

**REACTION LEVEL EVALUATION OF
DISTANCE EDUCATION PROGRAMS
IN BRANCH SCHOOLS OF TURKISH ARMY**

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of
Bilkent University**

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ABSTRACT

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Advancements in information and computer technology have radically transformed the education and training. The use of technology in education is increasing rapidly. Technology-assisted education have changed the distance education or e-learning methods in such a way that beyond the limits of imagination, ten years ago. However, usefulness of these technologies should be questioned.

The purpose of this thesis is to evaluate the effectiveness of distance education (especially e-learning) programs in Turkish Army according to the reactions of the coursiers and to determine the answer of the question: Is the distance education system implemented successfully in the army? As the method, we used the reaction level of the Kirkpatrick's evaluation model that is the most commonly known method to evaluate training. The first question that we should ask trainees is "How do you feel about the distance education?" We measure

the trainees' feelings and satisfaction with the distance education program by conducting a questionnaire to the coursiers of two courses, which were partially offered via distance education. After making the quantitative analysis and qualitative analysis of data we conclude that the implementation of distance education programs have some problems. To overcome these problems we put forth some suggestions about motivation of trainees, study time, content, etc.

Keywords: Training Evaluation, Distance Education, E-learning, Kirkpatrick`s Evaluation Model.

ÖZET

TÜRK KARA KUVVETLERİ SINIF OKULLARINDA UYGULANAN UZAKTAN EĞİTİMİN ETKİNLİĞİNİN REAKSİYON SEVİYESİNDE DEĞERLENDİRİLMESİ

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Bilişim ve bilgisayar teknolojisindeki gelişmeler eğitim ve öğretimi radikal bir şekilde değişime uğratmıştır. Eğitimde teknoloji kullanımı hızlı bir şekilde artmaktadır. Teknoloji yardımlı eğitim, uzaktan eğitim veya elektronik öğrenme metodlarını 10 yıl önce hayal bile edilemeyecek şekilde değiştirmiştir. Fakat, bu teknolojilerin kullanılışılığı tartışılmalıdır.

Bu tezin amacı, Türk Kara Kuvvetleri'nde uygulanmakta olan uzaktan eğitim programlarını kursiyerlerin reaksiyonlarına dayanarak değerlendirmek ve uzaktan eğitimin başarılı bir şekilde uygulanıp uygulanmadığını araştırmaktadır. Method olarak, eğitim değerlendirmesinde en fazla tanınan metodlardan Kirkpatrick'in değerlendirme modelinin reaksiyon seviyesini kullanıldı. Buna göre, kursiyerlere sorulması gereken ilk soru "Uzaktan eğitim hakkında ne düşünüyorsunuz?" olmalıdır. Bir kısmı uzaktan eğitim metoduyla verilen kurslara katılan kursiyerlere anket uygulanarak uzaktan eğitimden

memnuniyetleri ölçüldü. Toplanan verilerin analizinden çıkan sonuç uzaktan eğitim programlarının uygulanışında bazı problemlerin olduğudur. Bu problemlerin üstesinden gelebilmek için de kursiyerlerin motivasyonu, çalışma süreleri ve kurs içeriği hakkında bazı önerilerde bulunuldu.

Anahtar Kelimeler: Eğitim Değerlendirmesi, Uzaktan Eğitim, Elektronik Öğrenme, Kirkpatrick'in Değerlendirme Modeli.

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CHAPTER 1

INTRODUCTION

Thanks to great developments in communication and information technologies, managers are heavily equipped with suitable management tools to fight against problems in their businesses. Advancements in computer technology have enabled organizations to take advantage of the information explosion. P. Nick Blanchard et al. (2000) say that “To be competitive, Canadian organizations need to have leading edge on technology.” This is true for all organizations, especially for that in developing countries like Turkey.

In a world of rapid technological innovation, Human Resources (HR) managers must take advantage of the high-level information technology (IT). Implementing information technologies in business functions effectively can have a direct impact on competitiveness and cost reduction as well as improved and effective HR capital. Managers must adjust to the latest developments in information technologies or face the risk of losing the competition.

Information technology has radically transformed the education and training. Managers need to know if they are using training effectively. “The skills of the

work force are going to be the key competitive weapon in the twenty-first century” says Lester Thurow (Ross, 1999: 136).

Education in the future will be very different from today. In a paper, presented in the “Conference of Education in the light of Information Technologies,” David and Derya Davenport (2001) mention about a number of radical learning alternatives for the education system in the future, such as “no grades, no classes, no teachers, no school, no classrooms and no students”. Distance education may be an introduction to the system like that Davenports mentioned.

The concept and application of distance education has been around for over two hundred years (Duvall & Schwartz, 2000). Today the use of technology to improve the education process, known as technology-assisted education, is very common and essential. Personal computers and printers, fax machines, telephones, voice and electronic mail, and the Internet are increasingly used in education. Advances in technology-assisted education offer different methods that were beyond the limits of imagination ten years ago.

The use of technology in the classroom is increasing rapidly. Current educational systems expose learners to a large variety of technologies. However, usefulness of these technologies should be questioned.

By using technology, suppliers of education have many opportunities. One of these opportunities is distance education. Distance education is not a new

concept. It can be defined as a structured or programmed education process operating without the physical presence of an instructor.

Distance education represents a way of communication with geographically dispersed individuals and groups. It involves separation of the teacher and the learners in space and often time. The terms 'distance education' and 'distance learning' are often used interchangeably.

According to the 2001 American Society for Training and Development International Conference & Exposition in Orlando, USA, training needs to be "just-in-time, just-for-you." It must be tied to the organization's needs at a particular time. Employees must direct the learning. One solution for organizations to achieve all those goals is e-learning (Fox, 2001).

E-learning is the delivery of learning content via electronic media; including one or more of the following media: the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM.

Every concept is transferred to electronic means, such as e-mail, e-business, e-commerce, e-government, etc. Learning is also very convenient to be delivered electronically.

New demands in organizations are increasing the interest in e-learning. The need for less expensive ways to deliver training has led many companies to explore the option of e-learning. The classroom courses are too costly and

time-consuming. E-learning is often less expensive and more convenient than the alternatives. It is an effective way of delivering knowledge.

Like all other functions, the effectiveness of the e-learning is an important issue for managers. HR managers should evaluate its effectiveness to decide whether to continue offering a particular e-learning program and to improve future programs (Kirkpatrick, 1996).

The purpose of this thesis is to evaluate the effectiveness of the distance education (especially e-learning) programs in Turkish Army (Land Forces Command) according to the reactions of the coursiers and to determine the answer of the question: Is the distance education program implemented successfully in the army?

In Turkish Army, education and training is under responsibility of Training and Doctrine Command* (TRADOC). TRADOC sets principles and controls branch schools, such as Infantry School, Artillery and Missile School, Armor School, Signal, Electronics, Information Systems Schools, etc.

Each branch school arranges training programs (courses) for the army's professionals (officers, non-commissioned officers, specialists, civilian officials and workers) from units all over Turkey. Basically, traditional face-to-face education technique is used in these programs. However, distance education applications have begun in 1999 by branch schools.

* An English-Turkish Dictionary for some military terms included in Appendix A.

The army is currently implementing e-learning through sending CD-ROM's to students (coursiers) and working on an Intranet-based distance education system. The CD-ROMs are prepared by a committee consists of military instructors and programmers of the branch school.

The army's some courses that considered some part of them can be given through distance education are divided into two parts: (1) distance education and (2) face-to-face education. In distance education part, course materials are sent to the coursiers six weeks prior the face-to-face education. In the past, these materials were instruction notes and some books. Now, they include CD-ROM's that involve instruction notes. But, books are still being sent to some coursiers who do not have enough computer support. In the middle of the distance education phase (3rd or 4th weeks), coursiers are given an exam by their commanders.

After the distance education part, the coursiers are taken to the face-to-face education. Before entering this phase, they are given an entrance exam by the unit that will supply the face-to-face education. The coursiers' performances at distance education are evaluated with respect to the results of these two exams. Nearly all of the coursiers have been evaluated as successful at the end of these courses. They were also successful when these courses were given with the traditional method.

Our evaluation of distance education will be made according to reaction level of Kirkpatrick's training evaluation model. Therefore, the first question that we should ask trainees who participate in a distance education part of a course

is “How do you feel about the distance education?” In short, “Do you like it?” It is very important to understand the importance of trainees’ feedback. If participants like the training, they can obtain the highest level of benefits. Therefore, training evaluators should ask trainees how they feel about the training. Moreover, it should be the first step when evaluating training.

The trainees can do more than tell us whether they liked a training program or not. They can give opinions about the content and other factors that effect the training. Therefore, the evaluation was made according to these opinions of the trainees. They filled out a questionnaire form about distance education part of the program (course) they have participated. Their additional comments and suggestions were also welcomed.

We also looked at comments of instructors who have attended the face-to-face part of the course. These instructors can compare the distance education and traditional education and give us insights into the system. Their suggestions are also very important for the future training programs.

We considered two branch schools for evaluation of distance education: (1) “Signal, Electronics, Information Systems (SEIS) School” and (2) “Armor School”. Because these branch schools are among the main schools that implement distance education in their training programs to officers and Non-Commissioned Officers (NCO) who are in the same branch. Additionally, these schools address a great population in the army. They are also in Ankara so that we can get in close contact with course managers, instructors and some coursiers.

These branch schools are implementing distance education method only in Company Command course and Company NCO course. The Company Command course is given to the officers who will be assigned as company commander. In the same way, the Company NCO course is given to the NCOs who will be assigned as Company NCO. The coursiers who took one of these courses are approximately at the same rank and experience level. For example, the officers are in the rank of 1st Lieutenant. However, some coursiers in the rank of Captain and already working as a company commander are taken the course because they could not find any opportunity to go this course before.

In each branch school, these courses are implemented in a very similar way and they contain same topics in general. There is not any difference between two schools in terms of difficulty when applying distance education.

At the end of this study, we found that most of the participants of the training were not satisfied with the distance education part. Therefore, they could not get the full benefit from it. Their reactions become intense on the lack of motivation and time to study CD-ROM. They also criticize the content and make suggestions about the system.

In the following chapter, the literature review about training evaluation and distance education is provided, and Kirkpatrick's model of training evaluation is introduced. Then, distance education technologies are reviewed. The third chapter involves methodology that is used in this study and its implementation. The evaluation criteria and distance education system in

Turkish Army are also explained in this chapter. We put forth survey results for consideration in chapter four. Responses to all questions are examined one by one. Responses are also compared according to groups. In the last chapter, we discuss the results and make conclusion about the study. Some suggestions for Turkish Army and for researchers on this subject are also given in Chapter 5.

CHAPTER 2

LITERATURE REVIEW

2.1 TRAINING EVALUATION

Evaluation can be simply defined as determining an object's value. This value may be "worth and merit", quality, utility, effectiveness, or significance. Ernie House (1993) defines evaluation as "the systematic investigation of the merit or worth of an object for the purpose of reducing uncertainty in decision making." Evaluations are used to assist decision-makers. But many other factors influence program decisions, such as availability of resources, the political climate, and technological feasibility. Evaluations can be conducted on social and educational policies, programs, products, or personnel. For purpose of this thesis, we focus on the evaluation of training programs.

Like any other organizational functions, training (or education) should be evaluated to determine its effectiveness. Unfortunately, there are few organizations adequately evaluate their training programs (Blanchard et al., 2000; Sherman et al., 1998). Among a variety of methods available to evaluate training, the most commonly known one is the Kirkpatrick's model of training evaluation. His model is accepted by most of the academics

(Blanchard et al., 2000; Kirkpatrick, 1996; Sherman et al., 1998; Naugle & et al., 2000).

