CityUniversity of Seattle

THE USE OF DISTANCE LEARNING, FOR TEACHING COURSES IN REMOTE AREAS OF GREECE

By

Lengas Sotiris

A THESIS REPORT

Presented to the Project Management Program in the
School of Management of
City University of Seattle
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE in PROJECT MANAGEMENT

This Master Thesis was elaborated in the frame of the collaboration of the City University of Seattle and the Graduate Technological Education Institute (T.E.I.) of Piraeus to fully implement at TEI of Piraeus Campus the CU's MS in Project Management Program approved by the Hellenic Ministry of National Education and Religion Affairs as by decision E5/58291 published in the Hellenic Government Gazette (FEK) B/924/5- July-2005.

CityUniversity of Seattle

June 2010

THE USE OF DISTANCE LEARNING, FOR TEACHING COURSES

IN REMOTE AREAS OF GREECE

I, Lengas Sotirios, do hereby irrevocably consent to and authorize the City University of Seattle Library to file the attached thesis "THE USE OF DISTANCE LEARNING, FOR TEACHING COURSES IN REMOTE AREAS OF GREECE" and make such paper available for use, circulation, and reproduction by Library users at the City University of Seattle Library and all site locations.

I state at this time that the contents of this paper are my own work and completely original.

06 June 2010

APPROVED:

THE THESIS ADVISING COMMITTEE

a) Kontesis K.

---

b) Koutsogeorgis C.

---

c) Dimopoulos K.

THE CU PROGRAM DIRECTOR:

Milhauser Kathy

To my children, Nikos and Paulina

Resume

Sotiris Lengas, Mechanical Engineer.

I am a graduate of the mechanical engineering department of ASETEM/SELETE which is an institution that provides professors for the Secondary Technical and Vocational Education. After my studies I worked with the Technical Publishing firm ION Publications as Production Manager. In parallel I published 5 books:

S. Lengas, N. Parikos *Heating, Ventilation, Air Conditioning*, ION Publications 1987

S. Lengas, G. Parikos, *Auto Body Repairs*, ION Publications 1988

S. Lengas, K. Stathoulis, *Automotive Electrical Systems*, ION Publications 1991

S. Lengas, *Gas Engines*, ION Publications 1987

S. Lengas, *Automotive troubleshooting*, ION Publications 1991

In 1989 I was hired by the Ministry of Education as a professor in the Secondary Technical and Vocational Education and now I am Headmaster of the Technical Vocational Training Center (SEK) of Ag. Paraskevi. In parallel I attended seminars about computer programming and DTP and also created distance learning courses for the 01 Pliroforiki Company.

Abstract

The advance of Information and Communication Technology (ICT) and the reduction of cost in digital applications motivate course designers to develop new application of distance learning programs so as to meet the increasing educational needs in the knowledge-based society. As a consequence, distance learning courses are increasing in number, credibility and acceptability all over the world. The question is whether these programs are efficient in terms of costs. The main theme of this work is to investigate cost behavior and estimate cost efficiency of distance learning courses applied in low-inhabited, remote islands. The target group consists of high school students of Grade I. The distance learning course that is designed uses several scenarios of the “what-if form” and reaches the conclusion that cost of such solutions is far lower than that of any traditional course, even at the absence of scale economies.

Table of Contents

Chapter 1

1.1 Employment Position

I am employed as a teacher in the Public Secondary Vocational Education by the Ministry of Education. My current position is Headmaster of a Technical Vocational Training Center (SEK). The Technical Vocational Training Centers (SEK) are schools that support the needs of more than one Technical Vocational High Schools (EPAL) in Vocational Training. I have also authored books for courses in the Secondary Vocational Education and I have also developed lessons for the same courses through distance learning.

1.2 Nature of the Study

Because Public Secondary Vocational Education Schools are mainly situated in urban population centers the students in remote regions that want to study in a Technical Vocational School are forced to relocate. I decided to study the impact of a distance learning system as a solution for teaching students that are located in remote regions and are forced to relocate due to absence of Technical Schools near them.

1.3 Needs Assessment

Greece is comprised by the mainland and the Aegean Islands, thus this geomorphology forces the technical schools to be located in urban population centers in the mainland and the bigger islands.

In the case of the Technical and Vocational Training, the problem is more intense because the students are less and the cost of creating Technical and Vocational Schools is much higher due to the cost of the laboratories and special educational equipment. Therefore a distance learning system may stop the trend of student’s relocation due to the lack of Technical Schools close to their residence.

1.4 Purpose of the Study

The purpose of this study will be to study the impact of a distance learning system as an alternative in teaching courses for students located in remote areas of Greece. The parameters that will be studied will be the following:

- Impact of the system in the local economy
- Development of specifications for the courses
- Development of specifications for the hardware

1.5 Significance to my Workplace

As a Headmaster of a Technical Vocational Training Center (SEK) and author of distance learning courses I thought that there is an alternative in student migration to urban population centre's in order to attend Vocational Schools.

From the study of the application of such a system I can draw conclusions about the feasibility of such a system and also the viability of the system. It will also help the Ministry of Education find an economically viable alternative to classic Vocational Training Schools and help stop the internal immigration due to the lack of these schools.

1.6 Relation to the Program of Study

I will use the knowledge that I have acquired from the Project Management Program to help me accomplish the objectives that I have set for my Master Thesis. And to be more specific I will use the knowledge from the following courses:

PM501INTRODUCTION TO PROJECT MANAGEMENT

PM504PROJECT PLANNING AND CONTROL

PM507PROJECT FINANCIAL MANAGEMENT

PM508PROJECT RISKS AND DECISIONS

1.7 Definition of Terms

SEK	Technical Vocational Training Center
EPAL	Technical Vocational High School
YPEPTH	Ministry of Education
OTE	Hellenic Telecommunications Organization
OECD	Organization for Economic Co-operation and Development
ICT	Information and Communication Technologies
PSTN	Public Switched Telephone Network
ALN	Asynchronous Learning Networks
H.O.U.	Hellenic Open University
SME	Small and Medium-sized Enterprises
OEDB	Organization for Publishing Educational Books
OSK	Organization for School Buildings
A.U.Th	Aristotle’s University of Thessaloniki
LMS	Learning Management Systems

Chapter 2

2.1 Problem Statement

Greece is comprised by the mainland and the Aegean Islands, thus this geomorphology forces the technical schools to be located in urban population centers in the mainland and the bigger islands.

The most important structural deficiencies of the Greek economy are:

(A) The excessive concentration of the population (about one third) and the economic, social and cultural activities (most of them) in the region of Attica.

(B) In Athens - and to a lesser extent in Greece - and in some other urban centers, recreational and working conditions deteriorate, the movement and transport are problematic, nature, history and cultural environment are destroyed or significantly degraded and generally economic activity is adversely affected.

(C) Differences in quality of life among the regions and the disruption in economic, cultural and social structure of some rural areas, the adverse effects stretch across the country and erode national consistency.

In the case of the Technical and Vocational Training, the problem is more intense because the students are less and the cost of creating Technical and Vocational Schools is much higher due to the cost of the laboratories and special educational equipment. The children of the inhabitants of small islands and mountainous regions are forced either to relocate to urban centers, or to big islands.

2.2 Rationale

As a headmaster of a Technical School I came across many students that there families had relocated from their original place of living due to the lack of technical schools nearby.

In the year 2000 I participated in a team which developed courses for an internet based distance learning system that used the PSTN in regions with telecommunications infrastructure and GSM and Satellite technology in regions where there was no communications infrastructure.

2.3 Hypothesis/Objectives

Current telecommunications and information technologies provide the indispensable capabilities for lifelong education without the need for presence at a physical classroom; this is defined as “distance learning”.

This study will show that implementing such a system, training costs will be reduced compared to the costs of traditional education. This system will be implemented as a project and the objectives of this project are the following:

- Development of specifications for the hardware
- Development of specifications for the courses
- Impact of the system in the local economy

Chapter 3

3.1 Review of literature

Current telecommunications and information technologies provide the indispensable capabilities for lifelong education without the need for presence at a physical classroom; this is defined as “distance learning” the review of literature will provide information and data from previous applications of similar systems in Greece and also data about the cost of traditional education. One other area that the literature review will focus will be the statistical data about the internal immigration to urban population centers. (*Economic Surveys: Greece,* 2009)

3.2 Demographic Data

The total area of Greece is 131,944 km^2, of which mainland lists 106,777 km^2 (80,9%), while the island section lists 25.167 km^2 (19,1%). The extent of agricultural land is 35,455 thousand acres (29.8% of total area) but also include several mountainous areas.

The forest wealth of the land is limited. The mineral wealth of the country and includes several important minerals, but not in huge quantities (the most important are those reserves of bauxite, chromium, nickel, iron ore and construction materials). (*Economic Surveys: Greece,* 2009)

The energy raw materials are relatively limited. The main reserves are lignite (used for electricity generation) and to a lesser extent, deposits of oil, gas and hydrodynamic, but do not cover the total demand and needs. (*Economic Surveys: Greece,* 2009)

Recently, there is intense interest in the application of new technologies for the exploitation of solar and wind energy in the country. Looking at economic fundamentals between the Community Member States it is obvious that Greece is lagging behind both in

per capita Gross Domestic Product (GDP) and total investment. (*Economic Surveys: Greece,* 2009)

3.3 The Structure of the fundamentals of the Greek Economy

3.3.1 The structure by sectors of GDP in Greece

Primary Sector: The primary sector includes agriculture, animal husbandry, forestry and fisheries. As in the rest of the primary sector experienced a period of gradual decline in the contribution of GDP and also the employment of labor, the low educational attainment and poor and mountainous areas were further factors that prevented the application of new technologies and consequently the development of agricultural production. Although the living conditions of rural population showed significant improvement over time, the agricultural sector is characterized by structural weaknesses such as small farm size, poor and degraded lands, poor organization, lack of skilled personnel and low profitability. (*Economic Surveys: Greece,* 2009)

Secondary Sector: The secondary sector consists of industries, energy, water, mining, quarrying of minerals and construction. The industry in the broad sense includes all secondary sectors namely manufacturing, energy, water, mines, quarries, minerals and construction. In the strict sense of the industry include manufacturing, food companies, beverage, textiles, paper and chemicals. The creation of various infrastructure projects over time contributed to the increase in industrial production, increasing the contribution of the secondary sector (industry) in GDP, and employment in this sector. (*Economic Surveys: Greece,* 2009)

Greece, from an agricultural country which was the old economy based on primary sector has started to shift the focus in the secondary sector, and industrial industries. The 1950s and 1960s, apart from making large public investments in basic infrastructure to assist

in the development of Greek industry, attended and major investment projects in industrial areas (especially in areas of heavy industry, such industries steel, mining and shipbuilding). Despite efforts to boost investment in the industry through various incentives from development laws, over time there was a shift of investment and investment projects from heavy industry (e.g. chemical industries) in the form of light industry (e.g. example the food and drinks), especially during the 1980s and 1990s, a phenomenon known as de-industrialization. Reasons contributing to the de-industrialization are: small market, the existence of many small family businesses, changing the regime of protectionism (after the customs union with Europe) and the extension of trade liberalization (open economy) and the apparent inability the Greek small businesses to compete consistently large foreign firms and to cover part of the international demand. In addition to this lack of technological infrastructure, the lack of basic and applied research and not linking university research with Greek industry. Finally, most small businesses are defined and aimed more at domestic market and less on the development of exports. This was the main reason most often to exacerbate the cost of production of Greek products (rather than the apparent low labor costs) and eventually made their products uncompetitive compared with foreign firms. (*Economic Surveys: Greece*, 2009)

