ellerin doğru bası noktasına yerleştirilmesi
9: 2 nefes verilmesi
10: Her sette havayolunun açılması
11: Her sette en az bir kez göğüs kafesini yükseltecek biçimde nefes verme
12: CPR uygulaması

Not: a: Grup ana etkisi, b: Test ana etkisi, c: Grup – Test etkileşim etkisi

Koma Pozisyonu Gözlem Formu Verileri

Öğrencilerin, bilinci yerinde olmayan ancak solunumu olan yaralılara uygulanan koma pozisyonu performansları yine videoya kayıt edilmiş ve gözlem formu kullanılarak analiz edilmiştir. Temel yaşam desteğinde olduğu gibi koma pozisyonunda da, yaralının yaşamını acil yardım ekipleri gelene kadar güven altına almak ve daha fazla zarar görmesini engellemek amacı ile uygulanması gereken çeşitli adımlar vardır ve bu adımların ilkyardımcı tarafından etkin bir biçimde uygulanması gereklidir. Aksi takdirde yaralının daha fazla zarar görmesine neden olunabilir. Koma pozisyonu için takip edilmesi gereken adımlar ve bu adımların uygulanması sonucunda elde edilen ortalama ve standart sapma değerleri Tablo 1'de verilmiştir. Öğrencilerin performansları doğrultusunda elde edilen verilerin analiz sonuçlarına göre; gruplar arasında bilinç kontrolü, nefes kontrolü, yaralının bacaklarının, vücudunun ve başının doğru bir biçimde yerleştirilmesi konularında anlamlı fark olduğu ortaya çıkmıştır. Bununla birlikte 18 haftalık zamanın etkisi sadece nefes kontrolünde gözlenmiştir. Grup ve zamanın etkileşimi tehlikenin kontrol edilmesi, yardım için seslenilmesi, hava yolunun açılması, yaralının kollarının doğru yerleştirilmesi ve 112 acil yardım ekiplerinin çağırılması konularında ortaya çıkmıştır. Genel olarak bulgular 18 haftalık zaman aralığının, koma pozisyonu becerilerinin hatırlanması üzerine olumsuz etkisini göstermiştir. Aynı zamanda geleneksel ve vaka-destekli öğretim yöntemleri ile eğitim alan öğrencilerin performanslarının, web-tabanlı eğitim alan öğrencilere oranla; tehlikenin kontrol edilmesi, bilincin kontrol edilmesi, yardım için seslenme, havayolunun açılması, nefesin kontrol edilmesi, yaralının kollarının, bacaklarının, vücudunun ve başının koma pozisyonuna uygun bir biçimde yerleştirilmesi ve 112 acil yardım ekiplerinin çağırılması konularında daha yüksek olduğu bulunmuştur.

Tablo 103

Koma Pozisyonu Temel Yaşam Desteği Gözlem Formu Ortalama ve Standart Sapma Değerleri

	Geleneksel Yöntem				Vaka-destekli Yöntem				Web-tabanlı Yöntem			
	Son-test		Hatırlama Testi		Son-test		Son-test		Hatırlama Testi		Retention	
*Skills	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***	***M***	***SD***
1[c]	3.48	1.98	2.10	1.82	4.47	1.38	3.27	2.02	1.69	1.54	1.97	1.74
2[a]	5.00	.00	4.86	.74	5.00	.00	4.97	.18	3.86	1.77	3.55	1.84
3[c]	4.17	1.65	1.28	1.03	5.00	.00	1.40	1.22	1.69	1.54	1.83	1.65
4[c]	3.69	1.85	3.07	2.03	4.90	.55	3.27	2.02	2.10	1.82	1.97	1.74
5[a, b]	4.76	.91	4.52	1.06	5.00	.00	4.53	1.25	4.00	1.67	3.17	1.89
6[c]	4.31	1.39	4.21	1.42	4.90	.55	4.17	1.44	3.48	1.74	2.07	1.46
7[a]	4.31	1.42	4.59	1.09	4.90	.55	4.87	.57	2.97	1.90	2.66	1.70
8[a]	4.28	1.49	4.55	1.18	4.90	.55	4.80	.81	2.28	1.75	2.03	1.52
9[a]	3.90	1.82	3.76	1.79	4.90	.55	4.50	1.31	1.41	1.24	1.97	1.64
10[a]	4.31	1.54	1.28	1.03	5.00	.00	1.80	1.63	1.97	1.74	1.83	1.65

*1: Tehlike kontrolü
2: Bilinç Kontrolü
3: Yardım için seslenme
4: Havayolunun açılması
5: Nefes kontrolü
6: Yaralının kollarının yerleştirilmesi
7: Yaralının bacaklarının yerleştirilmesi
8: Yaralının vücudunun yerleştirilmesi
9: Yaralının başının yerleştirilmesi
10: 112'nin aranması

Not: a: Grup ana etkisi, b: Test ana etkisi, c: Grup – Test etkileşim etkisi

Duyuşsal Davranışlar

İlkyardım Duyuşsal Davranış Skalası Verileri

Duyuşsal davranışların ölçülmesinde kullanılan "ilkyardım duyuşsal davranış skalası" yapılan faktör analizi sonuçlarına göre beş ana parametrede toplanmıştır. Bu parametreler; yaralının özellikleri, ilkyardımcının özellikleri, kaza/acil durumun özellikleri, sosyal faktörler ve diğer faktörlerdir. Belirtilen parametrelerle ilgili ortalama ve standart sapma değerleri Tablo 1'de verilmiştir.