Initially, in 1959, Donald Kirkpatrick identified four levels of evaluation for training. Then, he wrote several articles about his model. In an article (1996), he reviews the model and notes that the content has remained basically the same. He has made only a few modifications in the guidelines for each of the four levels. The four levels identified by Kirkpatrick are reaction, learning, behavior and results (Kirkpatrick, 1996). These levels are hierarchically ordered (Blanchard et al., 2000).

Level 1: Reaction

Kirkpatrick (1996) defines the reaction level that comes first in order as “how well trainees like a particular training program”. It measures trainees' feelings and satisfaction with the training program. If participants do not like a training program they will not obtain the supposed benefit. They should have positive feelings about the program so they will to participate, pay attention and learn the principles, facts, and techniques discussed.

Cloyd Steinmetz, past president of American Society of Training Directors (ASTD), says, “It’s not enough to say ‘Here’s the information, take it.’ We must make it interesting and motivate people to want to take it” (Kirkpatrick, 1996). “Motivation is the process of arousing and sustaining goal-directed behavior” (Nelson, 1997: 132). A survey of 307 executives from Fortune 1000 companies and 308 executives from smaller firms (twenty-plus employees)

found that the most important quality-improvement techniques stressed human resources issues: *employee motivation*, change in corporate culture, and employee education (Shetty, 1989).

The concept of motivation (of customers or workers) is in the heart of many recent applications, such as Total Quality Management (TQM) and 360° performance appraisal system. Moreover, its importance is increasing everyday. Therefore, managers and teachers should maintain a learning environment and learning climate that supports the well-being, satisfaction, and motivation of participants.

It does not mean that the future employment of teachers in these training programs should depend on the trainees' feelings. Trainees' reactions are important and "can be used to give the teacher feedback on how their students react their teaching and classroom management style" (Naugle et al., 2000).

In this level of evaluation, there is not any attempt to measure for learning that takes place.

A comment sheet can be used to measure participants' reaction. In most cases, a simple form is sufficient. The form should be designed so that the reactions can be tabulated and quantified. Additional comments and suggestions of participants are also important for a comprehensive evaluation.

Level 2: Learning

Favorable results from the reaction level of evaluation are not enough to be evaluated as effective for a training program. It should be measured the amount of learning that results from training. Kirkpatrick (1996) defines the learning level as “a measure of the knowledge acquired, skills improved, or attitudes changed due to training”. Paper-and-pencil tests, observed simulations and skill demonstrations are typical ways used when measuring the learning (Robinson & Robinson, 1989: 166). “An evaluation of learning can be built into the training by setting up before-and-after situations in which trainees demonstrate whether they know the principles or techniques being taught” (Kirkpatrick, 1996).

Level 3: Behavior

The behavior level is “a measure of the extent to which participants change their on-the-job behavior because of training” and “it’s commonly referred to as transfer of training” (Kirkpatrick, 1996). It is related with the on-the-job use of the principles, facts, and techniques. Kirkpatrick (1996) suggests conducting a systematic appraisal of on-the-job performance on a before-and-after basis. Then, a post training appraisal should be conducted three months or more after the training (Kirkpatrick, 1996). However, data collection in this category is very difficult. Fewer organizations have the capability to collect them. After the appraisals, the results of the experimental group should be compared with that of a control group.

Level 4: Results

Finally, the results level is “a measure of the final results that occur due to training, including increased sales, higher productivity, bigger profits, reduced costs, less employee turnover, and improved quality” (Kirkpatrick, 1996). It considers organizational improvement. But there is no agreement about the applicability of the results level to some skills because of “too many factors that can impact performance, other than the training itself “(Abernathy, 1999).

When conducting results level evaluation, it is very difficult to convert some data to monetary values (Phillips, 1996). Therefore, it is not easy to measure results. The results level evaluations also require significant resources and budgets. It should also be considered the cost of evaluation versus the potential benefits (Kirkpatrick, 1996).

Phillips (1996) adds the Return On Investment (ROI) process as a fifth level to the Kirkpatrick’s model. This process compares the training’s monetary benefits with the costs. Motorola Company calculates the training return at about \$29 for each \$1 invested (Ross, 1999: 137). But few organizations conduct evaluations at this level.

However, organizations generally have not adopted all of the Kirkpatrick’s four levels of evaluation (Blanchard et al., 2000). Especially, the 3rd and 4th levels of evaluation are skipped for some training programs. The reaction level is one of the simplest and most common approaches to evaluate training. Almost all of the training directors measure the reaction level. Many

educators and trainers only conduct evaluations at Kirkpatrick's reaction level (Kaufman et al., 2001). Kirkpatrick (1996) recommends that training directors begin to evaluate proceeding the hierarchical order of levels.

Other levels of evaluation are skipped due to many difficulties. For the learning level, it is searched whether trainees actually learned anything or not. Evaluation of learning, behavior and results are more difficult than evaluation of reaction.

The evaluations concerning behavior and results: (1) need to be customized for each situation; (2) are costly and time consuming; and (3) require the cooperation of the customer (Blanchard et al., 2000).

Through an analysis of reactions, training directors can determine how well a program was accepted. They can also obtain comments and suggestions that will be helpful to improve future programs.

2.2 DISTANCE EDUCATION AND E-LEARNING

Distance education is the delivery of useful learning opportunities at a time and place convenient to the learner, regardless of the organization providing the learning opportunity (Kaufman et al., 2001). Education or training courses are delivered to remote (off-campus) locations, including both synchronous and asynchronous instruction.

The American Council on Education defines distance education as a system and a process that connects learners with distributed learning resources. It is characterized by: (1) separation of place and/or time between instructor and learners, and/or between learners and learning resources; and (2) interaction between the learner and the instructor, among learners, and/or between learners and learning resources conducted through one or more media (Duvall & Schwartz, 2000).

The intention in distance education is to offer useful learning opportunities to people at a time and location that is convenient to them. This is the key to success in distance education (Kaufman et al., 2001).

E-learning is the delivery of content via all electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV, and CD-ROM.

When we look at the difference between e-learning and distance education, e-learning is considered to be narrower in scope than distance education, which includes text-based courses as well as electronic media.

The e-learning technologies are:

- Video:
 - two-way video with two-way audio,
 - one-way live video,
 - one-way prerecorded video,

- Audio:
 - two-way audio transmission,
 - one-way audio transmission,

- Multimedia technologies,

- Web-based technologies:
 - Internet courses using *synchronous* computer-based instruction, such as interactive computer conferencing,
 - Internet courses using *asynchronous* computer-based instruction, such as e-mail, listservs, and Web-based courses.

Both the terms multimedia training and computer-based training fall broadly under e-learning. Computer-based training is any computer-delivered training including CD-ROM and World Wide Web.

Multimedia training is a kind of computer-based training. “Multimedia training uses two or more media, including text, graphics, animation, audio (sound/music), and video” (Brandon Hall,2002). The more media used in the program, the more practical it is to produce a colorful, engaging program delivered via the computer (Brandon Hall,2002). The users of a multimedia program should be able to control their progress and set the speed of progress through the course (Brandon Hall,2002). By this way, the user can learn at his/her own speed.

Web-based learning and online learning are often considered more restricted in focus than e-learning. Moreover, they are limited to activities delivered via TCP/IP for Internet, Intranets, and Extranets.

Web-based training (WBT) is typically delivered to the Web browser on the desktop. It may require additional plug-ins. The content of WBT may include “text, multimedia, audio, video, synchronous and asynchronous communications, simulations, collaboration tools, quizzes, and tests” (Fichter, 2002). E-training refers to corporate e-learning or WBT in corporate environments (Fichter, 2002).

The institutions offering and/or planning to offer distance education in the next three years chose web-based technologies as education technology (Powell, 2001). But, many forecasters believe that web-based learning will not conclude traditional education to an end; instead, “it will replace most lecture-based courses on campus in the future” (Powell, 2001).

Another issue in distance education is the evaluation of e-learning programs. Table 1 shows ten criteria used in the judging of the Brandon Hall of Fame Awards sponsored by brandon-hall.com (Brandon Hall, 2002). This criteria are especially for e-learning software used in a CD-ROM or a web-based technology. We will also use some of these criteria available to our study.

Table 1: Ten criteria used in the judging of the Brandon Hall of Fame Awards

#	Criteria	Explanation
1	Content	Does the program include the right amount and quality of information?
2	Instructional Design	Is the course designed in such a way that users will actually learn?
3	Interactivity	Is the user engaged through the opportunity for input?
4	Navigation	Can users determine their own way through the program? Is there an exit option available? Is there a course map accessible? Is there an appropriate use of icons and/or clear labels so that user don't have to read excessive documentation to determine program options?
5	Motivational Components	Does the program engage the user through novelty, humor, game elements, testing, adventure, unique content, surprise elements, etc.?
6	Use of Media	Does the program appropriately and effectively employ graphics, animation, music, sound, video, etc.? Is the unnecessary use of these media avoided? Is the soundtrack really annoying?
7	Evaluation	Is there some type of evaluation, (such as completion of a simulation, mastery of each section's content before proceeding to later sections, section quizzes, final exam)?
8	Aesthetics	Is the program attractive and appealing to the eye and ear? Does the structure of the screen add to the program?
9	Record Keeping	Are student performance data recorded, such as time to complete, question analyses, and final scores? Are the data forwarded to the course manager automatically?
10	Tone	Is the program designed for the audience? Does it avoid being condescending, trite, pedantic, etc.?

Although distance learning efforts receive much attention across the globe, some well-known universities look suspicious to it. May be the most important reason of this point of view is lack of face-to-face contact of instructor. Decreasing instructor-led training makes some trainees uneasy (Brandon Hall, 2002).

Early adopters like distance education and e-learning for its lower costs and more consistent training from one location to another (Alexander, 2001). Therefore, they made mistakes when replacing valuable face-to-face education.

Some researchers criticize that distance education lessons only reproduce traditional lessons by emphasizing the memorization of content and its representing on tests (Weston & Barker, 2001).

CHAPTER 3

METHODOLOGY AND IMPLEMENTATION

3.1 EVALUATION OF REACTION

To evaluate the distance education in the army, we used the reaction level of Kirkpatrick's evaluation model. It is not enough for an overall evaluation but it is the first step when climbing a four-step ladder.

3.1.1 REASONS BEHIND OF USING ONLY THE REACTION LEVEL

The reaction level comes first in the hierarchically ordered model of Kirkpatrick. We cannot evaluate other levels before it. For other evaluation levels of Kirkpatrick, customized surveys should be conducted for each training program (course) and each program should be evaluated individually.

To be able to evaluate all levels of Kirkpatrick, evaluators must have cooperation of the organization (Blanchard et al., 2000). Since we are not

insider evaluators who have a mission in the army to research this subject, we could not say that we have complete cooperation with the army.

For the 2nd, 3rd and 4th level evaluations, a great deal of work is required in planning the evaluation procedure, in analyzing the data that are obtained, and in interpreting the results. Each training program must be evaluated in its own conditions. Different test forms must be used for each program. Kirkpatrick (1987) says that “for many programs, it is not possible to find a standardized test and training directors must use their skill and creativity in planning their own measuring instrument”.

For an overall evaluation that covers all levels, our limited time and budget to complete this research would not be sufficient. Also, note that for the higher order level evaluations of the model, the army’s cooperation at a higher level is a must. If we get useful opportunities (mission, cooperation, time and budget), other levels of Kirkpatrick can be evaluated as another research topic.

3.1.2 GUIDELINES FOR MEASURING THE REACTION LEVEL

Kirkpatrick (1996) gives these guidelines for measuring the reaction level:

- Determine what you want to find out.
- Use a written comment sheet with the items determined in the task above.
- Design the sheet so that reactions can be tabulated and quantified.

- Obtain honest reactions by making the sheet anonymous.
- Allow trainees to write additional comments not covered by the questions designed to be tabulated and quantified. ...
- Attain an immediate response rate of 100 percent. ...
- Develop acceptable standards.
- Measure reactions against the standards and take appropriate action.
- Communicate the reactions as appropriate.