Tertiary Sector: The tertiary sector includes trade, transport (maritime, air and land), communications, public administration, banking, insurance, education, health and other services. Over time the Greek economy, as in all economies, showed an increase in the tertiary sector (services, public sector as well as banks) against the secondary sector. A large part of the increase in the tertiary sector in Greece is due to a soaring public sector as well as tourism. (*Economic Surveys: Greece*, 2009)

3.4 In conclusion:

As a general conclusion, Greek economy has shown impressive growth over the period until 1980. It is worth noting that per capita GDP in 1980 was higher by 4.7 times the corresponding level in 1950. In fact all of the period, the period with the best growth performance is the second half of the 1960s. Another reliable measure of economic performance is the change in real per capita income. The dramatic change of 7% in 1960 moderating to 3.9% in 1970, noted a significant decline in the 1980s, falling 1% in the 1980s. (*Economic Surveys: Greece,* 2009)

3.5 Structural Problems of the Greek Economy

The most important structural features of the Greek economy are:

(A) The excessive concentration of the population (about one third) and the economic, social and cultural activities (most of them) in the region of Attica. (*Economic Surveys: Greece,* 2009)

(B) In Athens - and to a lesser extent in Greece - and in some other urban centers, recreational and working conditions deteriorate, the movement and transport are problematic, nature, history and cultural environment are destroyed or degraded significantly and generally effective economic activity is adversely affected. (*Economic Surveys: Greece,* 2009)

(C) Differences in quality of life among the regions and the disruption in economic, cultural and social structure of some rural areas, the adverse effects stretch across the country and erode national consistency. (*Economic Surveys: Greece,* 2009)

(D) The unequal distribution of income and opportunities to choose lifestyles reduces social welfare attributable to residents of the regions. (*Economic Surveys: Greece,* 2009)

(E) The direction of investment in socially undesirable areas, limited use and exploitation of human and natural resources and the existing social infrastructure in some regions, increased production costs due to the lack of external economies, etc. Thus began a

process of cumulative inequality was very difficult to reverse. Already by the 1960s the problem of uneven regional development has been of concern to policy leadership and initiated the first regional policy measures. However, economic policy was in the 1950s and 1960s focused on developing the economy as a whole to address the consequences of the adventures of the war and regional policy were complementary in nature, but which gradually evolved and developed into the dominant policy of the Greek state. (*Economic Surveys: Greece,* 2009)

(F) The dispersion of natural resources and geographical position of the various areas is one of the main causes of the low level of development of all the mountain counties of the country (the percentages of mountain and upland soils are greater than 80%) and small and almost arid islands. (*Economic Surveys: Greece,* 2009)

3.6 Population Distribution, Production and Economic Activity

3.6.1 Population

The country has two large population concentrations. These are areas of Athens and Thessaloniki. A second element is visible very low densities, showing the main body of the country dominated by the Pindus mountain range. The vast majority of districts in the country found population densities of fewer than 50 inhabitants per square kilometer. (*Economic Surveys: Greece,* 2009)

The dynamics of population growth by region Areas with positive demographic change: The majority of the country's 11 provinces show a positive population change.

Areas with a negative population change: e.g. prefectures of Thrace (Evros, Rodopi) and the North Aegean, Florina, Kastoria and Trikala and Lefkada.

Areas with no population change: eg, Drama, Kavala, Serres, Kilkis, Larissa, Volos, Karditsa, Cephalonia, Ilia, Lassithi. (*Economic Surveys: Greece,* 2009)

3.6.2 GDP by region

Areas above the national average of GDP: Athens, Crete and southern Aegean.

Areas below the average GDP: almost all the rest. Major problems are the regions of Epirus and North Aegean, where prices are less than 85% of the national average and areas. Particularly problematic are also regions of the Peloponnese and eastern Macedonia and Thrace which are around 86% of the national average. Even lower are the areas of the island, Rodopi, Kastoria, Grevena, Thesprotia, Arta, and Evritanias (<65% of the national average GDP). (*Economic Surveys: Greece,* 2009)

3.6.3 Intra-regional disparities

The regions with the greater intra-regional disparities are Eastern Macedonia-Thrace, Western Macedonia and mainland Greece. The region with the lowest intra-regional disparities is Crete. (*Economic Surveys: Greece,* 2009)

3.6.4 The Human Factor

The human factor is a key element for the development of a country's economy. The term human factors mean the composition, structure and temporal evolution of the population and the *structure of educational attainment,* employment and unemployment of the population. The active population (i.e. one who is fit for work) is influenced (among other factors), by migration. (*Economic Surveys: Greece,* 2009)

External Migration: a phenomenon called the deployment of migrant outside the state boundaries of the previous installation. (*Economic Surveys: Greece,* 2009)

Internal Migration: the phenomenon called the establishment of the immigrant within the national boundaries of the previous installation. (*Economic Surveys: Greece,* 2009)

Temporary migration is one where the immigrant is likely to remain less than one year at the new facility. (*Economic Surveys: Greece,* 2009)

Permanent immigration is one where the immigrant will be more than a year at the new facility. (*Economic Surveys: Greece,* 2009)

The large flow of foreign labor migration in Greece determined the time period in the 1960s and 1970s. The main causes of migration were mainly economic (to find employment, better working conditions and wages), social (improving quality of life and living, providing better service conditions of education and welfare) and political (because of liquidity the political situation of that time). (*Economic Surveys: Greece,* 2009)

3.6.5 Consequences of migration

The economic impact was that a large part of the active Greek population, which mostly consisted of people 40 years old, was forced to emigrate for economic and social reasons.

Social consequences of immigration are abandoning the land and the countryside, as well as the diversity of cultural awareness of migrants (especially the second and third generation immigrants). Finally there are the demographic consequences of altered structure of the country's population in terms of gender and age, with negative consequences for the renewal and growth of the active population. Along with the outward migration has been intense at that time and the phenomenon of *internal migration* that led to urbanization, desertification and the development of major urban centers in the country. (*Economic Surveys: Greece,* 2009)

3.6.6 The workforce

The workforce of Greece (i.e. economic active population includes both employed and unemployed) amounts to four million people with information in 1993 (of which 3.719 million are employed and 281,000 unemployed). As an unemployed person is a person who wants to work but can not find a job at that time. (*Economic Surveys: Greece,* 2009)

The statistics do not accurately reflect the size of employment (and therefore unemployment) because the forms of employment described below, can not be measured statistically, and therefore can not be enclosed in the amount of employment:

Self-employment: (which occurs primarily among self-employed and farmers). (*Economic Surveys: Greece,* 2009)

The underemployment: (people working half the hours). (*Economic Surveys: Greece*, 2009)

Seasonal employment: (those working during summer months). (*Economic Surveys: Greece,* 2009)

Casual employment (those working in parallel in various professions). (*Economic Surveys: Greece,* 2009)

The overall percentage of unemployed in the total workforce was 8.3% in 1992. But the percentage is higher for young age of 25 years (where unemployment is close to 24%).

The highest unemployment rates are presented either in regions affected by industrialization, or in peripheral mountain regions. Increase in unemployment rate between 1993 and 1997 showed all regions outside western Greece and southern Aegean (because of the intense tourist development). The highest percentage of unemployed (44%) is concentrated in Attica, followed by Central Macedonia (17.8%). (*Economic Surveys: Greece*, 2009)

The lowest unemployment rates where experienced by the islands and Crete. These regions have smaller problems in female unemployment, youth unemployment and long-term unemployed (i.e. unemployed for more than a year).

Among the reasons given for the increase in unemployment is to introduce new technologies to cut workers, the absorption of surplus staff in the public where the work is not productive, the return of immigrants and political refugees (i.e. reversing the flow of

external migration, where since 1974 about 200,000 Greeks returned), lack of guidance and *poor education* (in some disciplines and shortages in other areas of surplus specialties). (*Economic Surveys: Greece,* 2009)

3.7 Previous Applications of Distance Learning Systems

3.7.1 The Cost of Implementing and Supporting a Distance Learning System

The experience accumulated in distance learning systems is mostly by the universities that have developed and implemented such systems. Recent years developments in ICT's (Information and communication technologies) provide an effective means to overcome the distance in time and space between the teachers and the students in distance learning and they are used to bridge the instructional gap. The term includes both education and training programs designed to meet the needs of adults that may consider a second chance for education, those who have limited spare time, those who live in remote areas, those with physical disability or those who want to update their knowledge or learn new techniques and methods for their work. The use of the World Wide Web provides alternative education chances and act as a new instructional tool. (Tsolakidis & Fokiali, 2010)

Distance learning can be synchronous and asynchronous. In the synchronous type, the distance learning focus on web application via Internet or via ISDN broadband transmission for audio video teleconferencing. Hence, networks and their applications provide the means to cover the instructional gap when the instructor and the trainee are in different locations. (Tsolakidis & Fokiali, 2010)

On the other hand, in the asynchronous type, web-based learning using asynchronous learning networks (ALN) focus on a new educational environment based on web-page applications via Internet, however, they still remain interactive through their proper design. Asynchronous distance learning can be web seminars, web lectures, web laboratory exercises,

web field trips, and finally, web term papers. In these paperless courses, students use their computers to obtain all needed information for class assignments, to discuss with every other student in the class, and to submit any kind of project. In the case of web lectures the instructor, as well as the student, can have access to the available material on the Web, that makes learning more real, interesting and dynamic than formerly was possible, and yet, stimulates the student. (Tsolakidis & Fokiali, 2010)

There are numerous advantages in distance learning, such as the quality of education that is improved, life long learning that is enhanced, the ease of obtaining information on the Web, the availability of quality information, the ability of the web environment to stimulate students interest, the promotion of engagement and communication between students and the instructor that becomes more frequent and productive including exchange of information and ideas, the recognition of Web value for learning, the evolution of traditional types of learning, etc. E-learners, having graduated from distance learning programs, they feel connected to their virtual classroom community and they have obtained new coping skills, a high level of discipline and self-direction and higher persistence rates. (Tsolakidis & Fokiali, 2010)

The on going projects in higher education institutes in Greece were collected through a research on the web pages of the Greek universities. The research concerned the retrieve of official university websites that included information on distance learning applications and similar on going telematics projects. The web research included all sites with the key words “distance learning”, “Tele-education”, “Tele-working”, “web courses”. “Web-teaching”, “computer based training” in combination with “higher education”. (Tsolakidis & Fokiali, 2010)

The collected data from the websites about distance learning in Greek universities were analyzed in terms of their content, and especially as it concerns the type of distance learning they support, their objectives, the target groups and the theme issues they cover.