Tablo 103

Koma Pozisyonu Temel Yaşam Desteği Gözlem Formu Ortalama ve Standart Sapma Değerleri

	Geleneksel Eğitim					
	Ön test		***Son test***		***Hatırlama testi***	
*Beceriler	***Ort.***	***SS***	***Ort.***	***SS***	***Ort.***	***SS***
Yaralının özellikleri[b]	2.89	0.51	2.83	0.44	2.84	0.47
İlkyardımcının özellikleri[b]	2.79	0.34	2.67	0.40	2.67	0.33
Kaza/acil durumun özellikleri[c]	2.99	0.72	3.15	0.45	2.87	0.47
Sosyal faktörler	2.73	.43	2.58	.39	2.69	.41
Diğer faktörler[c]	2.92	.40	2.95	.48	2.82	.45
	Vaka-destekli Eğitim					
	Ön test		***Son test***		***Hatırlama testi***	
* Beceriler	***Ort.***	***SS***	***Ort.***	***SS***	***Ort.***	***SS***
Yaralının özellikleri[b]	2.93	0.76	2.69	0.61	2.78	0.57
İlkyardımcının özellikleri[b]	2.82	0.32	2.47	0.54	2.61	0.45
Kaza/acil durumun özellikleri[c]	3.18	0.53	3.11	0.51	2.95	0.55
Sosyal faktörler	2.65	.52	2.70	.52	2.71	.40
Diğer faktörler[c]	3.07	.37	2.74	.49	2.81	.38
	Web-tabanlı Eğitim					
	Ön test		***Son test***		***Hatırlama testi***	
* Beceriler	***Ort.***	***SS***	***Ort.***	***SS***	***Ort.***	***SS***
Yaralının özellikleri[b]	2.93	0.26	2.73	0.57	2.88	0.36
İlkyardımcının özellikleri[b]	2.82	0.43	2.46	0.53	2.87	0.36
Kaza/acil durumun özellikleri[c]	2.72	0.39	3.14	0.47	3.31	0.38
Sosyal faktörler	2.77	.23	2.65	.48	2.67	.47
Diğer faktörler[c]	3.02	.54	2.80	.54	3.26	.35

Not: a: Grup ana etkisi, b: Test ana etkisi, c: Grup – Test etkileşim etkisi

Tablo 1'de verilen bulgular doğrultusunda yapılan analiz sonuçlarına göre, yaralının özellikleri ve ilkyardımcının özelliklerinin, tüm öğrencilerin ilkyardım duyuşsal davranışları üzerinde etkisinin olduğu ortaya çıkmıştır. Yaralının özellikleri cinsiyet, yaş, dış görüntü, ilkyardımcıya yakınlık derecesi konularını; ilkyardımcının özellikleri ise cinsiyet, konu ile ilgili bilgi sahibi olunması ve konu ile ilgili deneyim

konularını kapsamıştır. Bununla birlikte öğretim yöntemlerinin etkisi, kaza/acil durumun özellikleri ve diğer faktörler üzerinde etkili olmuştur. Sosyal faktörler konusunda zaman ya da öğretim yöntemlerinin herhangi bir etkisi gözlemlenmemiştir. Genel olarak ortalama değerlerine bakıldığında öğrencilerin skalada belirtilen faktörlerden duyuşsal davranış açısından etkilenmedikleri görülmektedir.

İlkyardım Duyuşsal Davranış Görüşme Verileri[3]

İlkyardım duyuşsal davranışlar konusunda toplanan nitel verileri desteklemesi açısından nitel araştırma yöntemlerinden "görüşme" kullanılmıştır. Görüşme soruları nitel verilerin toplanması amacı ile oluşturulan "ilkyardım duyuşsal davranış skalası" dahilindeki konulara paralel olarak hazırlanmıştır. Görüşmeler ilkyardım eğitimi öncesi ve sonrası olmak üzere toplam 36 öğrenci ile iki kez yapılmıştır.