We want to find out what the coursiers think about the distance education part of the course and the CD-ROM sent to them as a part of the distance education program.

3.1.3 CRITERIA USED IN EVALUATING E-LEARNING

Initially, we should put forth what should be done in a distance education or e-learning program. Some criteria should be selected and the evaluation should be made according to these criteria.

The criteria available to ask coursiers about the CD-ROM and distance education program selected from the ten criteria used in the judging of the Brandon Hall of Fame Awards (Brandon Hall, 2002). We did not use the criteria of *interactivity*, *record keeping*, and *tone* due to lack of usage in our distance education system. For example, only interactivity between the user and the program is multiple-choice questions after each training subject. Therefore, the program in the CD-ROM does not engage the user enough

through the opportunity for input. The performance data of the coursiers are recorded in a traditional method by keeping the exam results in the training center of the branch school. Especially web-based distance education programs have features such as interactivity with the user and keeping records of them to be able to send course manager automatically. However, the CD-ROM that was used in the courses does not have such features.

The criterion of tone, last one of the criteria used in the judging of the Brandon Hall of Fame Awards, considers design of the program for the audience. It should avoid being condescending, trite, pedantic, etc (Brandon Hall, 2002). The information on the CD-ROM should be easy to find and easy to use. The CD-ROM should also be designed to motivate and entertain the coursiers as well as educate. We evaluated the tone of the program by asking satisfaction of the coursiers with the program.

Then, the selected criteria and questions are modified to statements appropriate for this study. Two of the statements were changed to a reverse statement to avoid creating a response set. "A response set is the tendency to answer all questions in a specific direction regardless of their content. This problem may arise when a set of questions is presented together with the same response format" (Frankfort-Nachmias & Nachmias, 1997). The statements except the reverse ones show what should be done when designing a CD-ROM and an e-learning program and implementing it.

In our study, these statements will be asked to respondents whether they agree or disagree (strongly agree or strongly disagree) with them. Here are

the statements used in evaluating implementation of the CD-ROM and distance education:

1. *Content:*

- The course CD-ROM includes the right amount and quality of information.
- The course CD-ROM includes current and updated information.
- The information that the course CD-ROM includes is helpful for improvement in job.

2. *Instructional Design:*

- The program in the CD-ROM has an effective “help” menu to overcome problems when reviewing it.

3. *Navigation:*

- The coursiers can determine their own way through the program and study the subjects in their own order.

4. *Motivational Components:*

- The program engages the user through novelty, humor, game elements, testing, adventure, unique content, surprise elements, etc.
- The coursier gets good feedback at the end of the distance education program.

5. *Use of Media:*

- The use of graphics, animation, music, sound, or video in the CD-ROM contributes to the understanding of the material.
- There are too much and unnecessary use of the media such as graphics, animation, music, sounds, video, etc. in the context. (a reverse statement)
- The soundtrack is annoying and sound quality is not good. (a reverse statement)

6. *Evaluation:*

- The coursier thinks that the evaluation of his success in this course is right.

7. *Aesthetics:*

- The page design in the CD-ROM is attractive and appealing to the eye and ear.
- The page design in the CD-ROM contributes to the training.

As we mentioned before, the reaction level evaluation measures coursiers' feelings and satisfaction with the program. Therefore, we added satisfaction as the 8th criterion and some questions about the satisfaction of the coursiers for the distance education part of the course:

8. *Satisfaction:*

- The coursier is satisfied with the distance education part of the course.
- The coursier wishes to take another course given in the distance education style like this.

- The coursier recommends this course to his friend.

After these questions, we also asked whether the coursier has a personal computer that can read the CD-ROM in his home. Because, having a computer at home is very important for coursiers whom they may not have enough time to study the CD-ROM at work.

To get additional information about the usage of CD-ROM, we also asked coursiers some questions, such as:

- Do you use the CD-ROM after taking this course to get information?
- Which problems do you encounter when you would like to use the CD-ROM for purposes other than using for the course?
- How do you deal with the problem that you encounter while reviewing the CD-ROM?
- Which elements in the CD-ROM entertain you? (novelty, humor, game elements, testing, adventure, or surprise elements)

3.2 SURVEY METHODOLOGY

When collecting information about the army's distance education system, survey methodology was used. The survey was conducted to find out whether the coursiers think they got the information they needed, whether they would recommend others to participate in a similar program, and how satisfied they are with the distance education program.

In the survey, we used a questionnaire form that contains questions for respondents. Most of the questions in the questionnaire were about subjective experiences of respondents, not about facts. They were concerned with feelings, opinions and attitudes of the respondents. Only one question considers the statement of PC ownership of respondents.

We used both types of question structures: forced choice questions and open-ended. In the forced choice questions, respondents were given a set of responses and asked to choose the one that most closely describes their feelings and opinions. In the open-ended questions, they were asked to describe their feelings and opinions in their own words. The reason to use forced choice questions is that they can be scored quickly and objectively.

To be able to analyze qualitative data obtained from the questionnaire, responses of the questions were classified. Numerical values were assigned to the responses.

Several common techniques are used to structure the response categories of forced choice questions. The general format is to present all possible answers and has the respondents choose the appropriate categories. The respondent can either circle or write the number of the answer, or check a box or a blank.

In response sets of the questions, an ordinal scale was used. Because order exists among the categories – that is, one observation is of greater value than the other is or more important.

To obtain participant's feelings about distance education in a qualitative form, closed-ended questions was used. However, they are not enough to measure participant's reactions. Kirkpatrick (1996) suggests using a written comment sheet when evaluating training. It is important to get desired reactions. Kirkpatrick (1996) also says researchers should make these sheets anonymous to be able to obtain honest reactions. These guidelines were applied when designing the questionnaire form. For ethical considerations, respondents were guaranteed anonymity by explaining that identity information would not be used. The questionnaire form that is prepared for this study is in Appendix B.

Once the data have been collected by means of questionnaires, the next job was to organize and summarize the results so that readers can easily understand the meaning of the data. Initially, the data were classified. Then, statistical summaries, tables, and graphs were used to present the results in an easily comprehensive form.

In this research investigation, a mixed method of both quantitative and qualitative analysis is considered appropriate.

Qualitative analysis is required for the open-ended questions relating to additional comments and suggestions about the distance education. At the end of this study, the results were interpreted to evaluate the program.

3.3 IMPLEMENTATION OF THE SURVEY

First of all, an official permission was taken from the Land Forces Command in hierarchical order. Otherwise, we could not make this survey in the army. It took more than a month. Secondly, we got the names and unit addresses of the coursiers from the branch schools for the courses: Company Command Course and Company NCO Course. Each branch school gave us lists of the last two terms of Company Command Courses and one term of Company NCO Course. These coursiers are from different units that are in all over Turkey. Numbers of personnel attended these courses are shown in Table 2.

Table 2: Numbers of personnel attended the courses.

Branch School \ Course Name	Company Command Course		Company NCO Course	Total
	Term 1	Term 2		
Signal, Electronics, Information Systems School	15	14	20	49
Armor School	29	26	25	80
Total	44	40	45	129

Thirdly, the questionnaires were conducted with in-person interviews to some of the coursiers working in Ankara. We were able to reach only eight of seventeen coursiers who works in Ankara. Other coursiers who are working

different cities other than Ankara were reached by phone. The total number of respondents is 32 and the information about them is shown in Table 3.

It has been understood that most of the coursiers cannot be reached due to the following reasons: Some personnel had been assigned to another duty and they changed their places; Some of them were in foreign country or in another city for a temporary duty; Summer season has also affected our ability to reach the coursiers.

Table 3: Numbers of respondents completed the questionnaire.

Branch School	Course Name	Company Command Course		Company NCO Course	Total
		Term 1	Term 2		
	Signal, Electronics, Information Systems School	7	6	3	16
	Armor School	3	10	3	16
	Total	10	16	6	32

3.4 PILOT TEST

A pilot questionnaire was tested on a sample of respondents. The pilot questionnaire was conducted to eleven coursiers. Eight of them working in Ankara and we could able to reach them with in-person interviews. By this

way, we could discover weaknesses in the questions as well as the method of administration.

After conducting the pilot questionnaire, we concluded that some of the statements are not appropriate to ask coursiers. These statements are:

- The program in the CD-ROM has an effective “HELP” menu to overcome problems when reviewing it.
- The coursiers can determine their own way through the program and study the subjects in their own order.

Therefore, we could not ask statements about the criteria of instructional design and navigation. The reasons of skipping these questions: It should be, but there was no HELP menu in the program. Additionally, the coursiers do not meet any problem when studying the CD-ROM. So, we could not evaluate any “HELP” menu for overcoming problems. The program also contains the training subjects in hierarchical order. Each section headings includes sub-topics. Therefore, the coursiers do not meet any problem when finding and determining their own way. So, we decided not to ask these statements. The questionnaire form in Appendix B does not contain these omitted statements. Since other questions were not altered, the pilot questionnaire data were included to the statistical analysis.

CHAPTER 4

RESULTS

4.1 QUANTITATIVE ANALYSIS

The responses of the coursiers given to the first fourteen statements and the sixteenth statement of the questionnaire presented in Appendix B. In quantitative analysis of these data, descriptive statistics, correlations and inferential statistics will be used. Descriptive statistics will be used to summarize the data in terms of measures of central tendency (mean, median) and measures of variability (range, standard deviation, interquartile range). We will also look at correlations of some responses. Although we do not expect any difference between responses of the signal branch coursiers and armor branch coursiers, inferential statistics will be used to find whether there is a difference or not.

4.1.1 DESCRIPTIVE STATISTICS

Descriptive statistics was conducted to the first 14 questions of the questionnaire. Each of these questions contains a statement. Respondents

are requested to indicate whether they are in agreement or not with these statements. There is a five-point rating scale from strongly agree with point 1 to strongly disagree with point 5. The responses are counted according to categories and shown in Table 4.

Table 4: Responses to the questions from 1 to 14.

Question Number:		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Strongly agree	1	7	12	7	0	3	0	1	6	4	4	3	2	7	10
Agree	2	13	3	16	3	9	3	1	12	14	8	9	7	10	6
Neither agree nor disagree	3	4	4	3	2	2	1	5	6	7	2	1	2	1	2
Disagree	4	6	11	5	15	11	9	17	2	3	11	13	11	5	6
Strongly disagree	5	2	2	1	8	3	15	4	2	0	7	6	10	9	8
Total :		32	32	32	28	28	28	28	28	28	32	32	32	32	32

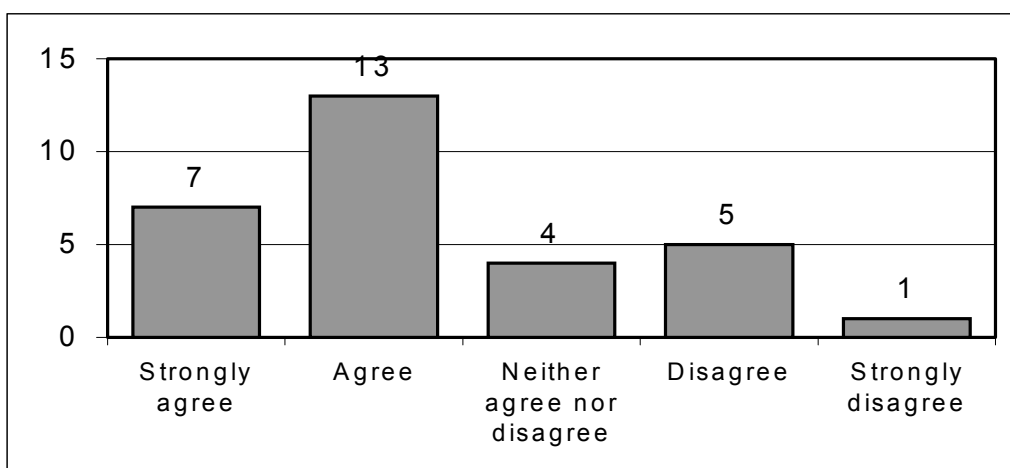
There is an order among response categories. Therefore, our scale of measurement is ordinal. Donna M. Mertens (1998:338) shows *median* for ordinal data as the choice of the statistical procedure in descriptive statistics. We also calculated other measures such as mean, standard deviation, range (minimum and maximum), and interquartile range (Q1 and Q3). Descriptive statistics of the questions from 1 to 14 are shown in Table 5.