3.7.2 Hellenic Open University

The Hellenic Open University (H.O.U. -Hellenic Open University) in Patras, Greece, is an innovative project for our country and it aims at distance education in university level in combination with the development and exploitation of educational material and research on new technology instructional methods Hellenic Open University. (*Hellenic Open University* Retrieved from the WEB http://www.eap.gr Date of access 10 April 2010). Students with a high school degree only, are able to enroll –usually on line- in theme units that substitute the traditional courses. During their courses they have to communicate with the instructor, they prepare assignments and they form on line groups with their co-students. In the end of their studies they have acquired a certificate for attending courses or for training, concerning certain theme units, graduate and post-graduate titles, such as in Humanitarian Sciences, Technology, Social Sciences and Applied Sciences. (Tsolakidis & Fokiali, 2010)

Research evidence on economic evaluation of courses of the H.O.U. shows that the benefits overrun the costs in any case and the system is judged to be a beneficial investment choice. (Michailides, A., G. Arabatzis, 2003) With regard in a survey on student drop-outs in H.O.U., more than half of the drop-out students claimed that they were not able to estimate precisely the time that they would have to devote to their professional activity and as a result the time dedicated to their education decreased unexpectedly. (Xenos, M., Pierrakeas Ch., Pintelas, P., 2002) Furthermore, one out of four students felt that their knowledge was not sufficient for university level studies.

3.7.3 Aristotle University of Thessaloniki

The ISDN Telecommunications Centre of AUTH administers and manages the operation of the telecommunications network and offers advanced services to all users of the academic community, while constantly upgrades current services and presents new ones (H. O’ Lawrence, 2007). Aristotle University in Thessaloniki is innovative since 1995 where

takes place the first pilot applications for the exploitation of new technologies in education within the 1st EE funded project. Since 1997, there is an important effort to transform the bigger university in Greece in a dual mode university that can provide a great part of graduate and postgraduate programs with both traditional methods and distance learning, with the creation of 6 virtual tele-classes and one tele-conference room. These virtual classrooms are fully equipped with the necessary peripherals to support transmission of 512 Kbps, 4-Isdn BRI interface, Video transmission (30 frames per sec), Video teleconference with protocol H.320 over ISDN network and T.120 applications, echo cancellation, ambient noise suppression, internet access, remote and PTZ cameras, data show projector, document cameras, electronic white board(smart board), VCR, omni-directional microphones, wireless microphones, 10 push-to-talk microphones, and finally a tablet pad for interactive control with the system In August 2002, A.U.Th.'s Multipoint Conferencing Server (Picturetel's Montage 570) was upgraded to support from 4 to 8 remote videoconference sites. The Telecommunication Centre of AUTH is now able to offer multipoint videoconferencing services supporting up to 8 simultaneous remote audio, video and data connections. Hence, academic community members can participate in distance learning activities, educational seminars and conferences with up to 8 participants from remote sites. This application sharing feature (T.120) offers multi-location data sharing for all remote sites, while Continuous Presence option delivers a more natural videoconference allowing the participants to view multiple simultaneous sites (4 of the 8) on their displays. A great number of teleconferences sessions took place within these last 8 years between Aristotle University and other academic units all over the world, where students and faculty from all participating universities had the opportunity to attend lectures, to participate in international conferences and to effectively train through seminars professionals such as teachers in all levels of education in new technology aspect. (Tsolakidis & Fokiali, 2010)

3.8 Distance Learning In the Context of Lifelong Learning

The development in the early sixties of the human capital theory that has clarified the links between education, productivity and economic development can be considered as a major explanatory factor of the dramatic increase in macro- and micro-demand for education (T. Schultz, 1961). Supply of education, on a lifelong level, reflects the continuous attempt to meet this demand. In this context, in the relevant literature there is a wide consent that the dynamic development of lifelong learning has been helped enormously by the development of ICT and especially the distance learning techniques. (Schuetz, 2007; Thorpe, 2005; Dinevski, and Kokol, 2004)

By allowing potentially anyone to have access to knowledge, distance education technology has accelerated production of diverse lifelong learning activities that aim to serve identifiable learning needs. (McMahon, 1998; Oosterbeek, 1998)

Within this frame, the numerous case studies through which the relevant field is investigated show that distance learning is continuously gaining appreciation in many parts of formal, non-formal and informal education as described below.

3.8.1 A. Formal education

The objective of improving educational quality in a knowledge-based economy and society implies the transformation and modernization of formal education systems, a process that involves the active adoption, support and development of e-learning, and distance learning. (T. Rekkedal, May 2006)

In respect to primary and secondary education, the cases of substitution of face-to-face teaching by distance learning are expected to be rare, particularly since the school plays not only an educational but also a social role, contributing to the children’s preparation for their future life. However, even in these educational levels, e-learning and distance learning have attracted the interest of educational designers who seek for tools and methods to

supplement traditional approaches and upgrade educational quality. This situation is expected to last at least until the cognitive, pedagogical and social effects of distance learning courses are fully investigated and researchers are able to answer the question whether and up to what extent distance education can substitute traditional methods.

A significant field in which distance education is well accepted is that of multigrade primary schools. (Tsolakidis, pp. 83 – 90, 2001 (in Greek); Little, 1994)

These are small schools, usually situated in remote, rural, low-populated areas, in which one educator teaches pupils of different age and educational level, in one single classroom.

Although these schools are marginal cases in an educational system, the perpetuation of their operation in almost every country is a strong argument in favor of them. (Tsolakidis, Sotiriou, et al, 2006) For multigrade school pupils, e-learning can be an important tool in support of the learning procedure, upgrading educational quality, hence meeting educational as well as social targets. (Tsolakidis, 1999; Veenman, 1995; Sotiriou, Tsolakidis, et al, 2006)

Distance learning and e-learning are recognized as offering opportunities to advance the benefits of tertiary education to populations that are dislocated by time and place and are difficult to reach. (McCormack, 1996)

At this educational level, distance learning is connected with the institutionalization of open universities and the supply of distance courses on undergraduate and postgraduate level. In such applications, distance learning is addressed to students that, for professional, family, economic or other reasons, cannot attend courses offered face-to-face. (Rumble, 1997)

3.8.2 B. Non-formal education

Distance education is gaining acceptability in nonformal education. Professional training, and in particular in-service training, is facilitated enormously by distance learning approaches. (Strother, 2002) Organizations of both, the private and public sector, no matter

whether big, medium or small in size, can either design and develop or simply adopt and apply distance learning training programs. (Paulsen, 2009; Paulsen and Vieira, 2006)

These programs allow employees to meet their needs for personal and professional development and give opportunities to organizations to become more efficient.

Teachers' training is a specific case in this context. (Sotiriou, Tsolakidis, et al, 2006; Tsolakidis and Fokides, 2001)

3.8.3 C. Informal education

The truly lifelong process whereby every individual acquires attitudes, values, skills and knowledge from daily experience and the educative influences and resources in his or her environment is helped enormously by ICT and distance learning technology. It is accepted that such techniques support individualized knowledge acquisition as a modern source that can be added to the traditional sources of informal knowledge, such as the family and the neighbors, the work and play, the market place, the library and the mass media. (Smith, 2002)

In conclusion, distance learning has gained solid grounds in any form and level of education, forming its own "market" of innovative diversified products as well as an interesting field of on-going research. Under such circumstances, it is not surprising that its economic behavior, and especially its cost structure and efficiency, became an issue worth investigating. (O' Lawrence, 2007; Oosterbeek, 1998)

3.9 Research in Cost of Distance Learning

3.9.1 A. Typology

The vast diversity of distance learning programs creates difficulties in forming a typology for the works referring to cost issues. An attempt is presented below, using as criteria the programs' contents, the central concept adopted, the methodological approach applied and the conclusions derived from the relevant works.

With respect to the contents, it is noted that research works in cost matters are based on three types of comparisons: (Fokiali, and Tsolakidis, 1999; Cukier, 1997)

a) Between institutions that offer similar programs using different approaches e.g. (Fokiali, and Tsolakidis, 1999; Inglis, 1999);

b) Between programs, in the same learning institution, applying traditional approaches on the one hand and distance learning techniques on the other. e.g. (Potashnik, and Adkins, 1996; Gandhe, 1995); and

c) Between distance learning programs that differ in the applied technology, e.g. (McGraw, and McGraw, 1993).

With respect to the central concept:

a) The majority of studies focus on cost issues per se, avoiding reference to benefits. (Pillai, and Naidu, 1991)

b) In the studies in which an integrated cost-benefit approach is adopted, researchers prefer to evaluate cost independently from benefits, mainly due to the lack of consensus on the definition of returns and the non availability of relevant data. (Cukier, 1997; Inglis, 1999)

c) Some studies attempt to quantify cost effectiveness in a wide sense, using techniques for measuring the relationship between the total inputs and outputs, expressed not necessarily in monetary terms, while some other prefer to make estimates of costs and benefits in financial terms, approaching efficiency by means of a rate of return. (Rumble, 1997)

d) Focusing on the benefits, some studies consider as benefit the quantitative and qualitative result that learners get from the program, while some other concentrate in estimating the learning institution’s profit.

e) Focusing on cost, there is a wide consensus about the main cost categories in the learning institution's budget that should be considered in a distance learning course. Such categories are the costs of developing e-materials, the e-delivery costs, overhead and infrastructure costs.

Each of these categories is further analyzed in several cost items. It is important to characterize cost items as fixed or variable and/or as recurrent, non-recurrent and, in some cases, as semi-recurrent. (Bartolic-Zlomislic, and Bates, 1999)

These distinctions help in analyzing the behavior of cost functions and derive conclusions about cost efficiency if one or some factors (e.g. the number of learners) change.

With respect to the methodology, the relevant research works in their majority present case studies, mainly due to the programs' diversity. This creates difficulties in making generalizations of the results. (Cukier, 1997)

With respect to the results:

a) Almost all studies accept that there are great limitations in approaching cost efficiency. (Jung, 2005) These limitations refer to the programs' diversity, difficulties in modeling programs, methodological problems, lack of adequate and reliable data on cost variables etc. (Bakia, 2000)

b) Cost efficiency of distance programs is reported to be high -in many cases higher than that of conventional programs, in cases of high number of learners attending the course. As some cost categories are shared by many learners, as the number of attendants increases, scale economies emerge, decreasing unit cost per learner. (Whalen and Wright, 1999)

c) Cost efficiency of learning organizations is reported high in cases of high number of distance programs.