İlkyardım duyuşsal davranışlarını etkilemesi muhtemel faktörlerden biri olan "yaralının özellikleri" ile ilgili sorulan sorulara öğrencilerden bir kısmı (geleneksel= %50, vaka-destekli= %92, web-tabanlı= %25) kaza anında yaralının yaş, cinsiyet, dış görüntü gibi özelliklerinin yardım etme davranışına bir etkisinin olmayacağını belirtmişlerdir:

> "yok, hiç bir etken etkilemez yani, belki eskiden vardı ama eskiden belki de bizim yasadığımız şeyler itibariyle şey yapıyorsunuz, biraz daha bayandan uzak duruyorsunuz, erkeğin belirli yerlerinden uzak durması gibi münazaralar içine girebiliyor insan ama artik öyle değil, hakikaten isin içerisine biraz insan hayati girince o faktörler biraz daha böyle baskın olunca düşünmüyorsunuz bu tip şeyleri" (G1-S3). "yaralının özellikleri etkilemez, yani neticede bir insanin hayati söz konusu, insanin özelliği önemli değil ki" (G2-S4). "yaralının özellikleri etkilemez açıkçası pek fazla, insan insandır sonuçta" (G3-S11).

Bununla birlikte bazı öğrenciler (%53) yaralının cinsiyetinin ilkyardım uygulayacak kişi üzerinde olumsuz etkileri olabileceğini ve özellikle karşı cinsten yaralılara müdahale etmekten kaçınabileceğini vurgulamışlardır:

[3] G: Grup numarası (G1: Geleneksel, G2: Vaka-destekli, G3: Web-tabanlı)
S: Öğrenci numarası

> "ya etkilemez desem yalan olur, etkiler, yani erkek olması en öncelikle, yani hani suni teneffüs yapmak zorunda kalacaksın, o zaman belki çekimser kalabilirim o durumda, sebebi hani temasa geçmek belki de karsı cinsten birisiyle, ama tabii ki hayat meselesi var ortada, "yani yaralının yası etkilemez de, cinsiyet etkileyebilir, simdi şey de var hani yani, bizim yapımızda mı diyeyim, yani halk arasında, yani karsı cinsten olması muhakkak etkiler, tabi etrafta birileri olup olmamasına bağlı bu" (G3-S5).

Yaralıların diğer özellikleri ile ilgili konularda da çeşitli öğrenciler farklı yorumlar yapmışlardır. Örneğin bazı öğrenciler (web-tabanlı= %8) kaza ortamındaki diğer kişilerden gelebilecek olumsuz tepkilerin de ilkyardım yapacak kişinin davranışına etki edebileceğini belirtmişlerdir. Yine yaralının yaşı ile ilgili olarak da bazı öğrenciler (geleneksel= %17, vaka-destekli= %8) yaralının bebek ya da çocuk olmasının, daha fazla zarar verme kaygısı ile olumsuz etki yaratabileceğini vurgulamışlardır:

> "etraftakilere bağlı, hani kalabalık içinde karsı cinsten birine müdahale etmek biraz daha zor, yani en azından nefes alıp almadığını yoklaması var, solunum, yani suni teneffüsü var, bunlar biraz etkiler tabi, ama şey var mesela, yaşı orda önemli iste, yaşı yüksekse diyeyim ya da küçükse sorun değil, ama diğer turlu iste, yaşıtsak o biraz etkili olabiliyor, galiba kültürden kaynaklı bir şey" (G3-S5). "bebek olursa daha çok yardım etmek isterim, bebekler daha masum geliyor ya böyle, daha çok acyosun onlara, ölmesinler o yüzden" (G1-S2). "çocuk veya bebekler biraz daha ürkütür açıkçası zarar verme korkusuyla" (G2-S5) "yaralının çocuk olması beni en çok etkileyen şey" (G1-S9).

İlkyardımcının özelliklerinin ilkyardım duyuşsal davranışlar üzerinde etkisinin olup olmayacağı ile ilgili sorulara, öğrencilerin bir kısmı (geleneksel= %67, vaka-destekli= %57, web-tabanlı= %25) bir etkisinin olmayacağı yönünde cevaplar vermişlerdir. Geleneksel öğretim yöntemi ile eğitim alan öğrencilerden bir kaçı (%8) ise ilkyardımcının bilgi seviyesinin daha etkili bir faktör olacağını belirtmişlerdir. Yaralının özellikleri ile ilgili sorularda olduğu gibi, ilkyardımcıların da karşı cinsten olmasının ilkyardım yapacak kişiyi olumsuz yönde etkileyeceği vurgulanmıştır (geleneksel= %33, vaka-destekli= %8, web-tabanlı= %33).