Table 5: Descriptive statistics of the questions from 1 to 14.

Criteria	Content			Motivational Components	Use of media			Aesthetics		Motivational Components	Evaluation	Satisfaction		
	1	2	3		4	5	6	7	8			9	10	11
Mean	2,47	2,63	2,28	4	3,07	4,29	3,79	2,36	2,32	3,28	3,31	3,63	2,97	2,88
Standard Deviation	1,22	1,45	1,08	0,9	1,27	0,98	0,88	1,13	0,86	1,4	1,33	1,31	1,6	1,64
Minimum	1	1	1	2	1	2	1	1	1	1	1	1	1	1
1st Quartile	2	1	2	4	2	4	3,75	2	2	2	2	2	2	1
Median	2	3	2	4	3,5	5	4	2	2	4	4	4	2	2,5
3rd Quartile	3,25	4	3	5	4	5	4	3	3	4	4	5	5	4,25
Maximum	5	5	5	5	5	5	5	5	4	5	5	5	5	5

The first three statements are about the content of the CD-ROM. The 1st statement is “The course CD-ROM includes the right amount and quality of information (Kurs CD-ROM’ u yeterli miktar ve kalitede bilgi içeriyor).” Responses to this question are shown in Figure 1.

Figure 1: Responses to the statement 1.



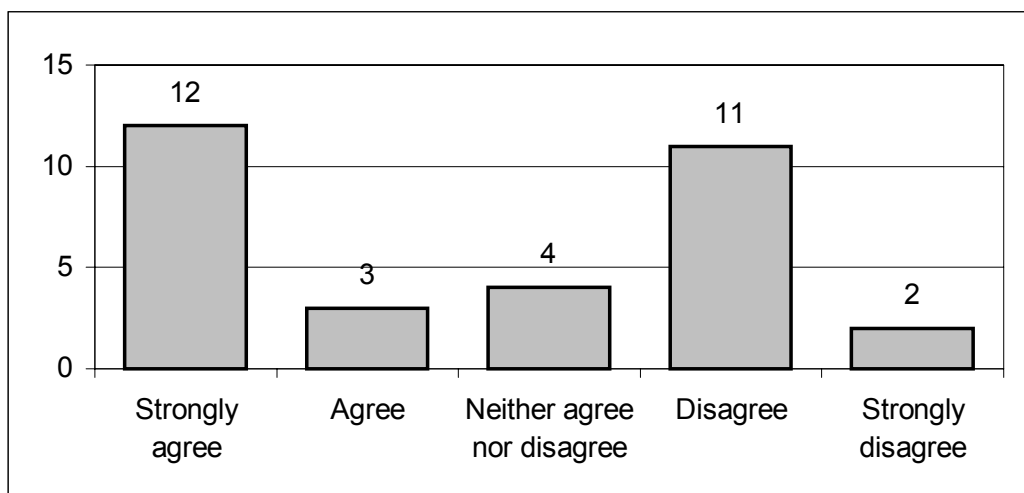
About 63% of the respondents agree with this statement. The coursiers who are in disagreement with this statement says that the CD-ROM should include mainly required information that gives important responsibility to the company commander or NCO. For example, financial and judicial subjects are very important and they can be included to the CD-ROM in more detail. The respondents say, “Experimental information is more important than theoretical one” so it should include lessons from the experiments of older coursiers.

Some coursiers say, “The CD-ROM can include more information. It should be a reference CD-ROM for a company commander after the course.” In the CD-ROM, there are lots of references to direct coursiers to make research. But many coursiers from armor or signal branch complain about it, because, in terrain, it is difficult to find the references such as field manuals, military laws, etc. They say that the CD-ROM could contain most of the references.

According to another coursier, “the information that the CD-ROM includes is already in books. It should support a contribution to the books.” A Signal NCO says that some topics, such as NBC (Nuclear, Biological and Chemical) Warfare, maintenance and alert were not, covered well in the CD-ROM.

The 2nd statement is “The course CD-ROM includes current and updated information (Kurs CD-ROM’ unun içerdđiğđ bilgiler yeterince güncel).” Responses to this question are shown in Figure 2. Numbers of respondents that are in agreement and disagreement with this statement are relatively close.

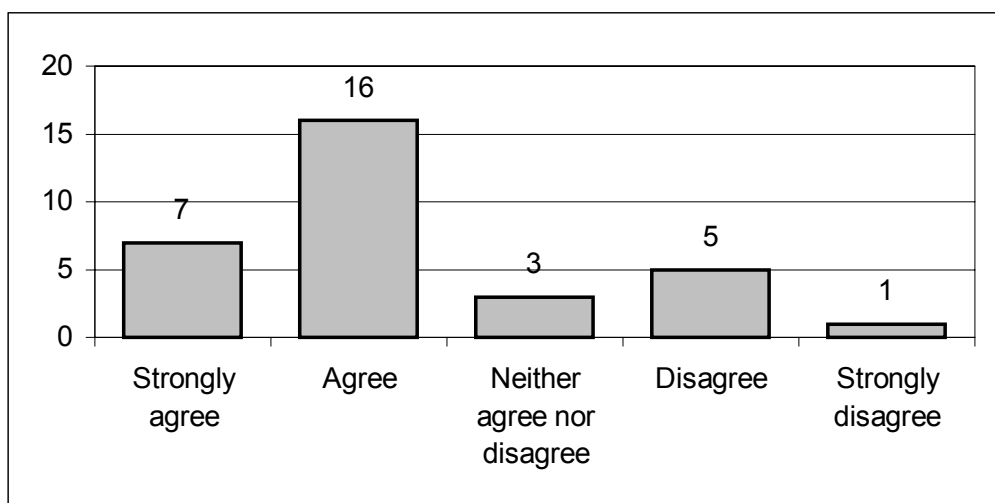
Figure 2: Responses to the statement 2.



The coursiers who are in disagreement with this statement says that some changes made in the books have not been written down to the CD-ROM. For example, enlisted men were given permission to go outside of the barracks biweekly. Recently, it has been changed to once a week. Unfortunately, it was not corrected in the company management section of the CD-ROM. To notice these uncorrected changes require being careful. Therefore, we can conclude that the respondents who disagree (especially strongly disagree) with this statement are a very careful. They follow changes in the military manuals carefully.

The 3rd statement is “The information that the course CD-ROM includes is helpful for improvement in job (CD-ROM’daki bilgiler mesleki açıdan yetiştirici).” Responses to this question are shown in Figure 3. Nearly 75% of the respondents agree with this statement.

Figure 3: Responses to the statement 3.

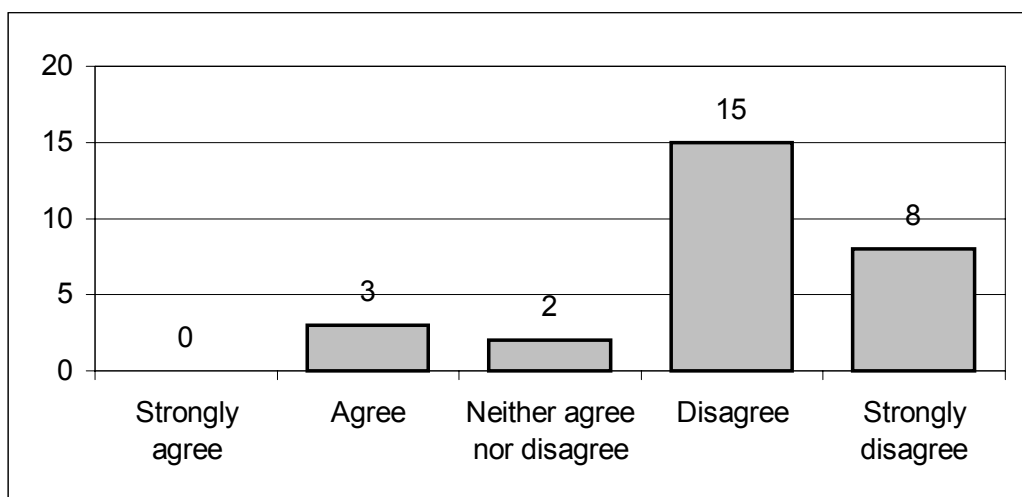


The coursiers who disagree with this statement says that the information should also be given in a format that includes questions and answers about the topic and answer follows its question. They give the CD-ROM of the Infantry School as a good example for this situation. The CD-ROM should include case studies especially for judicial and financial points. Different situations that a company commander or NCO may encounter in their duties can be included as a case study.

Although other statements were respondent by 32 coursiers, the statements from 4 to 9 are not responded by four coursiers due to the fact that they could not review the CD-ROM. They did not able to find available computer to read CD-ROM in their home or work so they could able to study only training books accompanied by the CD-ROM only for these coursiers. Since these books involve the same information with the CD-ROM, we could able to ask the statements other than 4 to 9. Therefore, total respondents for these statement are 28.

The 4th statement is “The program engages the user through novelty, humor, game elements, testing, adventure, unique content, surprise elements, etc (CD-ROM’ da yer alan yenilik, mizah, oyunlar, testler, macera ve sürpriz türü özellikler sayesinde zamanın nasıl geçtiğini anlamıyorum).” Responses to this question are shown in Figure 4.

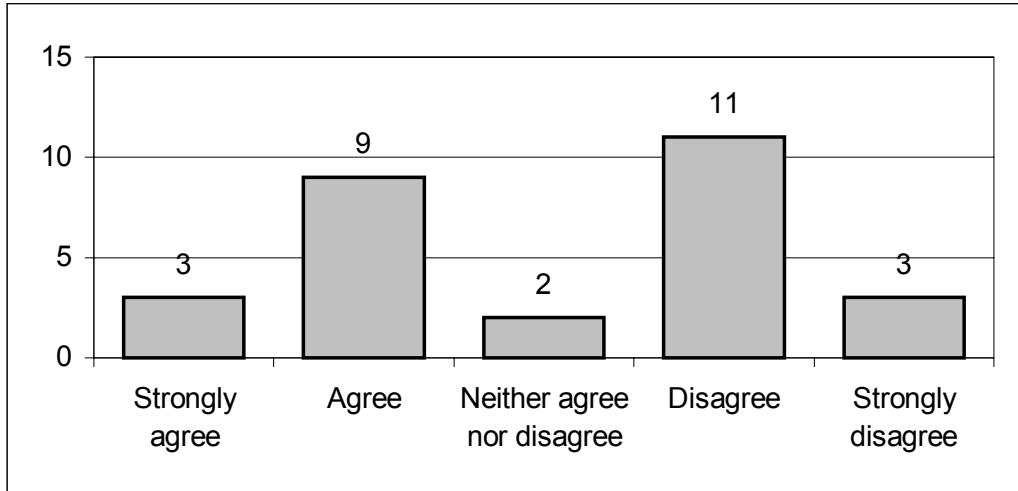
Figure 4: Responses to the statement 4.



Most of the respondents disagree with this statement. They think that there is not any element like that. The CD-ROM includes lots of text documents. Consequently, it is very boring to read them.

The 5th statement is “The use of graphics, animation, music, sound, or video in the CD-ROM contributes to the understanding of the information (CD-ROM içerisindeki grafikler, animasyon, müzik, ses ve görüntü, konuların anlatımına yardımcı olarak eğitime katkı sağlıyor).” Responses to this question are shown in Figure 5. Numbers of respondents that agree and disagree with this statement are approximately equal.