As some cost categories are shared by many programs, as the number of programs increases, scale economies emerge, decreasing unit cost per program and learner.

d) The initial fixed cost of distance courses is reported to be relatively high, due to the fact that for launching a distance program, it is necessary to make some non recurrent expenses for equipment, initial training and basic connections. Such costs are not necessary if a face-to-face approach is selected. (Tsolakidis & Fokiali, 2010)

e) In distance courses the marginal cost added whenever the learners' group increases by one attendant is relatively small. This is so because the size of an e-class can be large, since each distance educator can address its teaching to relatively large numbers of learners. On the contrary, in traditional programs, the size of a face-to-face class cannot be large. Since the number of learners per educator is an index of educational quality, teaching costs are expected to vary with the number of learners. (Tsolakidis & Fokiali, 2010)

From the above analysis it may be derived that distance learning becomes economically interesting in cases of large-scale programs. Evidence supports the view that when the number of learners is small, face-to-face courses are economically more efficient than distance ones; however, there is a critical number of learners over which distance courses become more efficient than traditional ones in terms of cost. This situation is depicted in Figure 1, in this; line D1 and line F represent the cost of distance and face-to-face approach respectively. At low numbers of learners line F exceeds D1. However there is a critical number of learners, represented by point A after which distance learning becomes more efficient than the traditional approach. The distinction between variable and fixed cost is critical in explaining this frame. (Tsolakidis & Fokiali, 2010)

3.9.2 B. The Proposed Frame

The question that arises is whether the general frame of cost behavior described above depicts a constant situation in the distance learning market, with no exemptions.

In an attempt to answer this question, two major factors were considered justifying reservations.

The first factor emerges if one examines chronologically ordered research works containing estimates of distance courses cost efficiency. Studies that were carried out up to the mid-nineties reach the conclusion that cost efficiency of distance courses is comparable to face-to-face approaches, yet not significantly higher. (Phelps, Wells, et al, 1991)

Later studies, however, seem to be more definite about cost efficiency In these it is well clarified that cost efficiency in distance courses is well above cost efficiency of those delivered in a face-to-face approach. (Jung, and Rha, 2000; Bartolic-Zlomislic, and Brett, 1999)

In other words, it is observed that there is an interesting gradual differentiation in cost efficiency of distance learning programs, showing that this has improved over time.

The second factor reflects the attempt to explain this differentiation, by looking at the trends in the market prices of the main cost items of distance courses. In the typical cost structure of a distance learning course, it is suggested that the relative cost inefficiency at low number of learners is due to the high contribution of some cost items for the initial launching of the program, such as purchase of technological equipment and software, cost for a high resolution telephone line connection and initial training of educators and learners in ICT. (Rumble, 1997). These items were relatively expensive in the past.

However, it needs but a comparison of some market prices in the past and now to understand that the initial cost for launching a distance learning program has now decreased substantially. Thus, the trend of prices of ICT hardware and software is constantly diminishing, particularly if affordable, mainstreaming applications are selected. (Tsolakidis & Fokiali, 2010)

Moreover there are many cases in which computers and other electronic equipment are already available for other purposes in a learning organization. The same applies for the cost of the Internet connection. Also, the cost for initial training in the use of ICT of both

educators and learners is not as high as in the past, since the expansion of the culture for ICT as well as the increasing degree of friendliness of ICT applications have minimized such requirements. Finally, this initial cost for infrastructure, training etc is not an exclusive characteristic of distance courses. Given the penetration of ICT in traditional education, the same cost is required for launching a face-to-face program. (Tsolakidis & Fokiali, 2010)

Of course not all cost items have decreased. Teaching costs have increased. Also, a cost category that has not followed the diminishing trend of ICT infrastructure refers to administration cost. This many times was not factored in the cost structure. (Rumble, 2001)

The importance of administration in a distance learning course is big, given that administrative quality offsets the absence of face-to-face communication.

Overall, it may be supported that the total cost of distance courses, if holistically viewed, is no longer represented by line D1 in Figure 1. The reduction of cost for launching distance courses results in changing the slope as well as moving downwards the line representing cost of distance courses of this Figure. If cost reduction (hence also the downwards movement of the line) is adequately extensive, then the cost of distance courses is lower than that of face-to-face courses, irrespective of the number of learners. The new line representing distance learning cost is now D2. If this situation holds, there is no longer a point of intercept between the new line of distance learning costs (D2) and face-to-face costs (F), in other words distance courses are expected to be more efficient in cost terms, even at low numbers of learners. This situation represents a revised frame of comparison of cost efficiency in distance learning and traditional approaches. (Tsolakidis & Fokiali, 2010)

This new hypothesis is similar to the one proposed in a recent study of Morten Paulsen, in the field of small and medium-sized enterprises (SMEs). It refers to distance training experiences from case studies in eighteen enterprises in eight European countries

programs and concludes that there are many e-learning programs which are cost efficient irrespective of the size of the organization that uses them. (Paulsen, 2009)

3.10 The Case of Cost Efficiency Evaluation of A Distance Course Addressed To Pupils In Small Islands

The revised frame proposed above is investigated in this work in the form of a case study that refers to planning and organizing a pilot distance-learning course for pupils of lower secondary school that live in remote and isolated low-inhabited Greek islands of the Aegean. The study is cost-centric and concerns evaluation of cost efficiency of the distance course in comparison to the traditional face-to-face approach. (Tsolakidis & Fokiali, 2010)

The reason for designing this program is founded on the fact that in some very small islands, the number of pupils is so small, that the operation of a face-to-face class for is economically and practically very difficult, if not impossible. (Tsolakidis & Fokiali, 2010)

Such a case is not rare in the Aegean islands: Thus, for the year 2009-10, in the island of Pserimos, there is only one pupil that should attend Grade I of lower secondary school. For the same period, in some neighboring islands, the number of pupils is very low –not exceeding five. (Tsolakidis & Fokiali, 2010)

For a secondary school to operate on the island, it needs at least three teachers to stay there and work on a full-time basis. This is practically and economically difficult, if not impossible. In front of such a situation, the options available for the pupil are:

Not to attend high school, a situation against the Greek Law of a 9-year compulsory education and an equivalent to abolishing the learner’s right to have access to education.

To leave the island either on his/her own or with his/her family; this is a difficult decision not only on individual grounds (given the young age of the student, the lack of proper infrastructure to cater for such a problem) but also for social reasons since it leads to a gradual de-population of the island. (Tsolakidis & Fokiali, 2010)

To attend a distance learning course organized on purpose; this is the option examined here as the initial scenario.

The proposed pilot program is based on the cooperation of the University of the Aegean, one secondary school in Rhodes (city that hosts the university) and the learner(s).

The program is supported by the Ministry of Education that plays the role of a catalyst since it is institutionally responsible for issuing the required permits for such an operation. The collaboration of other institutions, such as the Prefectural Administration, and the Municipalities is important in facilitating the launching and operation of project. (Tsolakidis & Fokiali, 2010)

The course covers the modules of lower secondary grade I. According to the organizational frame, the remote learner(s) can register in a secondary school situated in the City of Rhodes that hosts the University. This school has the required equipment and infrastructure and the appropriate human capacity for the operation of the program.

Preferably, this should be an evening school which has a relatively light program. The institutional and legal part is covered by recalling the Greek Law that provides regulations for studying at home, if specific circumstances hold; under such circumstances, distance learning is also accepted as an appropriate approach. (Tsolakidis & Fokiali, 2010)

A blended method (synchronous- asynchronous) is proposed with teleconference applications in a wide range.

The program provides also some limited face-to-face teaching in specific subjects that is expected to be covered in short visits of the instructors to the island.

It is proposed that the instruction needs are met by high school teachers who either will be employed for this purpose on an hourly basis or are already working and will do distance teaching overtime. The latter case is preferable since the distance teachers could be the ones working in the school where the learner is registered.

Though not necessary, it is purposeful that the learner visits the secondary school at the beginning of the school year so as to be introduced to the instructors and to get informed about the program. It is necessary to visit the school at the end of the school year, so as to participate in the exams. (Tsolakidis & Fokiali, 2010)

The University of the Aegean has an important role to play. It is the coordinator and animator of the project, and provides know-how as well as administrative and technical support. On the island, the distance course will be hosted in the premises of the primary school. The technological infrastructure includes: (a) a broadband connection to the Internet, (b) at least one personal computer (according to the case), (c) cameras, printer, and a Data Projector. (Tsolakidis & Fokiali, 2010)

3.11 Cost Estimation

The evaluation presented here uses different scenarios of a “what if” type. The initial scenario examines a marginal case in which the e-class consists of one learner in one island. It should be noted that economic theory often refers hypothetically to such marginal cases, for analytical and methodological reasons, as for example in the model of “one consumer-one producer” scenario. As already mentioned, however, such a marginal case is not hypothetical in the case of education in small Aegean islands.

Once cost efficiency is estimated for this marginal case, the critical assumption of one learner is relaxed and the case of two, three, up to N learners is approached. For every change in the number of learners, a different cost evaluation occurs, following the assumptions about the behavior of each cost category and cost item. Once a maximum estimated number of learners in one island is reached, the assumption of one island is relaxed, and the process is repeated for a second, third, up to M islands. In this way, numerous scenarios may be produced and conclusions may be drawn concerning the program’s cost efficiency, based on the assumptions about cost behavior.

The different scenarios are presented in Table 1 and Figures 2 and 3. In these there is an estimation of cost issues by cost category and by contributor (public- private). Eight different cases are examined concerning respectively the launching of a distance learning course in one, up to four islands. For each island two scenarios are presented, differing in the number of learners. (G. Rumble, 2001)

An estimation of the main cost categories is given analytically in Table 1. It reflects the market prices in year 2009. Some of these costs items are expected to be funded by the public sector (e.g. Prefecture, Municipality, other) and some by private sources. Given the social character of the program the greater part is expected to be financed by the public sector. (Varoglu and Wachholz, 2001).

Figure 2 depicts the behavior of total cost in the different scenarios of distance courses and Figure 3 compares the distance learning scenarios to the cost of traditional approaches.

Some remarks and findings from Table 1 are as follows.

a) Public expenditure is much higher than private expenditure, in correspondence to the social character of the program. Private expenditure could be diminished further in case that some cost is funded by the public sector (e.g. this year PCs were offered to grade I pupils).

b) With respect to infrastructure costs, it is likely that the host secondary school has already the required equipment. (Tsolakidis & Fokiali, 2010)

However the fast depreciation of such equipment justifies replacement costs.

c) Technical support includes also continuous training in technical issues of the participating teachers. (Tsolakidis & Fokiali, 2010)

d) Some cost categories as e-delivery and administration costs have the highest contribution in the structure of expenditure. This supports the view that distance learning is is no longer resource intensive. (Sherry, 1996)

e) The unit cost per learner is higher at the extreme case of one pupil on an island. Even in this case however, given that the lowest teacher's salary is more than 20.000 euros per year, the total cost approached above is far lower than the cost necessary for employing three full-time teachers, necessary for the operation of a face-to-face course. (Tsolakidis & Fokiali, 2010)

f) As the number of pupils in the same island increases, the program's total cost rises too. However, as expected, the rise in cost is not proportionate to the number of learners and this is so because cost of infrastructure, administration and overhead, cost for educational material and teaching costs (i.e. the entire public expenditure for the program) remains fixed.