Kazanın özellikleri ile ilgili sorulara öğrenciler değişik cevaplar vermişlerdir. Örneğin bir kızım öğrenci (geleneksel= %75, vaka-destekli= %33, web-b= %33)

ortamda kan ya da kusmuk gibi vücut sıvılarının olmasının ilkyardım yapacak kişinin duyuşsal davranışlarını etkilemeyeceğini söylerken, bazı öğrencileri (geleneksel= %25, vaka-destekli= %57) etkilenmeleri kaçınılmaz olmasına rağmen yardım edeceklerini belirtmişler ve bir diğer kısım öğrenci de (web-tabanlı= %42) kan ve kusmuktan olumsuz yönde etkileneceklerini ve yaralıya müdahale etmeyeceklerini vurgulamışlardır:

> "gerekli tedbiri aldıktan sonra zaten onu düşünmemek lazım, iste gerekli hijyen malzemelerini siz üzerinizde barındırırsanız bunların hiçbirine gerek kalmaz zaten, olduktan sonra da zaten bir şekilde mutlaka mecburen müdahale etmek zorundasınız, çünkü ilkyardımın temel şeyi de o herhalde, etkilememesi lazım" (G1-S3). "hayır, etkilemez, yani temas etmediğim surece, kendimi önce korumalıyım tabii ki, önlem almalıyım eldivenle bir şeyle, temas etmemem gerekiyor vücut sıvılarına, bir şekilde önlem aldıktan sonra müdahale ederim ama önce kendi güvenliğim" (G2-S9). "ilk basta olumsuz etkilese de temizleyip ondan sonra mudahale ederim" (G3-S3).

Öğrenciler tarafından ilkyardım duyuşsal davranışlarını etkileyen en önemli faktörler vicdan (geleneksel= %33, vaka-destekli= %33, web-tabanlı= %17), empati (vaka-destekli= %17, web-tabanlı= %8) ve dini duygular (geleneksel= %8) şeklinde sıralanmıştır:

> "söyle oldu simdi, hani önceden bilmiyordum, en azından öyle bir kaza ortamı olduğunda ya ben bilmiyorum zaten deyip kendimi rahatlatabilirdim hani, artık biliyorum, bildiğim için kenara çekilirsem vicdanim rahat etmez artik" (G1-S1). "yani böyle bir kaza durumuyla karsılaşsam kafamı çevirip de kesinlikle gidemem çünkü bir şey biliyorsunuz ve bilmek de size bir sorumluluk yüklüyor doğal olarak, yani mutlaka yardım ederim, biraz vicdani bunun sebebi, bir şeyleri biliyorsunuz, bir insanin yardıma ihtiyacı var ve donup gidemezsiniz yani, vicdanini sizi rahat ettirmez" (G2-S3). "yani sorumluluk duygum kesinlikle arttı, zaten normalde de sorumlu hissederim öyle bir durumda, simdi bilgim varken daha sorumluluk sahibi hissederim, bilgim varken bir şey yapmamak çok daha saçma olur" (G3-S9). "ya simdi online alıyoruz dersi, benim aldığım gibi mesela, ya sorumluluk derken, olaylara yaklaşım olarak sorumluluk biraz zor oluyor tabii ki, fazla örnekleri görmeyince, ya da nasıl davranacağını, sadece teorik şeyleri öğrenip onları uygulamayı ne kadar biliyoruz, yani sorumluluk pek olmadı diyeyim" (G3-S3).

Öğrencilerin bir kısmı (geleneksel= %67, vaka-destekli= %50, web-tabanlı= %17) kaza ortamında başkalarının olup olmamasının, ilkyardım duyuşsal davranışları üzerinde bir etkisinin olmayacağını belirtirken, bir kısmı (geleneksel= %42, vaka-

destekli= %17, web-tabanlı= %8) çevrede başkalarının olmasının yardımlaşmayı kolaylaştırması açısından olumlu etkisi olacağını vurgulamış, bir kısmı da sorumluluk hissini azaltacağı için olumsuz etkisinin olacağını söylemiştir (vaka-destekli= %33, web-tabanlı= %67):

> "yani bilgim olduğu için, neyin nasıl yapılacağını bildiğim için cevrede başkalarının olup olmaması etkilemez diyeceğim ama yaralının taşınması gibi konularda daha faydalı olur birilerinin olması" (G1-S2). "cevrede başkalarının olması hiç etkilemez, eğer onlar çok basına toplanıp, her kafadan bir ses çıkması gibi durumlarda hani biraz kotu etkileyebilir, onun dışında tam tersine, ben uygulama yaparken ona 112'yi aratmak gibi konularda insanlar olması daha iyi gibi" (G2-S7). "cevrede başkalarının olup olmaması yardım edip etmememi pek etkilemez, han elimden geldiğince yardım etmeye çalışırım ama birden çok insan etraftan müdahale etmeye kalkarsa belki biraz bocalayabilirim. Onun dışında etrafta insan olup olmaması etkilemez" (G3-S11). "daha çok kişinin olması sorumluluk duygumu azaltır, benden daha iyi bildiğini iddia eden kişinin olması benim sorumluluk duygumu azaltır, bunun yanında hiç kimse yoksa tamamen sorumlu olurum maksimum düzeyde" (G3-S7).