Figure 5: Responses to the statement 5.



The respondents who disagree with this statement think that there are some graphics, animation, music, sound, and video but they are not enough. These materials are used especially in some sections that are not related with the training. For example, there are some video and animation shows about branch school and the last developments in the branch (signal or armor) but they are used in the minimum level in the sections about the training subject, such as company management, maintenance, etc.

Each section in the CD-ROM includes multiple-choice tests about the topic. The respondents agree with this statement consider these tests and the video that shows the recent developments in the branch when approving this statement.

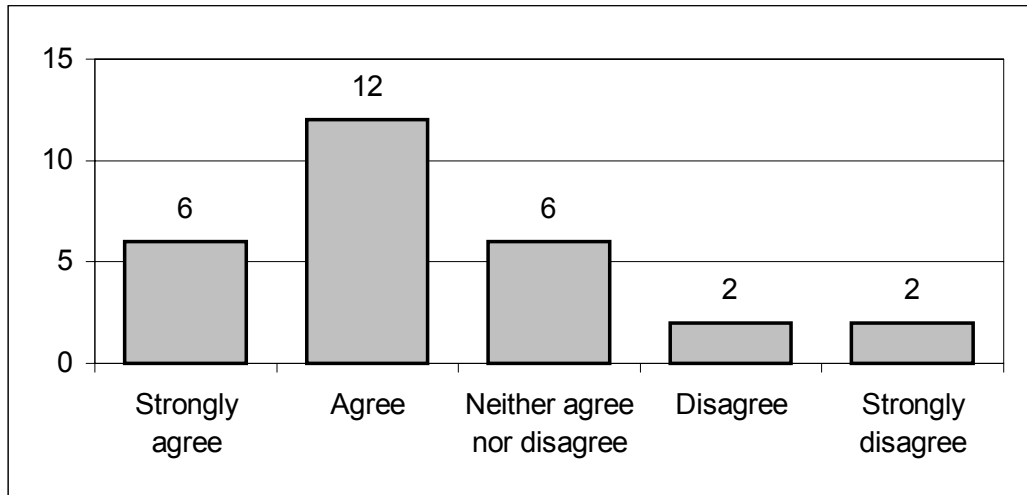
The 6th statement is “It is unnecessary to use lots of the audiovisual effects (CD-ROM’ da kullanılan sesli ve görüntülü kısımlar gereksiz ve/veya çok

fazla).” As seen from Table 4, 24 of the 28 coursiers (%86) disagree with this statement. Table 5 shows that median is 5 and mean is 4,29 for the 6th statement. Due to the lack of media used in the required sections of the CD-ROM, almost all of the respondents think that there is no unnecessary usage of media. They say, “audiovisual effects are used scarcely.”

The 7th statement is “The soundtrack is annoying and sound quality is not good (Sesli kısımlar rahatsız ediyor ve ses kalitesi iyi değil).” Table 4 shows that 21 of the 28 respondents (%75) disagree with this statement. It can be concluded that there is no problem with the soundtrack but it may be improved.

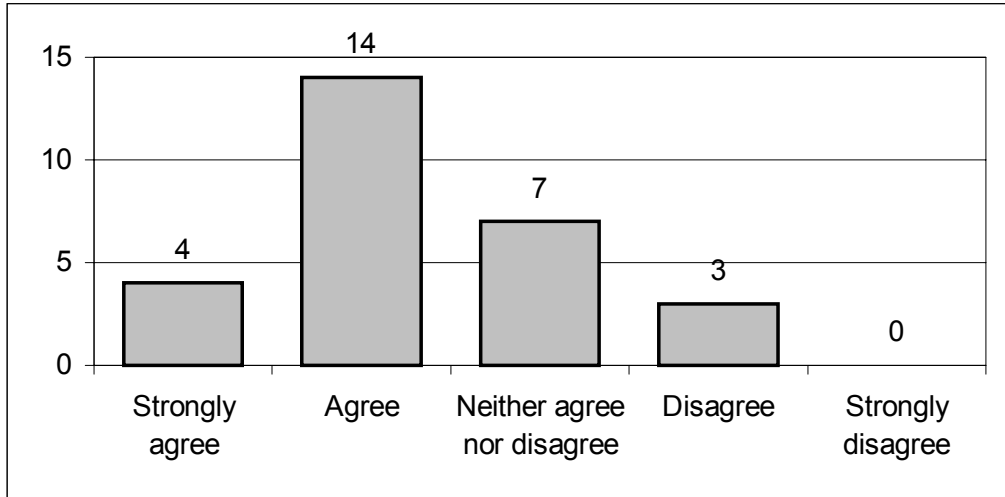
The 8th and 9th questions are about aesthetics. The 8th statement includes “The page design in the CD-ROM is attractive and appealing to the eye and ear (CD’deki sayfalar göze ve kulağa hoş geliyor ve çekici).” Responses to this question are shown in Figure 6.

Figure 6: Responses to the statement 8.



The 9th statement “The page design in the CD-ROM contributes to the training (CD’deki sayfa tasarımları eğitime katkı sağlıyor).” Responses to this question are shown in Figure 7.

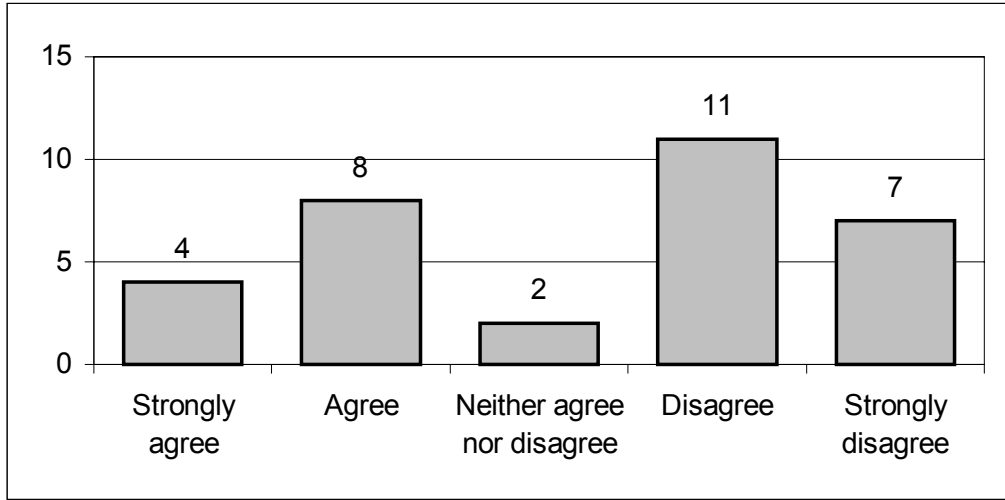
Figure 7: Responses to the statement 9.



Because most of the responses agree with the statements of 8 and 9, we can say that page design and aesthetics are good but may be improved. One instructor in these courses said that: “The software of the CD-ROM was prepared with the Visual Basic. If it was prepared with multimedia supported programs such as Flash Media, it would be more aesthetic.”

The 10th statement is about motivational components of the course. It states “I (the coursier) get good feedback at the end of the distance education program (Uzaktan eğitimin sonunda kendi durumumla ilgili iyi bir geri besleme alıyorum).” Responses to this statement are shown in Figure 8.

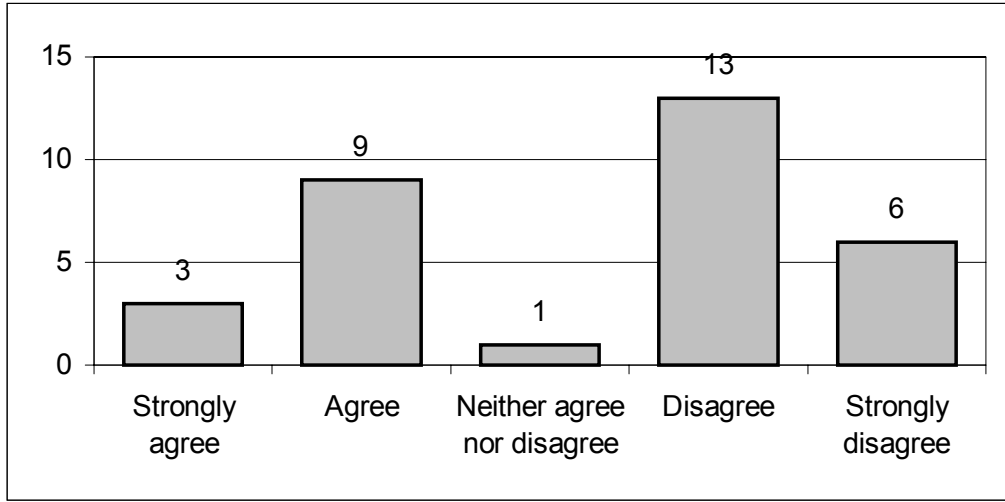
Figure 8: Responses to the statement 10.



Most of the respondents (56%) are in disagreement with the statement. The median of this data is 4 and the mean is 3,28. Only feedback given to the coursiers was to explain results of the exams that were made in the middle of the distance education and at the beginning of the face-to-face part. It is not enough for a training of six weeks. However, the respondents who agree with this statement consider this feedback as sufficient. To provide feedback about the progress of the coursier is very important to maintain and even increase motivation (Sherman & Bohlander & Snell, 1998: 223). It is more important in distance education due to low interactivity when it is compared with the face-to-face education.

The 11th statement is about the evaluation of the coursiers. It includes “I (the coursier) think that the evaluation of my success in this course is right (Uzaktan eğitimdeki başarımların değerlendirilmesinin doğru olarak yapıldığını düşünüyorum).” Responses to this question are shown in Figure 9.

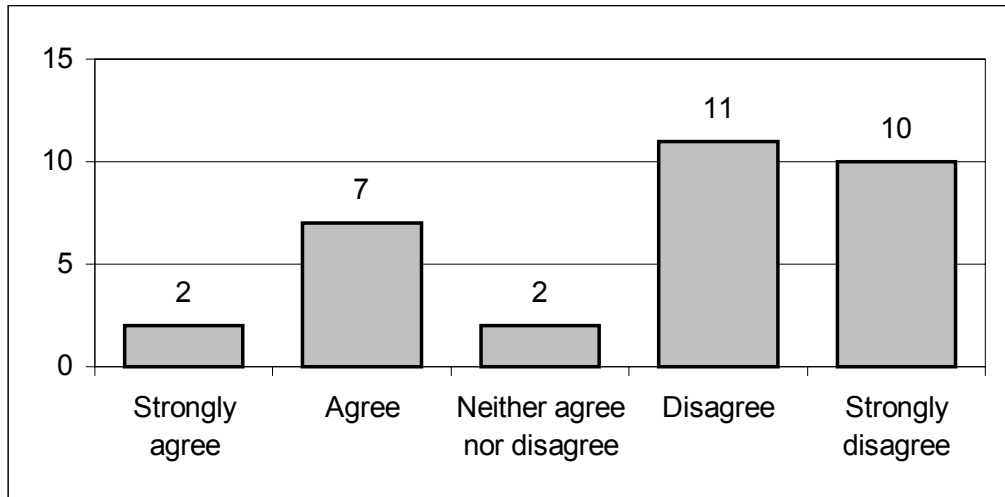
Figure 9: Responses to the statement 11.



About 59% of the respondents do not think that their evaluation was right. According to them “the exams were not made standard” and “the examination system were not told coursiers and their supervisors clearly.” For example, the first exam should be made under observation of the first chief of the coursier. But some coursiers did not taken in a control like this. So, different applications were made in the evaluation system.

The statements from 12th to 14th are about the satisfaction of the coursiers. They are parallel statements and very critical for the purpose of this survey. But the most important question of the survey is the 12th statement. It includes “I am satisfied with the distance education part of the course (Kursun uzaktan eğitimle verilen bu bölümünden memnun kaldım).” Responses to this question are shown in Figure 10.