The only cost category that varies proportionally to the number of learners in the same island is the private expenditure. As a consequence of such a behavior of cost items, the structure of cost categories changes as the number of pupils increases. The relevant contribution of infrastructure, administration and overheads, educational material, and teaching costs decreases indicating the presence of economies of scale. (Tsolakidis & Fokiali, 2010)

g) Compared with the cost of employing three teachers for operating a full-time course on the island, the distance method seems highly efficient.

h) As the number of islands to which the program addresses increases, total cost for launching increases too, although the total rise is not proportional to the number of islands. Equipment cost at school remains fixed, administration costs increase slightly mainly due to the rise in traveling costs and some more hours spent on administrative and technical support. (Tsolakidis & Fokiali, 2010)

Teaching costs remain constant up to the case of fifteen learners (three islands). Once this number is exceeded, teaching costs are expected to increase so as to ascertain educational quality. As with previous scenarios, in the case of the third scenario, the distance learning course provides a far more efficient method, in economic terms, than the operation of a similar face-to-face course. (Tsolakidis & Fokiali, 2010)

3.12 Cost of Secondary Education

3.12.1. Introduction

This study applies the methodology of the cost of educational programs, as used internationally to cost curriculum in High Schools in the country. The empirical results of this survey believed that they would "shed light" in this area has little in this investigated systematically, and simultaneously provide the basis for a more systematic and continuous recording and evaluation of educational expenditure in a rational education policy. The research findings are commented as compared to other EU countries to promote educational effectiveness in our country.

3.12.2. Research cost of secondary education by level

The study will undertake a theoretical overview of the concept of educational costs, although it was very interesting and useful. I reported on the empirical question of the type, amount and efficiency of education spending is always in the context of neoclassical economic theory (Marshal, Schultz, Mincer). Simultaneously, I emphasize the need for proper management of financial education resources, as is well known, particularly in the scientific field, that the proper allocation and use of financial resources can increase efficiency, without the need to change more than the amount.

The research aims at a sampling rate calculating all forms of cost includes the educational process in high school. The treatment costs will be informed by the contributions and experiences of economists of education (Psacharopoulos, Stone).

The first classification / discrimination used in the cost of educational programs are among the direct or indirect and durable or capital costs. (Psacharopoulos, and Woodhall, 1985; Dimakos, 1994). The direct costs include the costs that are often costs relating to materials and services that bring immediate and short-term results. The indirect costs on the purchase of buildings and capital equipment, whose results are expected and enjoyed for longer (usually more than a year).

Before presenting the empirical research will make a brief reference to the concept of opportunity cost, which is used to fill some gaps in pricing, if it includes costs relating to "missed opportunities, personal or social level. More precisely, the term opportunity cost refers to the monetary value of actions / resources which might not be directly measured and the valuation is the indicative price of the most productive alternative, quantitative use (Levin, 1983). This is the difference between the concept of opportunity cost is usually referred to by the concept of the cost of the program.

It is obvious that the opportunity cost is broader than the book cost, estimated by the rate of spending. For example, when calculating the opportunity cost of an investment education program be counted even if they are not purely financial costs, the cost of the time students or pupils, the cost of goods and services provided by the local community (e.g. Free food and accommodation for teachers) and the cost of any voluntary work. More specifically, a student attending a course devotes some time for both the intercepts and for the study. The opportunity cost of time the student is what I call loss of income, meaning income would have been a student if the time it worked, which is the opportunity cost for the student. To calculate the income that used the data showing income people the same age and with similar

qualifications tailored to specific economic processes. As stated by G. Psacharopoulos (1985). Knowledge of the opportunity costs of educational programs, both for economists of education, and for politicians, because it affects the efficiency of educational programs for which they are both interested.

3.13 Planning of the empirical research

The data collection method was compared with the type, form and source of origin. Sources of information were the Ministry of Education, Departmental Directorates, Local Authorities, the OEDB, School Managers, Teachers and where necessary students.

Regarding the selection of the sample of schools was based on the reasonable assumption that there are differences and variations between urban and rural areas, for educational expenses. That's why I try to identify where possible these differences through discussions with stakeholders in the Ministry of Education and some schools. These discussions and personal experiences of researchers help in selecting a sample of schools in the greater Attica region, which has areas with characteristics of both urban, and rural communities. Selected a total of four schools and four high schools in the region of Attica (two from each group were in urban areas and two rural).

3.13.1 Types of expenses / costs being calculated

The training costs associated with teaching is direct and indirect and mainly occurs at the school. For this collection of information was from documents (eg financial reports) and interviews at schools in the sample. The cost categories were formed in proportion to the categories used in international practice in institutional cost analysis (institutional cost) training programs (Thomas, 1990; Stone, 1992; Mace, 1990; Karadjia, 1997). For the cost of textbooks, the information came from the Agency Office of School Books. Specifically, the cost information related to:

1. Operating costs of institutions (high school)

- Expenditure on personnel (secretaries, cleaners, caretakers)

- School maintenance costs (bills, oil, cleaning) and procurement of furniture (OSK).

- Expenditure on procurement of stationery

- Cost of postage and telephone costs

- Expenditure on transport and travel

- Cost of textbooks (OEDB)

3.13.2. Teachers Payroll

In this category of costs data were collected at the school. The information related to payroll and time required of teachers who teach in all parts of drills and high schools that was included in the survey. The cost of hours spent by the Headmaster in the administration accounted analogous to the proportional allocation of all pupils of the school.

3.13.3. Capital expenditure

This category refers to costs, indirect costs related to the purchase of buildings, laboratories, libraries and equipment items to offer benefits, as generally understood, more than a year. One way of calculating this cost category is, after agreeing to the life of the item to us and set the discount rate price, find the amount per year for the depreciation of the value (used in the special case Discount factor tables Valuation - discounting factor-). In this case it is necessary to agree on the definition of "life" of capital goods and the selection of an appropriate discount rate.

An alternative method of cost of capital expenditure is one which is based on the concept of opportunity cost, in which I discussed earlier. The rationale to this case is that the building e.g. whose value is estimated cost to the Greek government what it would receive from alternative use with subleasing. In other words, if rented whether rent should take. I

considered the method most appropriate to the Greek reality, where information on the cost of subleasing, since there is still insufficient number of public buildings rented to house schools.

3.14 Calculation of costs

3.14.1 Expenditure on schools (secondary schools)

The calculation of costs, based on data drawn from documents of the Ministry of Education and related economic accounts of the schools and pay teachers

(Per school and classroom with similar numbers of students). For these amounts where calculated in December 2007 prices.

The average running costs of institutions for the categories listed above, excluding the cost of textbooks is 80,00 € per pupil in Gymnasio (lower secondary general education) and 95,50 € in Lykeio (higher Secondary Education).

This amount must be added the cost of books per student per class. The amounts calculated in this case are shown in table II.

3.14.2 Cost of teachers

This amount is calculated annually per student in current prices with a time reference point in December 2007. Used the average of the amount calculated for each class of the sample of schools to find the weighted average for each class in all schools.

Information on the salaries of all teachers in schools in the sample and those relating to the mandatory hours of each teacher and the teaching hours in each section were collected by the Office of Education data. The total cost of instruction in each section was distributed to students. That is, the relevant calculation, as distributive has known problems and risks inherent in evenly spread distribution costs, but is most suitable when used as sources of information monthly payroll (Mace et al, 1999).

Chapter 4

4.1 Methodologies and Procedures Used In the Study

In earlier chapters of this thesis, I have recognized that the purpose of this study is the identification of the benefits, provided from the implementation of a distance system in teaching courses through distance learning systems to students located in remote areas of Greece compared to the traditional type of education.

The methodology used in this study is based on the “Evaluation project” which is about devising a project and implementing it so that I can have comparative data to decide if the implementation of such a system is economically and educationally viable.

The Project has been designed on the assumption that the recipients of training must both be and co-designers. It is they who, having the experience and the feasibility of the proposed solutions, to propose improvements that may result from testing solutions in field conditions at schools. More generally, basic principle of the project is to offer a flexible system of training, which can be adapted to suggestions undergoing training, and be continuously improved in line with the findings of frequent and multi-level evaluation.

- The basic principles of the training program.
- The technological infrastructure and skills required available to trainees at the school.
- The characteristics of the technologies used to implementation our distance learning project
- The structure, content and implementation procedures of the Training program.
- The program evaluation procedure and the involvement of teachers, trainees in their implementation.

4.2 The Project

4.2.1 Problem statement

On large islands, mountainous and other disadvantaged rural areas of my country, children who live there are trained in schools, through which the Greek state seeks to providing not only of any access to education but education quality and also help the local population to continue to dwell in the region.

Unfortunately, in practice, schools are one of the abandoned structures, most of the educational system. Due to various geographical and socio-economic peculiarities, lack of technical infrastructure and staff, schools are still operating margins of the educational process. Teachers in these schools are experiencing significant challenges in highly heterogeneous systems. Their initial training is insufficient and the need of continuous training is obvious, especially in remote areas where inexperienced junior Teachers often serve for short intervals.

Providing training to teachers in remote areas is a difficult task. The transition to training centers in urban areas is significant, but is actually feasible due to the inherent weakness of the school to fill the vacuum created by the transfer of a teacher.

4.2.2 Mission and Goals

My mission is to prove that the implementation of a distance learning system in teaching courses in remote areas of Greece will provide a feasible alternative to the traditional school and teacher and that it will greatly help the local economy by preventing the internal immigration of families due to the lack of schools.

The project must give answers to the following topics:

- Development of specifications for the hardware
- Development of specifications for the courses

- The cost of developing the system and the courses
- Deployment cost of the system

4.2.3 Project Charter

This project has been undertaken by Infinite Solutions Inc. which is a company that develops educational software for distance learning systems and LMS applications. The CEO of Infinite Solutions is Pitsos Kitsos and assigns this project to Phoebus Logos who is the PM of the project. The project team will be staffed by people from different Departments of Infinite Solutions and will be the following:

Phoebus Logos	Project management
Vasilis Tokas	Software Department
George Mitsos	Software Department
Nick Lalos	Hardware Department
Spiros Kalos	R&D Department
Akis Panos	Telecommunications Department
Manolis Papadopoulos	Accounting Department
George Pappas	Quality Control Department
Lola Lalou	Secretary
Nick Profis	Training Department

Besides Infinite Solutions that will undertake the key role of running, managing and coordinating the project key stakeholders and subcontractors to this project will be the following companies and institutions:

OTE	the National Telecommunications operator of Greece

Pedagogical Institute	is a research institute that advises the Ministry of Education about the Educational Policy and also evaluates the educational programs
Aegean University	the University-network that links the Aegean islands, with expertise in Pedagogy, new technologies and the needs of remote schools
INTRAKOM	Provider of innovative information technology and Telecommunications equipment
HellasSat	managing body of the Greek satellite

4.2.4 Assumptions

The remote schools in most parts of the world suffer from abandonment and lack of support. My project is a pilot project with duration of just eighteen months, aiming to reverse this picture, showing the way to provide remote support and continuous training to teachers in this neglected area of the educational system.

The program is flexible and adaptable to the particular conditions of the trainees.	The variety of circumstances faced by each teacher and correspondingly the specific needs for training required a design that allows the Education Program to be characterized by flexibility and adaptability to individual needs.
The program is modular and is comprised by independent modules and topics	I have selected modular structure of the program and the organization of training content in autonomous objects, allowing the trainees to focus attention on those parts of training that they believe are useful.
The trainees co-design and provide feedback to the Program.	The Program is continuously adapted through feedback from the trainees and teachers, who help their comments to pinpoint the problematic points that need revision and improvement. Furthermore, the educational activities are designed so they promote reflection, and innovations
The trainees participate actively communicate and interact.	Participation in the Program provides opportunities for the abolition of isolation of teachers in remote areas. To fully exploit the Program, active participation is needed, communication, exchange of ideas, and generally interaction with the teacher other trainees and trainers.