Öğrenciler, diğer faktörler kapsamındaki bir diğer faktör olan "risk alma olasılığı"nın öğrenciler tarafından ilkyardım duyuşsal davranışları üzerinde bir etki yaratmayacağını belirtmişlerdir (geleneksel= 83%, vaka-destekli= 75%, web-tabanlı= 50%). Ancak bazı öğrenciler (geleneksel= 17%, vaka-destekli= 25%, web-tabanlı= 8%), risk olasılığının olumsuz etki yaratacağını belirtmişler ve buna rağmen olaya müdahale edeceklerini de eklemişlerdir. Bununla birlikte, öğrencilerden bir kısmı da (web-tabanlı= %42) risk alma olasılığının olumsuz etki yaratacağını ve olaya müdahale etmeyeceklerini vurgulamışlardır:

> "risk alıp almama konusunda düşünmem çünkü eskiden olsaydı düşünürdüm risk konusunda, yanlış bir şey mi yapıyorum diye ama simdi en azından bir şeyler bildiğim için, yani o kişiye hiç kimsenin yardım etmemesindense risk almanın gerekli olduğunu düşünüyorum" (G1-S5). "ya belki zaten o müdahaleyi yapmasam o insan ölecek, daha kotu ne olabilir, olum var sonuçta" (G2-S12) "risk konusunu sadece cevre güvenliği acısından düşünebilirim, onun dışında kim beni suçlayabilir ki bir insan yardım etmeye çalışmamdan ötürü, ya da ne olabilir?" (G3-S7). "yani risk açısından düşünebilirim, o yine duruma bağlı, hani çok ciddiyse yardım etmek isterim, yani giderim yanına en fazla ilk orda yapabileceğim şey olur herhalde, yardım çağırmak olabilir, müdahale etmem" (G3-S1) "biraz düşünürüm, sonuçta ilkyardım bilgi olarak var biraz ama dediğim gibi uygulamada pek fazla bir şey yok, CPR yaparken gayet tereddütte oluyorum, acaba doğru mu yapıyorum, yanlış mı yapıyorum, karşımdakine zarar verir miyim diye tereddüt ederim tabi" (G3-S11).

Tartışma ve Sonuç

Bilişsel Davranışlar

İlkyardım bilişsel davranışları açısından bakıldığında, geleneksel, vaka-destekli ve web-tabanlı öğretim yöntemlerinin bilişsel kazanımlar üzerinde olumlu etkileri olduğu bulunmuştur. Ortaya çıkan bulgular literatürde pek çok çalışma ile desteklenmiştir. Örneğin; web-tabanlı öğretim yönteminin, öğrencilerin temel yaşam desteği öğrenimi üzerindeki etkilerinin kontrol grubu ile karşılaştırılarak incelendiği bir çalışmada, öğrencilerin teorik bilgi kazanımı üzerinde olumlu etkisi olduğu ortaya çıkmıştır (Teague & Riley, 2006). Fabius, Grissom ve Fuentes (1994) de bilgisayar destekli öğretim yöntemi ve geleneksel yöntemi karşılaştırmışlar ve temel yaşam desteği bilgisinin arttırılmasında iki yöntem arasında fark bulamamışlardır. Benzer biçimde, Todd ve arkadaşları da (1999) video ile kendi kendine öğrenme yöntemi ve geleneksel öğretim yöntemini karşılaştırarak yaptıkları çalışmada, her iki yöntemin de öğrencilerin temel yaşam desteği bilgisi kazanımı üzerinde olumlu etkisi olduğunu saptamışlardır.

Vaka-destekli öğretim yönteminin önemli bir parçasını oluşturan simülasyonlar da eğitim alanında oldukça popüler yöntemler olarak göze çarpmaktadır (Brendel, Best, With & Vries, 2008; Kuznar, 2007). Simülasyonlar, ilkyardım ve temel yaşam desteği eğitimi alanında da kullanılmaktadır. Yapılan bir çalışmada geleneksel yöntem ve aktör aracılığı ile vaka canlandırma yöntemi kullanılmış ve her iki yöntemin de bilgi düzeyini arttırmada benzer oranda etkili olduklar ortaya çıkmıştır (Miotto, Couto, Collart, Amaral, & Moreira, 2007).

Çalışmada her üç öğretim yöntemi ile eğitim alan öğrencilerin ilkyardım bilişsel düzeyleri 18 haftalık zaman aralığı sonucunda anlamlı olarak azalmıştır. Bilgilerin kazanılması ve zamana bağlı olarak azalması literatürde pek çok araştırma tarafından desteklenmektir (Azcona, Gutierrez, Fernandez, Natera, Speare, & Ali, 2002; O'Donnell & Skinner, 1993; Su, Schmidt, Mann, & Zechnich, 2000).