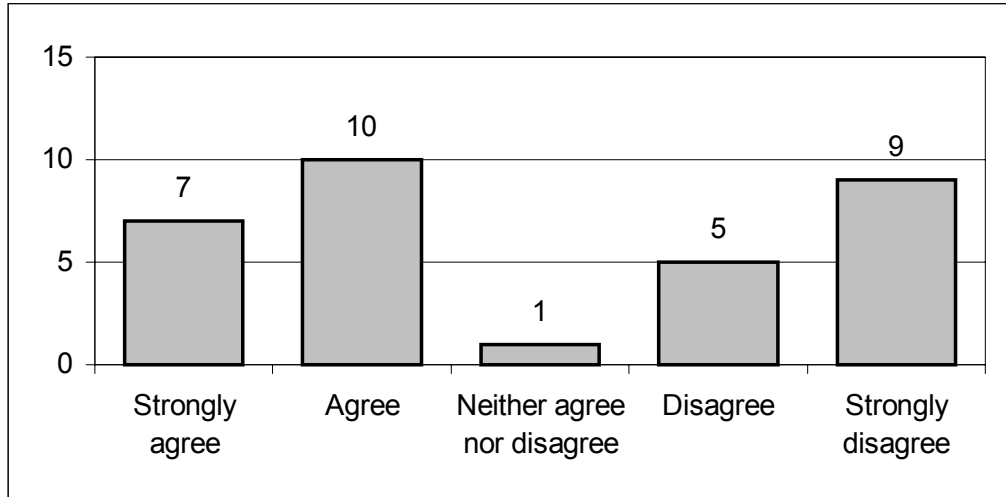
Figure 10: Responses to the statement 12.



21 of the 32 respondents are not satisfied with the distance education part of the course (median is 4 and mean is 3,63). This important unsatisfied response is mainly made up of lack of time to study CD-ROM. This time problem occurs because of too much workload. Most of the respondents do not agree with “Distance education can be applicable in the Army.” The reason of this opinion will be explained at the end of this chapter.

The 13th statement “I wish to go on another course given in the distance education style like this (Bu şekilde uzaktan eğitimle verilen başka bir kursa da katılmak isterim).” Responses to this question are shown in Figure 11.

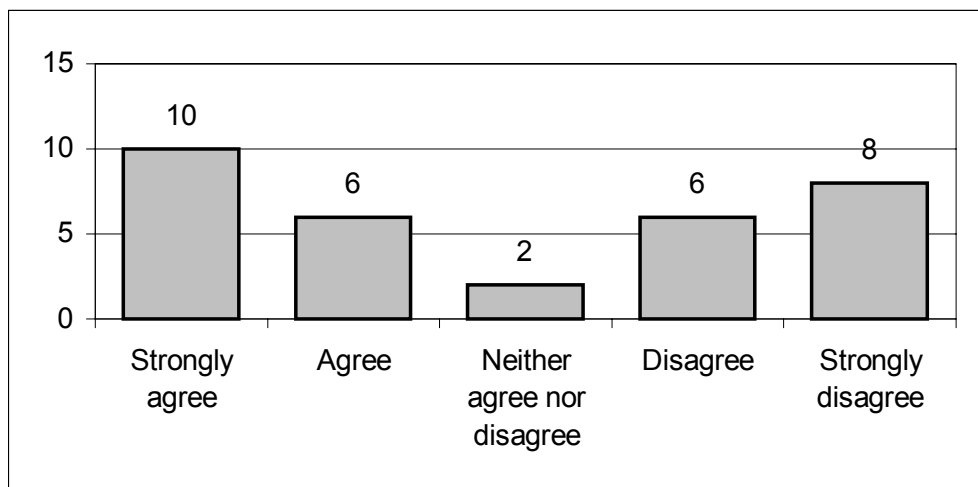
Figure 11: Responses to the statement 13.



For these responses, median is 2 and mean is 2,97. Agreement with this statement is a little bit bigger than disagreement. Although they are not satisfied with the distance education, some of them would like to participate in another course like this. These respondents explain this contradiction by “for the sake of face-to-face education” part of the course. Despite the fact that the face-to-face part of the training decreased to two weeks after the distance education application, they still would like to attend courses.

The 14th statement “I recommend this course to another friend of mine (Bu kursu başka bir arkadaşına da tavsiye ederim).” Responses to this question are shown in Figure 12.

Figure 12: Responses to the statement 14.



According to Table 5, median is 2,5 and mean is 2,88. The result of this question is very similar to that of the 13th one. Most of the respondents answer these two statements same. If they think that a course like this is useful for them, it is also useful for others.

After considering all of the descriptive statistics of data, we conclude that although the content of the course CD-ROM has some deficiencies it was generally accepted as good. The motivational components have barely used in the CD-ROM. There is also lack of media usage. The page design is not considered as aesthetic. May be the most important one is that the respondents have not satisfied with the distance education part of the course.

4.1.2 CORRELATION

We will measure the degree of linear relationship between responses of the coursiers to two different questions by using the Pearson product moment correlation coefficient, r . It is a measure of the strength of the linear relationship between two variables (McClave et al., 1998: 461). The r -value shows the slope of the relationship line made up of two variables. If one variable tends to increase as the other decreases, the correlation coefficient, r , is negative. Conversely, if the two variables tend to increase together the r is positive.

The r values of all relationships according to pairwise comparisons of responses to the questions by 32 respondents are calculated with the MINITAB and Table 6 shows all of it in matrix structure. The p -values for the individual hypothesis tests of the correlations being zero is compared with the 0,05 alpha level. Then, the correlation coefficient values that satisfy this condition are showed as bold in Table 6.

When we look at the correlation value of the PC ownership (Question 16) and satisfaction of respondents with the distance education program (Question 12), r is -0.196 with the p -value is 0,284. We can not reject the null hypothesis of the correlations being zero. This sample provides insufficient evidence at $\alpha=0.05$ to support the alternative hypothesis which is the correlation is not zero. We cannot say that there is a negative relationship between responses to the two questions.

Table 6: The Pearson product moment coefficient values of the correlation between responses to the questions.

Question #	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Q2	0,339													
Q3	0,483	0,642												
Q4	-0,137	0,114	0,143											
Q5	0,367	0,175	0,390	0,579										
Q6	0,081	0,101	0,057	-0,210	-0,345									
Q7	0,196	0,201	0,320	0,468	0,313	0,031								
Q8	-0,145	-0,191	0,033	0,254	0,239	-0,197	-0,032							
Q9	0,434	0,006	0,277	0,238	0,416	-0,245	0,143	0,372						
Q10	-0,232	0,228	0,116	-0,115	-0,131	0,088	-0,289	0,020	-0,209					
Q11	-0,073	0,163	0,317	0,300	0,283	-0,440	-0,181	0,394	0,464	0,264				
Q12	-0,028	-0,059	0,144	0,509	0,584	-0,273	-0,091	0,321	0,106	0,182	0,401			
Q13	0,024	0,064	0,173	0,590	0,492	-0,017	0,021	0,233	0,197	-0,155	0,263	0,656		
Q14	-0,099	0,061	0,165	0,545	0,304	-0,105	0,049	0,233	0,093	0,030	0,329	0,681	0,848	
Q16	0,151	-0,365	-0,012	0,000	-0,217	0,106	0,118	0,061	0,147	-0,058	0,006	-0,196	-0,185	-0,136

Note: Some r -values are shown as bold for the p -value is smaller than 0,05 alpha level.

The strongest correlation exists among responses to Question 13 and 14. The r -value is 0,848 and the relationship is positive. P-value that calculated by MINITAB is smaller than 0,05 alpha level. There is sufficient evidence that the correlation is not zero. It means that if the respondent wish to go another course given with the distance education method he also recommend this course to his friends.

Responses to Question 12 have also strong relationships with Question 13 and Question 14. The r -value is 0,656 for Question 12 and 13 and 0,681 for Question 12 and 14. Their p -values are also smaller than 0,05 alpha level. Therefore, we can say that the respondents who have satisfied with the distance education wish to go another course like it and recommend this course to his friends. It is an expected result.

4.1.3 INFERENCE STATISTICS

Inferential statistical tests are used due to data from two different groups that we have to compare. We do not expect any difference in their responses to the questions but we will search whether they have any difference or not. We will compare the coursiers of the Signal, Electronics, and Information Systems (SEIS) School with the coursiers of Armor School. Our sample groups are independent and the data from the first 14 questions are ordinal. The 15th question has nominal data.

Inferential statistics may be parametric or non-parametric. Parametric statistics are use especially for large samples. Because the characteristics of the sample should be normally distributed in the population, randomization should be used in the selection of sample and/or the interval or ratio level of measurement is used in the parametric statistics (Mertens, 1998:333). Therefore, it needs some assumptions about the distribution of the population.

Non-parametric statistics can be used for small samples. There is no need for assumption of normal distribution. Also, ordinal and nominal data are used for non-parametric tests (Mertens, 1998:333).

4.1.3.1 MANN-WHITNEY U TEST

For two independent samples and ordinal level data, the Mann-Whitney U test is recommended (Mertens, 1998:333). The Mann-Whitney U (or Wilcoxon-Mann-Whitney) test is one of the widely used statistical tests in studies of behavior. It is used as “an alternative to a *t* test when the data are not normally distributed. Whereas a *t* test is a test of population means, the Mann-Whitney test is commonly regarded as a test of population medians” (Hart, 2001).

We will compare responses of two groups to the first 14 statements individually. Our assumptions are (1) the two samples are randomly selected from the population of the coursiers and (2) the two probability distributions from which the respondents are drawn are continuous.

Prior to the beginning of data analysis with inferential statistics, we should state the null and alternate hypothesis. Then, we can follow other steps of statistical analysis.

i. Null hypothesis.

H_0 : The responses of the SEIS School coursiers are equal to the Armor School coursiers for the each statement.

Alternate hypothesis.

H_1 : The responses of two groups for each question are not equal.

ii. Statistical test. The Mann-Whitney test is chosen because this study employs two independent samples, uses small samples, and uses an ordinal scale of measurement (from strongly agree to strongly disagree).

iii. Significance level. Let $\alpha = 0.05$, $m = 16$ (SEIS School coursiers), and $n = 16$ (Armor School coursiers).

iv. Sampling distribution. For $n > 10$, the significance of an observed value W_x determined by an equation that is asymptotically normally distributed (Siegel & Castellan, 1988).

$$Z = \frac{W_x \pm 0.5 - \mu_{Wx}}{\sigma_{Wx}} = \frac{W_x \pm 0.5 - m(N + 1)/2}{\sqrt{mn(N + 1)/12}}$$

- v. *Rejection region.* Since H_1 does not state a direction of difference, a two-tailed test is appropriate. Therefore, since $\alpha = 0.05$, the rejection region consists of all values of z which are greater than 1.96 ($z_{0,025}$) or less than -1.96 .
- vi. *Decision.* The test scores calculated in MINITAB are illustrated in Appendix D. For each compared statement, none of the test scores reject the null hypothesis at 0,05 alpha level. We conclude that this sample provides insufficient evidence at $\alpha=0.05$ to support the alternative hypothesis. Consequently, we cannot conclude on the basis of this sample information that responses of the two groups to each statement are similar. According to coursiers' reaction to the distance education, there is no statistically proven difference between SEIS School and Armor School. The problems are common and not related to one of the schools. However, we also cannot say that each group faces the problems about the same.

4.1.3.2 CHI-SQUARE TEST

The 15th question is about whether they have a computer in their home to read the CD-ROM or not. The respondents answered this question by yes or no. Therefore, the data is nominal. Among 16 respondents from each of the branch schools, 12 signal branch coursiers and 10 armor branch coursiers have a personal computer (PC) at home. The probability of PC ownership of signal branch coursiers are expected more than that of armor branch

coursiers because signal branch is mainly related with the communication and computer technology.