Also a very important feature of the training program is the structuring of two distinct implementation cycles, as presented below.

The basic objective of the project is all stakeholders (trainees, trainers, educators and technicians) to cooperate closely to continuous improvement of the program. In this context and for evaluation of the training course, and to introduce changes and improvements, implementation of training under the

Dias is in two phases, which are respectively first and Second Round of training.

The logic of this choice is obvious if you study the course implementation of the training program as a series of steps in the time axis: (Figure 4)

4.2.5 WBS

The Work Breakdown Structure of this project is on Figure 5 of the Appendix

4.2.6 Statement of Work

For this project I have 14 summary tasks (level 2 tasks) that define the project. A statement of work for each summary task is defined below:

1.	Recording and analysis of the needs	Pedagogical institutions that implement the project cooperate to record and analyze the needs for Training the teachers serving in the schools.
2.	Design and development of the original Training Framework	Based on the analysis, and experience in training teachers the institutions design and develop an initial Framework for the Educational Program
3.	Implementation of the First Cycle	After the conclusion of the first cycle the data collection mechanism accumulates and categorizes the data from the participants of the first cycle

4.	Analysis and Redesign	Evaluation of the collected data on the implementation of the project and a redesign phase according to the responses of the participants
5.	Implementation of the Second Cycle	I have the implementation of the second cycle of the project and the evaluation mechanism collects data about the implementation and the response of the participants
6.	Final Evaluation	I analyze the data collected in Second Cycle and evaluate the whole Education Program, in order to reach to final conclusions and propose further actions, improvements and features.

4.2.7 Master Project Schedule

The project has been planned to be executed in 18 months. The Master Project Schedule of this project is on the Figure 6 of the Appendix

4.2.8 Risk Assessment

Risk ID 2.1: I may not find suitable hardware. Because the information market changes rapidly, we may be unable to find suitable hardware in the predetermined price range. Then i will have to buy hardware that has the required specifications but will have a higher price.

Risk ID 3.2: Because of the complexity of the project i may find problems in the course design operation and there may be a need of redesigning part of the course. In order to mitigate the risk I am prepared to eliminate some of the features of the course, that are not critical to the use of the system.

Risk ID 4.2: I may need more time to design the courses. Because of the complexity of the project I may need more time to design the courses this will lead to a schedule overrun.

In order to mitigate the risk I am prepared to eliminate some of the features of the courses that are not critical to the use of the application.

Risk ID 4.3: I may need more time to design the long distance learning website. Because of the complexity of the project more time may be needed to design the courses website this will lead to a schedule overrun. In order to mitigate the risk I am prepared to eliminate some of the features of the website, that are not critical to the use of the application.

Risk ID 5.2: There may be a possibility of incompatibility between parts of the hardware with the software. To mitigate this risk I have decided to buy hardware that has been tested and approved by the software vendors.

The Risk Matrix is in Table IV of the Appendix.

4.2.9 Configuration Change Control

A Project Change Control Board will be established consisting of one member of Software, Hardware, R&D and Accounting departments. This board will be responsible for evaluating all requested changes to project scope. The Board is the only group that can authorize the change to the project. The change control document is listed in Figure 8 of the Appendix.

4.2.10 Customer Satisfaction

The main problem that I face is to familiarize the teachers and the students with the new teaching method. I have estimated that the users of this project will be in the position to receive proper training without relocating from their place of origin. In order to test the results of the distance learning project after the first cycle of implementing the there will be data collection about the progress of the students and the efficiency of the courses. There will be also an evaluation of the system flaws and maybe it will be necessary to redesign parts of the courses or the distance learning platform depending from the users feedback. After the

second cycle with the usage of the redesigned platform there will be a second phase of evaluation that will show if the platform is a feasible and viable solution to satisfy the learning needs of students in remote areas of Greece compared to a traditional learning system.

4.2.11 Project Control

Project Web application will be monitored and executed by a full time project manager assigned to it from Infinite Solutions Inc.

The project manager will daily oversee progress of the project and the subcontractors. The project team and manager will have an office space on the premises of Infinite Solutions Inc. near the Software department during the development of the software and also an office on site during the installation and the testing of the software.

The project manager and subcontractors will be required to keep documentation for the project at all times. This includes all software, hardware and courses development related documents and project management documentation.

4.2.12 Financial analysis

As can be seen from table VI of the appendix the total cost of the project will reach the sum of 1.218.865,00 € including the purchase of all the necessary equipment and the work needed to deploy, implement and evaluate the system spanning in an 18 moth period. In Figure 7 shows the time capital needed during the lifecycle of the distance learning project.

Chapter 5

5.1 Results

This chapter is the core essence of this thesis since firstly is the outcome of the whole research and secondly provides food for thought for the development of the next chapter. It is the results as they derived from the procedures and processes described in methodology. The results have been divided into two sections, as the procedures in methodology, and have revealed several interesting findings. The two sections are: the literature findings and the long distance learning project outcome.

5.2 Costs of School Buildings

For this type of expenditure, which is fixed / capital, gathered information from eight departments of education in six prefectures of the country, where there were departments of the prefectures of Attica. The data relates to the amount of rent for leased school buildings in the area and the same number of students housed in schools. Using these data was calculated (as a weighted average) the target annual cost per pupil for school buildings. As mentioned, this amount will be used as an indicative measure of the value of school buildings in general. This amount is 148 € per student per school year.

5.3 Total cost

Table 4 shows the total cost of secondary education at constant prices of December 2007. Table 4 shows the average cost of lower secondary and upper secondary education as a result of the calculations described here. In our case I see that an average student of the higher secondary level education costs in a range between 2.251,00 € and 3.722,90 € per year per student. These prices apply to schools that have classes comprised from 20 to 25 students per class. In the case of small islands and mountainous regions the classes are comprised by 2

to 10 students per class. When I take in mind this factor the cost per student per year is exponentially higher.

5.4 Distance learning Project

The distance learning project has a total cost of 1.218.865,00 € and this cost applies to the cost of work by all the stakeholders and also the cost of the needed materials and equipment.

The greatest cost is the work which reaches the sum of 1.213.590,00 € or 99,5 % of the total cost of the project. Because it is the first application the cost is great because it is mainly Research and Development with the greatest cost dedicated in the development of the specifications of the program and the courses. One other cost after the ministry decides to implement such a project will be the training of the teachers so they become familiar with the system and its intricacies.

Off course there will be a need for physical presence in order to set up the systems and also there will be a need to teach basic computer skills to the students. As for the lab courses and necessary skills that are required from the students in the case of the technical and vocational education a separate program must run that will gather the students from the remote areas in a urban lab center for a period 2 weeks and teach them the basic skills needed by the curriculum with the cost of transportation and hospitality paid by the Ministry of education. Such programs run also today mainly for the students of mountainous regions through chartered busses from the Ministry of Education. These are the main considerations that must be taken in consideration besides the cost of the basic program.

The total number of students in remote areas that will benefit from such a program is about 15.000 students and if I divide the cost of the project with this number I come to a cost per student of 85,00 € on which I must add the cost of the hardware and training needed

bringing the total cost per student to 761,00 € per student per year compared to the average cost of the classical education which is roughly 2.500,00 € per student per year.

Chapter 6

6.1 Discussion, Conclusions and Recommendations

It is a challenge to design distance learning programs that can be addressed to learners in remote sites. (Sotiriou, Tsolakidis, et al 2006)

The challenge concerns two main criteria, educational effectiveness and cost efficiency. With respect to educational effectiveness, two are the major issues that should be taken into account during the design of such courses. The first refers to the ensuring that learners will have the ability to participate in e-Learning platforms. Therefore, before the start of a course, the learners must test the necessary infrastructure and become familiar with the tools to be used within the course, as it is very easy for them to feel disappointed and abandon the education procedure. The second important issue is the great importance of the instructor's role, which was proved crucial for the success of the synchronous learning. Therefore, an instructor should be well trained and prepared, not only on the content of his presentation, but on how he will stimulate the learner's interest and ensure their active participation, before he enters the virtual classroom.

With respect to cost efficiency -which is the subject of this work- this can be approached by reference to the major categories that constitute the expenditure of a distance course. Such categories are the educational material, teaching – tutoring, administration, infrastructure and access to the web. (Rumble, 2001)

The behavior of these categories in time helps in providing a new cost structure that ascertains cost efficiency. Thus in the nineties and the beginning of the two-thousands it was well accepted that costs are driven by a series of factors among which the course population, the number of courses offered and the length of the course. (Rumble, 2001)

If the number of learners was small, then scale economies did not emerge and distance learning was expected to be less efficient in economic terms than face-to-face learning. (Sherry, 1996)

It is impressive up to what extent these costs have changed over time: Nowadays, ICT equipment is relatively cheaper, and most of the times already available in the learning institution. Viewing form the learner's aspect, while in the past joining a distance learning course was often connected with purchasing electronic hardware and software, now these are often part of the household's equipment. The same applies for the access to the web, which compared to the past, is cheaper, more efficient and most of the times available in both, the learning organization and the learner's household.

Furthermore, nowadays the need to train instructors and learners in the use of the computer and the web is many times a redundancy. Even if some instructions are required, the already existing background of knowledge by the participants limits significantly the time, hence also the cost, needed for this.

Given the behavior of most cost categories, it is not surprising why distance learning courses prove to be competitive, even at very low number of remote learners, as is the extreme case that concerns courses designed for pupils of low-inhabited islands of the Aegean.

In spite of the simplified assumptions that were set, some of which should be further investigated, the study gives a schematic but realistic estimate of the cost structure of the designed distance course that promises to provide solutions to major educational problems at low cost.

The major finding is that the cost of such solutions, under certain conditions, is far lower than that of any traditional course, even at the absence of scale economies. Of course,

if the program is addressed to more pupils and/or more than one islands, the emergence of scale economies further increases the program's efficiency, thus multiplying its benefits.

It seems that the potential that distance learning provides is Among other the work shows that in extreme cases of very small numbers of pupils, a situation often met in the small islands in the Aegean Sea, distance learning may solve the educational problem by providing education of good quality in a socially acceptable, but also economically efficient way.

References

Bakia, M. (2000), The Costs of ICT Use in Higher Education, What Little we Know, *TechKnowLogia*, pp. 49-52, Retrieved Jan. 2010, from http://www.techKnowLogia.org .

Bartolic-Zlomislic, S. and Bates, A. W. (1999), Assessing the costs and benefits of telelearning: *A case study from the University of British Columbia*, Retrieved Jan. 2010 from http://research.cstudies.ubc.ca/nce/reports.html

Bartolic-Zlomislic, S. and Brett, C. (1999), Assessing the costs and benefits of telelearning: *a case study from the Ontario Institute for Studies in Education of the University of Toronto*, Retrieved Jan. 2010 from http://research.cstudies.ubc.ca/nce/reports.html

Cukier, J. (1997), Cost-benefit analysis of telelearning: developing a methodology framework, *Distance Education*, Vol . 18(1) pp. 137-152.