Geleneksel yöntemle eğitim alan öğrencilerin ilkyardım bilişsel düzeyleri 18 haftalık zaman aralığından sonra uygulanan hatırlama testinde, vaka-destekli ve web-tabanlı öğretim yöntemleri iler eğitim alan öğrencilere oranla anlamlı bir biçimde yüksek bulunmuştur. Bu farkın ilkyardım bilişsel düzeyin belirlenmesi için hazırlanan geleneksel değerlendirme yönteminin kullanılmasından kaynaklandığı düşünülmektedir.

Özet olarak, ilkyardım bilişsel davranışlarına etkisinin belirlenmesi amacı ile seçilen geleneksel, vaka-destekli ve web-tabanlı öğretim yöntemlerinin, bilişsel davranışların gelişimine benzer düzeyde etkisinin olduğu ortaya çıkmıştır. Bununla birlikte hatırlama düzeyinin belirlenmesi amacı ile verilen 18 haftalık zaman aralığının da bilişsel davranışlar üzerine olumsuz etkisi her üç öğretim yöntemi ile eğitim alan öğrenciler üzerinde görülmüştür. Geleneksel, vaka-destekli ve web-tabanlı öğretim yöntemleri ilkyardım bilişsel davranışlarının geliştirilmesinde etkin yöntemler olarak önerilmiştir.

Psikomotor Davranışlar

İlkyardım psikomotor davranışların belirlenmesi amacı ile 2 farklı beceri seçilmiş (CPR ve koma pozisyonu)ve bu davranışların belirlenmesi amacı ile 2 ayrı yöntem kullanılmıştır. Bunlardan bir tanesi olan simülatör manken aracılığı ile toplanan kalp masajı verileri analiz sonuçlarına göre, öğretim yöntemleri ve 18 haftalık zaman aralığının ortalama kalp masajı oranı, dakikadaki ortalama kalp masajı sayısı, derin kalp masajı ve sığ kalp masajı üzerinde bir etkisi olmadığı ortaya çıkmış; buna ek olarak, öğretim yöntemlerinin doğru kalp masajı yüzdesi, ortalama kalp masajı derinliği, sığ kalp masajı sayısı, kalp masajı esnasında ellerin alçak pozisyonda yerleştirilmesi, ellerin yanlış yerleştirilmesi, tamamlanmamış kalp masajı sayısı üzerinde etkisinin olduğu bulunmuş; son olarak da 18 haftalık zaman aralığının, doğru kalp masajı yüzdesi, toplam kalp masajı sayısı üzerinde etkisi olduğu ortaya çıkmıştır.

Temel yaşam desteği kapsamındaki kalp masajı parametrelerinde ortaya çıkan veriler, özellikle web-tabanlı öğretim yöntemi ile eğitim alan gruptaki öğrencilerin performanslarının, geleneksel ve vaka-destekli yöntemlerle eğitim alan gruptaki öğrencilere göre daha düşük olduğunu açık bir biçimde göstermektedir. Özellikle web-tabanlı eğitim alan öğrencilerin doğru uyguladıkları kalp masajı ve suni solunum yüzdeleri; bununla birlikte etkin uyguladıkları suni solunum sayısı ve kalp masajı sayısı konularındaki performansları, geleneksel ve vaka-destekli eğitim alan öğrencilerin performansları ile karşılaştırıldığında oldukça düşük bulunmuştur. Elde edilen verilen aynı zamanda Avrupa Resustasyon Birliği ve Sağlık Bakanlığı tarafından önerilerin değerlerin de oldukça altında bulunmuştur. Bu veriler doğrultusunda web-tabanlı eğitim alan öğrencilerin ilkyardım gerektiren durumlarda sahip oldukları becerileri uygulamaları yaralıların daha fazla zarar görmesine neden olabilecektir. 18 haftalık zaman aralığının olumsuz etkileri de yine her üç gruptaki öğrencilerin performans verilerinden açıkça gözlemlenmiştir. Temel yaşam desteğine ek olarak seçilen bir başka psikomotor beceri olan koma pozisyonunda da web-tabanlı öğretim yöntemi ile eğitim alan gruptaki öğrencilerin, geleneksel ve vaka-destekli gruptaki öğrencilere oranla daha düşük performans sergiledikleri bulunmuştur. Temel yaşam desteğinde olduğu gibi, yaralılara koma pozisyonu verilirken uygun yöntemler kullanılmaması, yaralıların durumlarının kötüye gitmesine, belki de yaşamlarının kaybedilmesine neden olabilmektedir.