The chi-square test was used to determine the significance of differences between the SEIS School and the Armor School coursiers. Our assumptions are (1) the 32 respondents are a random sample from the population of coursiers and (2) the sample size, 32, is large enough so that, for every cell, the expected frequency will be equal to 5 or more.

i. *Null hypothesis.*

H_0 : The ownership a PC is unrelated to the coursiers' branch.

Alternate hypothesis.

H_1 : The ownership a PC is related to the coursiers' branch.

ii. *Statistical test.* The chi-square test is chosen because the 15th question uses a nominal scale of measurement (yes or no).

iii. *Significance level.* Let $\alpha = 0.05$ and N is the number of coursiers who responded = 32.

iv. *Sampling distribution.* The sampling distribution of X^2 is asymptotically distributed as chi square with df (degrees of freedom) = 1. The df is determined by $df = (r-1)(c-1)$, where r is the number of categories (2) and c is the number of groups (2). So, $df = (2-1)(2-1) = 1$.

- v. *Rejection region.* The rejection region for this test consists of all values of X^2 that exceed the critical value of the chi-square distribution for $df=1$. $\alpha= 0.05$. According to the table of critical values of chi-square distribution (Siegel & Castellan, 1988), the critical value of the chi-square distribution is 3.84 for $df=1$. $\alpha= 0.05$.
- vi. *Decision.* The table 7 summarizes the observed and expected frequencies of PC ownership for coursiers. Expected value (E_{ij}) is calculated by:

$$E_{ij} = \frac{(\text{Row total}) (\text{Column total})}{\text{Total sample size}} = \frac{r * c}{N}$$

12 of 16 the SEIS School coursiers and 10 of 16 the Armor School coursiers have a PC at home to read the CD-ROM. The expected frequencies in the table are at least 5. This means that the chi-square probability distribution can be used to determine an approximate critical value (McClave, et al., 1998: 935).

Table 7: Observed and expected frequencies of PC ownership.

PC ownership		SEIS School Coursiers	Armor School Coursiers	Combined
YES	Observed	12	10	22
	Expected	11.00	11.00	
NO	Observed	4	6	10
	Expected	5.00	5.00	
Total		16	16	32

The value of X^2 is computed by using the equation below:

$$X^2 = \frac{N(|AD - BC| - N/2)^2}{(A+B)(C+D)(A+C)(B+D)}$$

$$X^2 = \frac{32(|12*6 - 10*4| - 32/2)^2}{22*10*16*16} = 0.145$$

Since the observed value of X^2 (0.145) does not exceed the critical value (3.84), there is not sufficient evidence to reject H_0 . We can not reject the null hypothesis that the ownership a PC is unrelated to the coursiers' branch. However, we cannot accept the alternate hypothesis that the ownership is related to the branch. We expected to find a statistical significance for independence of PC ownership from

the branch but we could not. The respondents of signal officers and NCOs have more PC at their home than armor coursiers. It may be concluded that the signal branch personnel is more interested in computer technology. Therefore, they can evaluate e-learning differently from the armor branch personnel. But statistically, we could not prove this hypothesis, so, we avoid concluding that the PC ownership is related to the coursiers' branch.

4.2 QUALITATIVE ANALYSIS

For qualitative analysis, we collected data since the beginning of this study. We made notes whenever someone implied an important impression in the field. To collect additional qualitative data from the respondents, we designed the 15th and 21st questions as open-ended. 15th question asks comments and suggestions of respondents for the first 14 questions. 21st question is additional comments and suggestions to them for the distance education system.

In a qualitative analysis, we can use non-participants' observations. So, we shared results of our initial impressions with coursiers and instructors. Therefore, our impressions were strengthened.

After studying all of the data, we concluded that reactions of the coursiers are intensified on a few points. Now, we will discuss these points.

4.2.1 MOTIVATION

May be the most important point is the motivation of coursiers. We observed that majority of the respondents were not motivated for the course. The instructors of the face-to-face part were also explained that the motivation of the coursiers was very low.

According to expectancy theory of motivation, “a person’s motivation increases along with his or her belief that efforts leads to performance and that performance leads to rewards, assuming the person wants the rewards” (Nelson & Quick, 1997:149). These rewards may change from promotion to pay. However, the respondents do not believe that their efforts and increased performance will increase their rewards in job.

The courses that we evaluated are arranged as a license for coursiers to become a company commander or company NCO. But the respondents do not think there is a reward after the course for successful personnel. A respondent says, “In the past, the courses were considered as a reward, but it is a punishment now.” The reward value is one of the most important characteristics of the traditional face-to-face courses. Because a coursier usually goes to another city such as Ankara, İstanbul, İzmir, etc. This is a break to heavy workload, an opportunity to meet his friends, to know new people and to meet his personal needs in a big city. Therefore, it is considered as a vacation by the coursiers. But the distance education is completely inappropriate to this idea. The traditional course was divided to two parts and the face-to-face training was reduced to two weeks. Many

respondents want the duration of face-to-face part to increase. To be able to get more performance from coursiers, the distance education system should overcome the disappeared reward and add something over it.

Motivation of the coursiers can be maintained and even increased by providing feedback about their progress in the course. This feedback indicates that whether their efforts lead to improved performance in the course or not. But respondents do not think that they get a good feedback. The feedback should be given individually after each step in the distance education. The CD-ROM can give programmed feedback to entered responses of the coursier.

4.2.2 TIME PROBLEM

Almost all of the participants complain about lack of time for studying CD-ROM. Most of them could not find enough time to look at because of too much workload. They say: "We could not give enough time even to our family. There is no time to study CD-ROM at home." They told us their working hours have been extending up to 6 or 7 pm everyday and they have been working some weekends additionally. Therefore, they could not find enough time for studying as well as themselves.

One of the important factors that effect the distance education part adversely is supervision of the units by the superior commands. Many coursiers complain of supervisions that were done frequently by different commands.

Therefore, they were focused on these supervisions and could not study the notes sufficiently. Moreover, some coursiers came to the face-to-face part not opening one page. This problem occurs due to lack of managerial support. Their first or second commanders do not support the coursiers for giving enough time to the distance education.

4.2.3 DISTANCE EDUCATION CONTENT

Another important issue is which subjects will be given in the distance education phase. The contents of the distance education and face-to-face education parts should be selected very carefully. For example, the respondents say that training management issues were well known by coursiers, but judicial and financial issues were not. Therefore, it should be given more emphasis to issues that is required by the coursiers.

The distance education part is considered as a preparation for the face-to-face part. The CD-ROM should include basic and really necessary issues to prepare the coursier.

Time planning of contents for both of the distance education and face-to-face education parts should also be made according to importance of the subjects. The respondents say that it should be given more time to some important topics mentioned above.

In face-to-face part, the coursiers share their experiments and ask the problems that they encounter. Then, they can find solutions by discussing with the instructors and other coursiers. Therefore, according to most of the respondents, “face-to-face part of the course is more useful”. As a result, “its time should be increased.”

4.2.4 COMPUTER PROBLEM

Some participants do not have any computer that could read the CD-ROM in their home. The respondents say, “Computers in the work are used for other jobs.” So, they were not able to study the CD-ROM carefully at others’ computers. Since these coursiers were not able to use the CD-ROM, books were sent to them instead of the CD-ROM. These books have same information with the CD-ROM.

Additionally, some books were distributed in the face-to-face part. Most of the respondents say, “Books are more useful. You cannot find any computer in the terrain. But books can be read anywhere. Reading from books is more useful than from the CD-ROM.” But we think that they prefer books because of inefficient use of CD-ROM. The CD-ROMs were not prepared by using the advantageous computer technologies. They were mostly text-based.

4.2.5 PREFERENCE OF BOOKS

Many respondents prefer books to CD-ROM. Unlike books; the CD-ROM could present video, audio and animated materials. But these technologies were used in the course CD-ROM rarely. The CD-ROM looks like a condensed book.

Moreover, many coursiers used CD-ROM to get printed output. They printed all of the course material. Since the pages designed in HTML form, most of them are not appropriate for printing. We conclude that the multimedia technologies were not used effectively.

4.2.6 LEARNING ENVIRONMENT

The work and learning environment was the same for the distance education in the Army. The coursier could not pull himself from the work. This effects the coursier to concentrate on the training adversely. The learning environment should be separated from the work as much as possible.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 DISCUSSION

As we have said at the beginning, all organizations need to take advantage of the high-level information technology. It is a requirement to be competitive in a rapidly changing world. When building a new information system, it should be considered that this is an organizational change. So, the business processes of the organization should be redesigned. In a broad mean, we call it as “*business process reengineering*”.

Business process reengineering refers “the radical redesign of business processes, combining steps to cut waste and eliminate repetitive, paper-intensive tasks in order to improve cost, quality, and service, and maximize the benefits of information technology” (Laudon & Laudon, 2001:294). Before implementing a new information system, managers should rethink the business process. It should be analyzed and simplified. It requires radical changes in the flow of work. By reengineering, it can be benefited from the information technology widely. Moreover, negative affects of it can be removed.

In our opinion, when transforming the traditional face-to-face training to distance education, the training process should also be reengineered, i.e., design of printed material, course length, the communication media between the coursier and the instructor, etc.

5.2 CONCLUSION

After analyzing all of the data, we can say that the transformation of the training method caused a decrease in motivation of trainees. It was not able to benefit from the advantages of computer technology adequately. The contents of the distance education and face-to-face education parts should also be reconsidered. May be the most important thing to remember is that the first step is the satisfaction of trainees to benefit from the training program.

As a result, we conclude that there is a lack of reengineering in the army when applying distance education system. The application of the new system without a reengineered focus will not lead to the success that the army looking for in the future. The new system was just an electronic copy of the old one. Therefore, there is a resistance from both of the respondents (coursiers and instructors). They say, "The distance education can not be implemented successfully in the army" (in this way). To overcome this resistance, some required changes should be made in the current system. Now, we will explain these required changes by giving suggestions for Turkish Army. Then, it will be given a few suggestions for researchers in this subject.

5.3 SUGGESTIONS

5.3.1 SUGGESTIONS FOR TURKISH ARMY

1. **Motivation:** Training satisfaction can be produced by building motivation factors into the training. Course success should be positively reinforced by rewards, rather than threatened by punishment. The course performance of the coursiers should be evaluated in the annual performance appraisals. An instructor of the face-to-face education part of the courses suggests that all of the courses that an officer or NCO will take in his/her* period of work should be combined. By this way, the content and time of the course will increase to be able to consider promotion for successful coursiers. For example, one year promotion is very attractive for officers and NCOs.

The organization that gives the training should track performance of the coursiers closely. Because if they do not know whether the coursier has progressed through the course they can do little to motivate and help them. However, it is very difficult with the current system. Communication is very low and requires one-by-one contact.

2. **Enough Time:** To provide enough time for studying CD-ROM, a complete time period (for example, one day in a week, every afternoon in a day, etc.) should be left to the coursier. In these period, it should not be

* Up to now, the courses that we evaluated have not given any female, but it may be in the future.

expected any duty from him/her. He/she could devote that time only to study, either at work or at computer center. Additionally, the supervisors (commanders) of the coursiers should be accountable for the success of their employees.

3. Content of the CD-ROM: It should include the topics that give serious responsibility to the coursier in the work. Especially, judicial and financial subjects are very important. The Frequently Asked Questions (FAQs) should be added to the content and improved frequently.

4. Web-based Learning: In the long-term, the distance education system should be transformed to the web-based and synchronous education program. Unlike CD-ROMs, the Web-based materials can be regularly updated and revised. Java applets can be used to create complicated interactive learning materials (Weston & Barker, 2001). Web-based technology is very convenient to follow progress of trainees closely and communicate with them.