Dinevski, D. and Kokol, P. (2004, June), *ICT and Lifelong Learning*, in EURODL, II, 2004 [EDEN 2004, *Annual Conference, New Challenges and Partnerships in an Enlarged European Union*, 16-19 June, 2004, Budapest University of Technology and Economics, Budapest, Hungary.

Doug, V. (2002, fall), Distance Learning: Promises, Problems and Possibilities, *Online Journal of Distance Learning Administration*, Vol. V (III).

Fokiali, P. and Tsolakidis, C. (1999, July) Economic parameters of Distance Education, unpublished paper presented in the International Conference *Current Trends in Economic and Labor Market*, University of the Aegean(Greece), Purdue University (USA) & Society for the Advancement of Economic Theory (USA), Rhodes.

Gandhe, S. K. (1995), The Role of Distance Learning in Economic Development of the South Asia Region, in *One World Many Voices: Quality in Open and Distance Learning, selected papers*,, Vol. 1, D. Sew (ed), Birmigham UK , pp. 265-268.

Inglis, A. (1999), Is online delivery less costly than print and is it meaningful to ask?, *Distance Education*, Vol. 20(2) , pp. 220-239.

Jung, I. S. (2005), Cost-effectiveness of online teacher training, *Open learning: the Journal of open and distance learning*, Vol. 20 (2), pp. 131-146.

Jung, I. S., and Rha, I. (2000), Effectiveness and cost-effectiveness of online education: a review of literature, *Education Technology* pp. 57-60.

Little, A. (1994), Multigrade teaching- A review of research and practice, Education Research Paper No 12, *Institute of Education*, University of London.

McCormack, T. (1996), Understanding the True Cost of Distance Learning, *MC Journal, The Journal of Academic Media Librarianship*, Vol. 4(1).

McGraw, B. A., and McGraw, K. L. (1993), The performance support system as a training solution: Cost/benefit considerations, *Journal of Instructional Delivery Systems*, Vol. 7(4), pp. 439-468.

McMahon, W. W. (1998), Conceptual Framework for the Analysis of the Social Benefits of Lifelong Learning, *Education Economics*, Vol. 6(3), pp. 309-346.

Michailides, A., Arabatzis, G. (2003), Economic evaluation of post-graduate course entitled *Quality Secureness of the Hellenic Open University*, Proceedings of the 2nd Panhellenic conference on Open and distance education pp.129-136.

Ng, K. (2000), Costs and Effectiveness of Online Courses in Distance Education, *Open Learning*, Vol. 15(3), pp. 301-308.

O' Lawrence, H. (2007), An Overview of the Influence of Distance Learning on Adult Learners, *Journal of Education and Human Development*, Vol. 1(1).

Organization of Economic Cooperation and Development, *Economic Surveys: Greece, 2009* OECD, 31 Jul 2009

Oosterbeek, H. (1998), Innovative Ways to Finance Education and Their Relation to Lifelong Learning, *Education Economics*, Vol. 6(3), pp: 219-251.

Paulsen, M. F. and Vieira, V. (2006), *State of the Art Report, E-learning Quality in European SMEs - An Analysis of E-learning Experiences in European Small and Medium-sized Enterprises*, ELQSME Project, Bekkeshua, Norway.

Paulsen, M. F. (2009), Successful E-learning in Small and Medium-sized Enterprises, *EURODL* (I).

Phelps, R. H., Wells, R. A., Ashworth, R. L., and Hahn, H. A. (1991), Effectiveness and costs of distance education, using computer mediated communication, *American Journal of Distance Education*, Vol. 5(3), pp. 7-19.

Pillai, C. R., and Naidu, C. G. (1991), Costing Terms and Methodological Framework, in: *Cost Analysis of Distance Education*, Pillai, C. R. & Naidu, C.G. (eds), IGNOU, New Delhi, pp. 7-18.

Porter, L. R. (1997), *Creating the Virtual Classroom: Distance Learning with the Internet*, Wiley Computer Publishing, John Wiley and Sons, Inc.

Potashnik, M., and Adkins, D. (1996), Cost analysis of Information Technology Projects in Education: Experiences from Developing Countries, in *Education and Technology Series*, Vol. 1(3).

Rekkedal, T. (2006), *State of the Art report on Distance Learning and Elearnong Dquality for SMEs*, paper prepared for the EU Leonardo project, E-learning Quality for SMEs: Guidance and Counseling.

Rumble G. (2001), The costs and costing of networked learning, *Journal of Asynchronous Learning Network* Vol. 5(2), pp. 75-96.

Rumble G. (1997), *The Costs and Economics of Open and Distance Learning*, Open and Distance Learning Series, London.

Schuetze, H. G. (2007), Individual Learning Accounts and Other Models of Financing Lifelong Learning, *International Journal of Lifelong Education,* Vol. 26(1), pp. 5-23, 2007.

Schultz, T. (1961), Investment in human capital, *American Economic Review,* vol. 51, pp. 1-17.

Sherry, L. (1996), Issues in Distance Learning, *International Journal of educational Telecommunications,* Vol. 1(4), pp. 337-365.

Smith, M. K. (2010, April), Globalization and the incorporation of education, in *The Encyclopedia of Informal Education*, retrieved from, http://www.infed.org/biblio/globalization.htm.

Sotiriou, S., Tsolakidis, C., Koulouris, P., Touloumakou, A., Konstantinidi, A. and Sotiriou, M. (2006), ZEUS: E-Training Teachers in Rural Areas Through Satellite, in *Technology in Education, Proceedings of the International Conference on ICT in Education*, K. Fernstrom and K. Tsolakidis (eds) Canada, UCFV Press, pp. 128-137.

Strother, J. (2002), An assessment of the effectiveness of e-learning in corporate training programs, *International Review of Research in Open and Distance Learning*, Vol. 3(1).

Thorpe, M. (2005), The Impact of ICT on Lifelong Learning, in: *Perspectives on Distance Education. Lifelong Learning & Distance Education,* C. McIntosh & Z. Varoglu (eds), UNESCO, COL, pp. 23-42.

Tsolakidis, C. (1999), Distance Education: *The Telos experiment,* in Teaching of Mathematics and Information and Communication Technologies in Education. Conference, University of Crete (ed), Rethymno, Crete, (in Greek).

Tsolakidis, C. (2001, September), *Information and Communication Technologies: Indispensable tool for the improvement of teaching in Multigrade Schools,* in E-

learning, new technologies in education and distance education. Conference Proceedings, Ellhnogermaniki Agogi (ed), pp. 83 – 90, (in Greek).

Tsolakidis, C. and Fokides, M. (2003), *Information and Communication Technologies as a Tool for Improving Teaching in Multigrade Schools*, in: Proceedings, Learning Without Limits: Developing the Next Generation of Education, European Distance Education

Tsolakidis, C., Sotiriou, S., Konstantinidi, A. and Koulouris, P. (2006), *The Network of Multigrade Schools of Europe: NEMED*, in Readings in Technology in Education, Proceedings of the International Conference on ICT in Education, Fernstrom, K. and Tsolakidis, K. (eds) Canada, UCFV Press, pp. 122-127.

Varoglu, Z. and Wachholz, C. (2001 Jan- Feb), Education and ICTs: Current Legal, Ethical and Economic Issues, *TechKnowLogia*, pp. 15-19.

Veenman, S. (1995), Cognitive and non cognitive effects of multigrade and multi-age classes: A best evidence synthesis, *Review of Educational Research*, vol. 65 (4), pp. 319–38.

Whalen, T. and Wright, D. (1999), Methodology for cost-benefit analysis of web-based tele - learning: case study of the Bell Online Institute, *American Journal of Distance Education*, Vol. 13(1), pp. 23-44.

Xenos, M., Pierrakeas, Ch., Pintelas, P. (2002), A survey on student drop-out rates and drop-out causes concerning the students in the course of Informatics of the Hellenic Open University, *Computers and Education, Elsevier Publishing.* NH. Vol. 39, issue 4, pp. 361-377.

Appendix

List of Figures

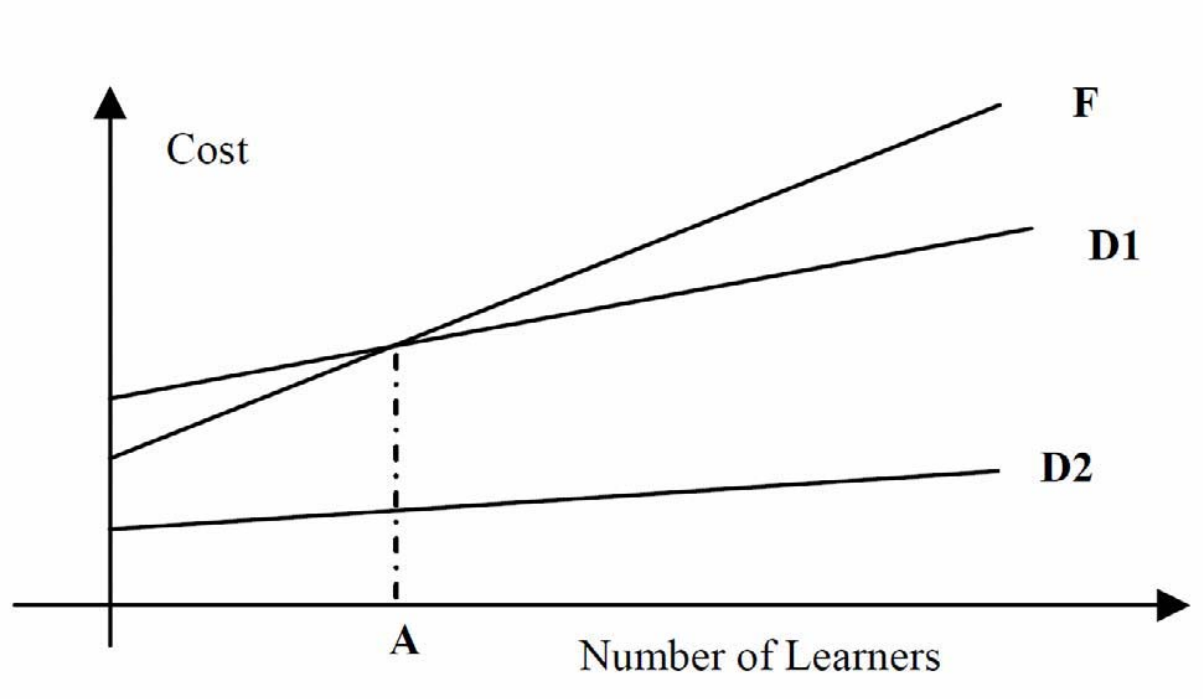

Figure 1 Cost comparison between distance and traditional (F) approach. Existing (D1) and proposed (D2) frames