Yapılan çalışmada web-tabanlı öğretim yönteminin, bilişsel davranışların geliştirilmesi açısından etkin bir yöntem olarak bulunmasına rağmen, psikomotor davranışların kazanımı ve hatırlanması açısından tek başına uygun bir yöntem olmadığı net bir biçimde açığa çıkmıştır. Ancak, literatürde pek çok çalışmada kendi kendine öğrenme yönteminin etkin olduğu vurgulanmıştır (Batcheller et al., 2000; Braslow et al., 1997; Todd et al., 1998; Lynch, Einspruch, Nichol, Becker, Aufderheide, & Idris, 2005). Bu araştırmalarda, kendi kendine öğrenme yöntemi pek çok kişiye ulaşılmasını sağlayan, basit, ucuz ve hızlı olması açısında özellikle temel yaşam desteği becerilerinin kazandırılmasında etki bir yöntem olarak önerilmiştir.

Bazı araştırmalarda, kendi kendine öğrenme yönteminin, geleneksel öğretim yöntemi de dahil olmak üzere, diğer öğretim yöntemleri ile benzer oranda becerileri arttırdığı bulunmuştur (Isbye, Rasmussen, Lippert, Rudolph, and Ringsted, 2006; Roppolo et al., 2007). Bununla birlikte, web-tabanlı öğretim yöntemi ile karşılaştırıldığında, geleneksel öğretim yönteminin daha etkin bulunduğu araştırmalar da bulunmaktadır. Örneğin; Teague ve Riley (2006) online eğitimin bilişsel anlamda kazanımlar için uygun olduğunu ancak psikomotor becerilerin kazanımında etkin olmadığını bulmuştur. Benzer biçimde Messmer, Meehan, Gilliam, White, ve Donaldson (1993). Geleneksel yöntemin bebekler için temel yaşam desteği öğretiminde daha etkin olduğunu belirtmişlerdir.

Web-tabanlı eğitimin temel yaşam desteği ve koma pozisyonu becerileri kazanımı üzerindeki olumsuz etkilerinin özellikle motivasyon eksikliğinden kaynaklandığı düşünülmektedir. Sınıf ortamında yapılan eğitim esnasında, özellikle beceri gerektiren kazanımlar söz konusu olduğunda, öğretmenin geribildirimleri ve motive edici davranışlarının olumlu etkilerinin, web-tabanlı eğitimde var olmadığı ve psikomotor davranışların kazanılmasında öğrencilerin özellikle motivasyon ve geribildirim konularında eksikliklerinin olduğu düşünülmektedir.

Duyuşsal Davranışlar

Öğrencilerin duyuşsal davranışlarının belirlenmesi amacı ile 2 ayrı yöntem kullanılmıştır. İlk yöntemde duyuşsal davranışlar "İlkyardım Duyuşsal Davranış Skalası" aracılığı ile belirlenmiştir. İkinci yöntemde öğrencilerle, duyuşsal davranış skalasındaki sorularla paralel olmak kaydı ile nitel görüşmeler yapılmıştır.

İlkyardım duyuşsal davranış skalası sonuçlarına göre yaralının özellikleri, ilkyardımcının özellikleri, kaza/acil durumun özellikleri ve diğer faktörler konularında öğretim yöntemlerinin etkisinin olduğu ve gruplar arasında bir fark yarattığı bulunmasına rağmen, ortalama değerlerin, öğrencilerin acil durumlarda, ilkyardım uygulaması yapmak konusunda dış faktörlerden etkilenmediklerini ortaya koymuştur. Kaza anında, acil yardım ekipleri olay yerine gelene kadar, kaza