5. Knowledge Workers: To benefit from the capabilities of the information technology, it should be invested in knowledge workers. It requires time for developing expertise or money for hiring a professional programmer. The committee who prepares the CD-ROM should consist of instructional designers, art directors, expert programmers and evaluators. As a result, the distance education technology (CD-ROM or web-based) can be implemented effectively.

6. Program Specifications: The program in the CD-ROM or web-based technology should provide a means for coursiers to print all or some of the information in pages appropriately. It should also keep the records of the coursiers to give feedback.

5.3.2 SUGGESTIONS FOR RESEARCHERS IN THIS SUBJECT

Training evaluation and distance education are very attractive subjects for educators and graduate students. Technological advances effect both areas and new research topics arise due to their implementations. In making these researches, to be successful the evaluation has to be made immediately after the training (which would help us to reach most of the coursiers).

Also, a very interesting research topic that can be considered as a future work is to make another survey with instructors of the face-to-face education. They have important opinions. The results of two surveys can be compared.

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APPENDIX A

ENGLISH-TURKISH DICTIONARY

FOR SOME MILITARY TERMS

1 st Lieutenant:	Üsteğmen
Armor School:	Zırhlı Birlikler Okulu
Artillery and Missile School:	Topçu ve Füze Okulu
Branch School:	Sınıf Okulu
Captain:	Yüzbaşı
Company:	Bölük
Company Commander:	Bölük Komutanı
Company NCO:	Bölük Astsubayı
Infantry School:	Piyade Okulu
Land Forces Command:	Kara Kuvvetleri Komutanlığı
Non-Commissioned Officer:	Astsubay
Signal, Electronics, Information Systems School:	Muhabere, Elektronik Bilgi Sistemler Okulu
Signal branch:	Muhabere sınıfı

Specialist:	Uzman Erbaş
Terrain:	Arazi (eđitim, atıř ve tatbikat yapılan blge)
Training and Doctrine Command (TRADOC):	Eđitim ve Doktrin Komutanlıđı (EDOK)

APPENDIX B

QUESTIONNAIRE FORM

Katıldığınız kursun

Adı : _____ Dönemi : _____ Tarihi : _____

Uzaktan eğitim CD'si ile ilgili aşağıdaki yorumlara katılıp katılmadığınızı yandaki boşluklara (X) işareti koyarak belirtiniz.

		Kesinlikle katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle katılmıyorum
1	Kurs CD'si yeterli miktar ve kalitede bilgi içeriyor.					
2	Kurs CD'sinin içerdiği bilgiler yeterince güncel.					
3	CD'deki bilgiler mesleki açıdan yetiştirici.					
4	CD'de yer alan yenilik, mizah, oyunlar, testler, macera ve sürpriz türü özellikler sayesinde zamanın nasıl geçtiğini anlamıyorum.					
5	CD içerisindeki grafikler, animasyon, müzik, ses ve görüntü, konuların anlatımına yardımcı olarak eğitime katkı sağlıyor.					
6	CD'de kullanılan sesli ve görüntülü kısımlar <u>gereksiz</u> ve/veya <u>çok fazla</u> .					
7	Sesli kısımlar <u>rahatsız ediyor</u> ve ses kalitesi <u>iyi değil</u> .					
8	CD'deki sayfalar göze ve kulağa hoş geliyor ve çekici.					
9	CD'deki sayfa tasarımları eğitime katkı sağlıyor.					
10	Uzaktan eğitimin sonunda kendi durumumla ilgili iyi bir geri besleme alıyorum.					
11	Uzaktan eğitimdeki başarımın değerlendirilmesinin doğru olarak yapıldığını düşünüyorum.					
12	Kursun uzaktan eğitimle verilen bu bölümünden memnun kaldım.					
13	Bu şekilde uzaktan eğitimle verilen başka bir kursa da katılmak isterim.					
14	Bu kursu başka bir arkadaşıma da tavsiye ederim.					

15. Katılmadığınız konular için yorum ve önerileriniz nelerdir?

.....

.....

.....

.....

16. Evinizde, CD'yi kullanabileceğiniz, size ait bir bilgisayar var mı?

(a) Evet

(b) Hayır

17. Bilgi elde etmek maksadıyla kurs dışında da (evde veya işyerinde) CD'yi kullanıyor musunuz?

(a) Hayır

(c) 3-5 kere kullandım

(b) 1-2 defa kullandım

(d) 5 kereden fazla kullandım

18. CD'den kurs dışında da bilgi elde etmek istediğinizde ne gibi problemlerle karşılaşıyorsunuz? (Birden fazla seçenek işaretleyebilirsiniz)

(a) Çok fazla zaman alıyor.

(b) Kullanabileceğim bilgisayar yok.

(c) Bilgisayar var ama başka işler için kullanılıyor.

(d) Bilgisayar var ama CD'yi kurabilmem için yetersiz.

(e) Diğer problemler :

.....
.....

19. CD'yi kullanırken bir problemle karşılaştığınızda nasıl gideriyorsunuz?

(a) CD içerisinde karşılaşılabileceğimiz problemlerle ilgili detaylı bir YARDIM menüsü var.

(b) CD ile gelen dokümanlar karşılaşılabileceğimiz problemleri anlatıyor.

(c) YARDIM için bilgiler var ama yetersiz.

(d) Bir bilene soruyorum.

(e) Problemleri gideremiyorum.

(f) Diğer durumlar :

.....
.....

20. CD'yi kullanırken zamanın hoşça geçmesini sağlayacak neler var? (Birden fazla seçenek işaretleyebilirsiniz)

(a) yenilikler

(d) testler

(b) mizah

(e) macera

(c) oyunlar

(f) sürprizler

(g) hiçbiri yok

21. Eksik gördüğünüz konular için yorum ve önerileriniz nelerdir?

.....
.....
.....
.....
.....

APPENDIX C

RESPONSES OF THE COURSIERS

RESPONSES OF THE SEIS SCHOOL COURSIERS																
Question #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	
RESPONDENTS	1	1	1	2	3	2	5	4	2	2	3	3	2	2	2	1
	2	2	4	2	2	2	4	2	2	2	4	4	2	1	1	0
	3	2	4	4	4	2	5	5	3	2	4	4	4	2	4	1
	4	1	1	1	5	2	5	3	5	4	4	5	4	5	5	1
	5	2	2	2	4	4	5	4	5	2	4	2	4	2	1	1
	6	1	1	1	2	1	5	1	1	1	5	2	4	2	2	1
	7	3	4	4	5	4	5	4	2	2	4	4	5	5	5	0
	8	2	4	2							4	4	5	5	5	0
	9	1	1	1	5	3	4	4	2	2	1	2	4	4	5	0
	10	4	5	2	2	2	4	4	2	2	2	2	3	1	1	0
	11	1	1	2	5	4	2	4	4	2	5	5	5	1	2	1
	12	4	2	2	4	4	4	4	1	4	5	5	4	1	1	1
	13	3	4	4	4	4	4	4	3	3	3	4	4	4	4	1
	14	2	3	2	4	2	4	4	2	2	5	4	4	3	3	1
	15	2	4	2	5	5	5	5	1	1	5	1	5	5	5	0
	16	5	5	5	4	4	5	5	1	4	2	2	2	2	1	1

RESPONSES OF THE ARMOR SCHOOL COURSIERS																
Question #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	
RESPONDENTS	17	2	4	3	4	2	5	4	2	2	5	4	4	5	5	1
	18	4	4	3	5	5	4	4	3	3	1	5	5	5	5	1
	19	2	1	2							4	4	5	2	4	1
	20	4	1	1	4	4	5	3	2	2	2	2	5	5	4	1
	21	5	1	3							2	2	5	4	3	1
	22	1	1	1	4	1	5	5	1	1	1	1	1	1	1	1
	23	2	4	2							5	2	2	1	1	0
	24	1	2	2	5	5	4	4	3	3	1	5	5	5	2	0
	25	4	4	4	4	4	5	4	2	2	4	4	2	2	1	1
	26	2	4	2	4	1	5	3	1	1	4	4	2	2	2	1
	27	2	1	1	4	2	5	4	2	2	2	1	2	2	1	1
	28	3	3	2	4	4	2	4	3	3	2	4	3	4	4	1
	29	2	1	2	5	4	2	4	2	3	2	4	4	4	4	1
	30	2	3	2	4	3	3	3	2	2	4	4	4	2	2	0
	31	3	3	4	4	4	4	3	4	3	4	5	5	5	5	0
	32	4	1	1	3	2	5	4	3	3	2	2	1	1	1	1

APPENDIX D

MANN-WHITNEY TEST RESULTS

Mann-Whitney Test and CI: S1, A1*

S1 N = 16 Median = 2.000
A1 N = 16 Median = 2.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,0.000)
W = 235.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.2913
The test is significant at 0.2698 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S2, A2

S2 N = 16 Median = 3.500
A2 N = 16 Median = 2.500
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-0.000,2.000)
W = 291.0
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.3179
The test is significant at 0.2936 (adjusted for ties)

Cannot reject at alpha = 0.05

* Si refers to response data of the SEIS School coursiers and Ai refers to response data of the Armor School coursiers to the question i, i = 1,2,.....,14.

Mann-Whitney Test and CI: S3, A3

S3 N = 16 Median = 2.000
A3 N = 16 Median = 2.000
Point estimate for ETA1-ETA2 is 0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,1.000)
W = 270.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.8211
The test is significant at 0.8074 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S4, A4

S4 N = 15 Median = 4.000
A4 N = 13 Median = 4.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,1.000)
W = 211.0
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.7822
The test is significant at 0.7616 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S5, A5

S5 N = 15 Median = 3.000
A5 N = 13 Median = 4.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,1.000)
W = 210.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.7646
The test is significant at 0.7530 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S6, A6

S6 N = 15 Median = 5.000
A6 N = 13 Median = 5.000
Point estimate for ETA1-ETA2 is 0.000
95.2 Percent CI for ETA1-ETA2 is (-0.000,1.000)
W = 224.0
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.7822
The test is significant at 0.7632 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S7, A7

S7 N = 15 Median = 4.000
A7 N = 13 Median = 4.000
Point estimate for ETA1-ETA2 is 0.000
95.2 Percent CI for ETA1-ETA2 is (0.000,1.000)
W = 231.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.5340
The test is significant at 0.4785 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S8, A8

S8 N = 15 Median = 2.000
A8 N = 13 Median = 2.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,1.000)
W = 212.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.8358
The test is significant at 0.8273 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S9, A9

S9 N = 15 Median = 2.000
A9 N = 13 Median = 2.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,1.000)
W = 211.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.8000
The test is significant at 0.7849 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S10, A10

S10 N = 16 Median = 4.000
A10 N = 16 Median = 2.000
Point estimate for ETA1-ETA2 is 1.000
95.2 Percent CI for ETA1-ETA2 is (-0.001,1.999)
W = 311.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.0765
The test is significant at 0.0665 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S11, A11

S11 N = 16 Median = 4.000
A11 N = 16 Median = 4.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.001,0.999)
W = 263.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
1.0000
The test is significant at 1.0000 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S12, A12

S12 N = 16 Median = 4.000
A12 N = 16 Median = 4.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,2.001)
W = 274.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.7063
The test is significant at 0.6942 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S13, A13

S13 N = 16 Median = 2.000
A13 N = 16 Median = 3.000
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-2.000,1.000)
W = 250.5
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.6242
The test is significant at 0.6121 (adjusted for ties)

Cannot reject at alpha = 0.05

Mann-Whitney Test and CI: S14, A14

S14 N = 16 Median = 2.500
A14 N = 16 Median = 2.500
Point estimate for ETA1-ETA2 is -0.000
95.2 Percent CI for ETA1-ETA2 is (-1.000,1.000)
W = 271.0
Test of ETA1 = ETA2 vs ETA1 not = ETA2 is significant at
0.8065
The test is significant at 0.8007 (adjusted for ties)

Cannot reject at alpha = 0.05