mahallindeki kişilerin yaralıya yapacakları uygun ilkyardım müdahaleleri, yaşam kurtarmada önem taşımaktadır. Ancak, kişilerin kaza anında pek çok faktöre bağlı olarak, zaman zaman da olsa yaralılara müdahale ya da yardım etmedikleri bilinmektedir. Bu açıdan bakıldığında, çalışmaya katılan öğrencilerin yaralının özellikleri, ilkyardımcının özellikleri, kazanın özellikleri, sosyal faktörler ve diğer faktörlerden etkilenmedikleri ve yardım gerektiren durumlarda yardım edeceklerini belirtmeleri yardım etme davranışı açısından olumlu bir durum olarak görülmektedir. Ancak, nitel görüşmeler sonucunda elde edilen veriler, öğrencilerin bazı durumları ilkyardım davranışını olumsuz etkileyebilecek faktörler olarak gördüklerini ortaya koymuştur. Genellikle, sosyal normlardan kaynaklı olarak (Aronson, Wilson, & Akert, 2005), öğrencilerin karşı cinse yardım etme konusunda, özellikle kalabalık kaza ortamlarında çekindikleri, hatta yardım etmeme davranışına doğru yönelme eğilimi gösterdikleri ortaya çıkmıştır. Çeşitli kültürlerin farklı toplumsal kuralları (resmi ya da yazılı olarak belirtilmemiş olsa bile) vardır ve bireyler bu kurallara uymakla yükümlüdürler. Uymadıkları takdirde toplumdaki diğer bireylerin olumsuz eleştiri ya da davranışlarına maruz kalacaklarını bildikleri için uymayı tercih ederler. Ancak, sosyal normlar açısından ele alındığında, bir kaza ya da acil durum anında, karşı cinse müdahale ya da yardım etme, özellikle kalp masajı ve suni solunum içeren temel yaşam desteği konusunda, yaralının cinsiyeti ne olursa olsun hayatını tehlikeye sokabilecek ve hatta kaybetmesine yol açabilecek bir durum olarak karşımıza çıkmaktadır. Toplumsal normalara uymak pahasına insan yaşamının yok sayılması büyük bir problem olarak algılanmalı ve özellikle bireylerin bu konuda eğitilmesi sağlanarak gerekli tedbirler alınmalıdır. Stem ve Spence (1986) tarafından yapılan çalışmada cinsiyet ve yardım etme davranışı arasında bir ilişki bulunamamıştır, ancak çalışmada elde edilen bulguların tersine, literatürde özellikle bayan yaralılara erkekler tarafından daha fazla yardım edildiği belirtilmektedir (Eagly & Crowley, 1986). Benzer şekilde Laner, Benin, ve Ventrone (2001) da 700 öğrenci ile yaptıkları çalışmada erkeklerin bayan yaralılara daha çok yardım ettiklerini bulmuşlardır.

Buna ek olarak, kalabalık ortamlarda, özellikle web-tabanlı eğitim alan öğrencilerin, kendilerinden daha iyi bilen birisi olup olmadığından emin olduktan sonra yardım

etme davranışını sergileyecekleri bulunmuştur. Bickman (1971) da kişilerin kalabalık kaza ortamlarında, yardım edecek kimsenin olmadığına kanaat getirdiklerinde yardım etme davranışı sergilediklerini vurgulamıştır.

Pek çok öğrenci tarafından, kalabalık kaza ortamlarının olumsuz etki yaratacağı ve sorumluluk duygusunun azalacağı vurgulanırken; bir kısım öğrencinin de bu durumun yardımlaşma açısından fayda sağlayacağı belirtilmiştir. Her üç öğretim yöntemi ile alınan eğitimin sorumluluk duygusunu arttırdığı açıklanmıştır. Literatürde de kız ve erkek bireylerin kaza ortamındaki insan sayısının fazla olduğu durumlarda yardım etme davranışını daha az sergileyecekleri (Latane & Dabb, 1975; Shotland & Heinold, 1985); ve kişilerin yalnız olduğu durumlarda çok büyük olasılıkla yaralıya yardım edecekleri belirtilmiştir (Latane & Nida, 1981).

Kaza ortamının özellikleri göz önüne alındığında; öğrencilerin bir kısmı kan ve kusmuk gibi vücut sıvılarından olumsuz etkileneceklerini belirtirken, bir diğer kısmı da etkilenmeyeceklerini ve bu sıvıların gerekli hijyen tedbirlerinin alınmasında önemli rol oynayacağını belirtmişlerdir. Literatürde ise özellikle temel yaşam desteğinde suni solunum söz konusu olduğunda kişilerin özellikle yabancılara nefes vermekten kaçınacakları ortaya çıkmıştır (Taniguchi, Omi, & Ineba, 2007; Axelsson et al., 2000; Brenner et al., 1996; Horowitz, & Matheny, 1997).

İlkyardım duyuşsal davranışlarının belirlenerek, kişilerin ilkyardım gerektiren durumlarda müdahale etmesini engelleyecek olası faktörlerin ortaya çıkarılması ve gerekli tedbirlerin alınması büyük önem taşımaktadır. Bu çalışma ışığında belirlenen faktörlerin ilkyardım eğitim programları hazırlanırken göz önünde bulundurulması, bireylerin yardım etme davranışı kazanmaları ve daha fazla insan yaşamının kurtarılması açısından fayda sağlanmış olacaktır.

APPENDIX N

CURRICULUM VITAE

Leyla Saraç

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Educational Background

Ph.D.	**2004-2008**	**Middle East Technical University**
		Faculty of Education
		Educational Sciences Department
		Curriculum and Instruction
M.S.	**2000-2003**	**Middle East Technical University**
		Faculty of Education
		Physical Education and Sports Department
		Curriculum Development in PE
B.S.	**1995-2000**	**Middle East Technical University**
		Faculty of Education
		Physical Education and Sports Department

Work Experience

2000-2007	**Research Assisstant** **Physical Education and Sports Department**

National Publications

Hurmeric, I., **Saraç, L.**, Kocak, S. (2006). Student's preferences regarding coed versus non-coed physical education classes. Education and Science, 31(140), 75-80.

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