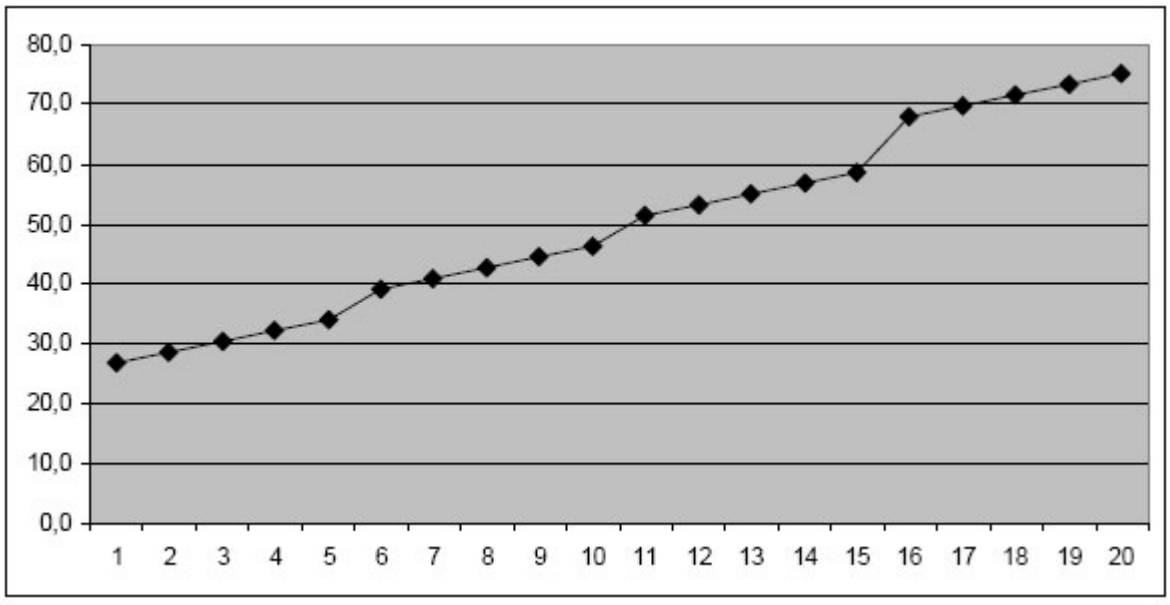

Figure 2 Distance Education in small islands –Behavior of total cost

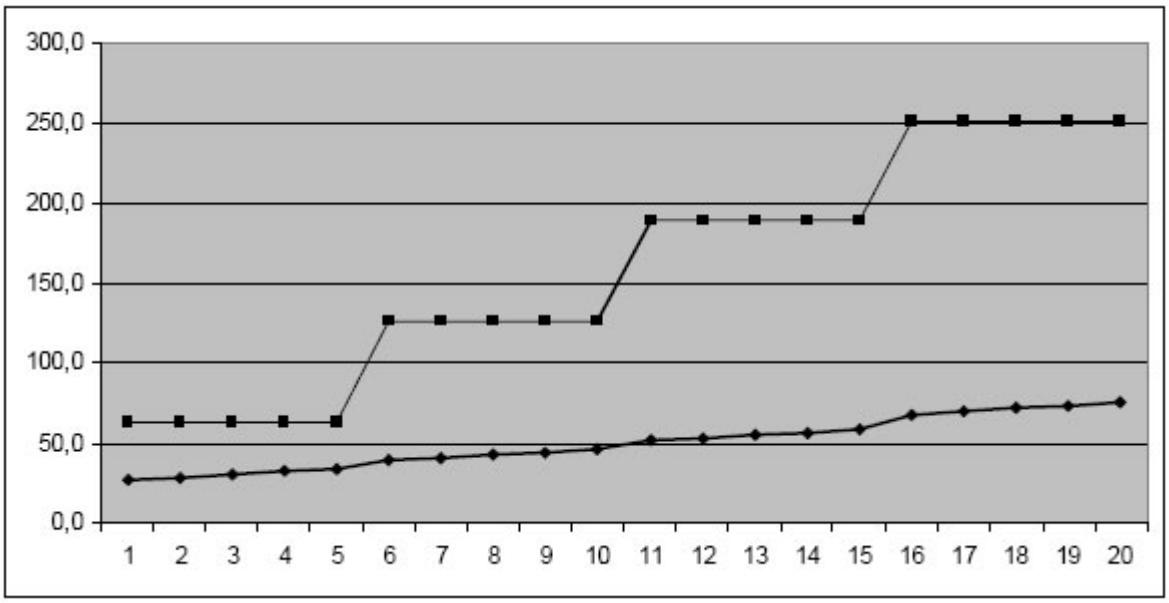

Figure 3 Distance vs. traditional education in small islands – Behavior of cost

Figure 4 Chronological order of the project execution

Recording and analysis of the needs	**Design and development of the original Training Framework**	**Implementation of the First Cycle**	**Analysis and Redesign**	**Implementation of the Second Cycle**	**Final Evaluation**
Pedagogical institutions that implement the project cooperate to record and analyze the needs for Training the teachers serving in the schools.	Based on the analysis this, and experience in training teachers the institutions design and develop an initial Framework for the Educational	After the conclusion of the first cycle the data collection mechanism accumulates and categorizes the data from the participants of the first cycle	Evaluation of the collected data on the implementation of the project and a redesign phase according to the responses of the participants	Implementation of the second cycle of the project and the evaluation mechanism collects data about the implementation and the response of the participants	We analyze the data collected in Second Cycle and evaluate the whole Education Program, in order to reach to final conclusions and propose further actions, improvements and features.
		The trained teachers become evaluators and co designers of the training Program			

Figure 5 WBS of the distance Learning Project

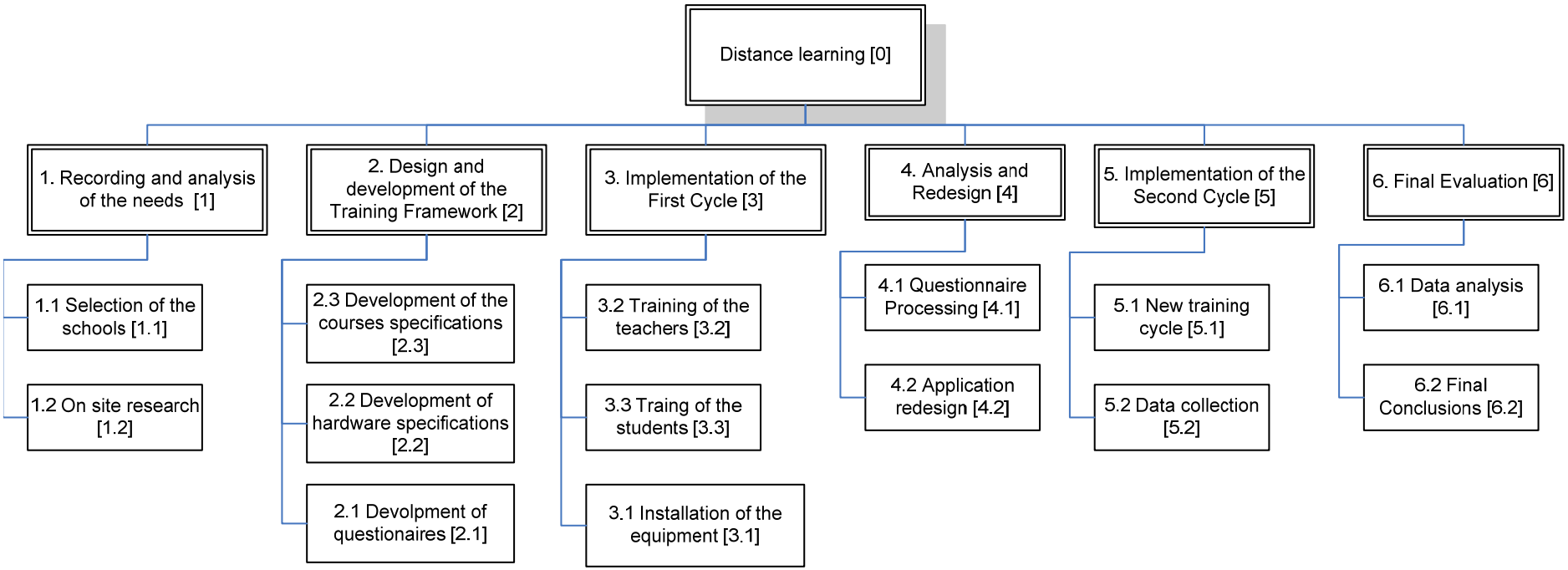

Figure 6 Master Project Schedule

Company	Infinite Solutions Inc.
Current Date	24/5/2010
Title	The use of distance learning, for teaching courses in remote areas of Greece
Project Start	18/5/2010
Project Finish	14/11/2011

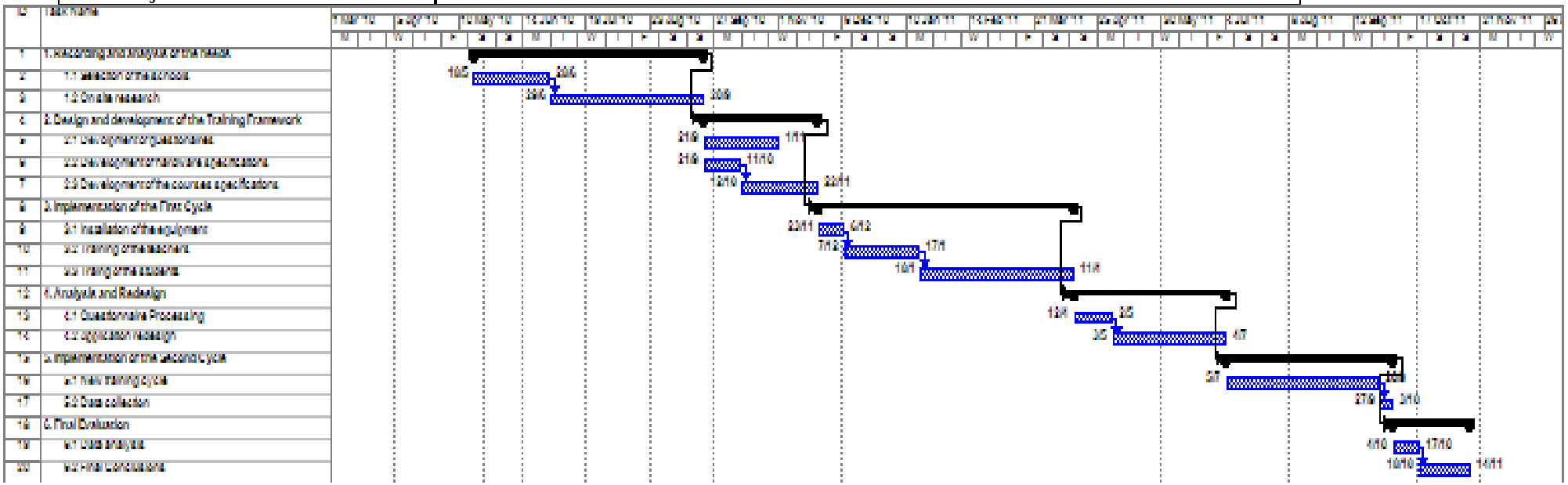

Figure 7 Time scaled cost of the distance learning project

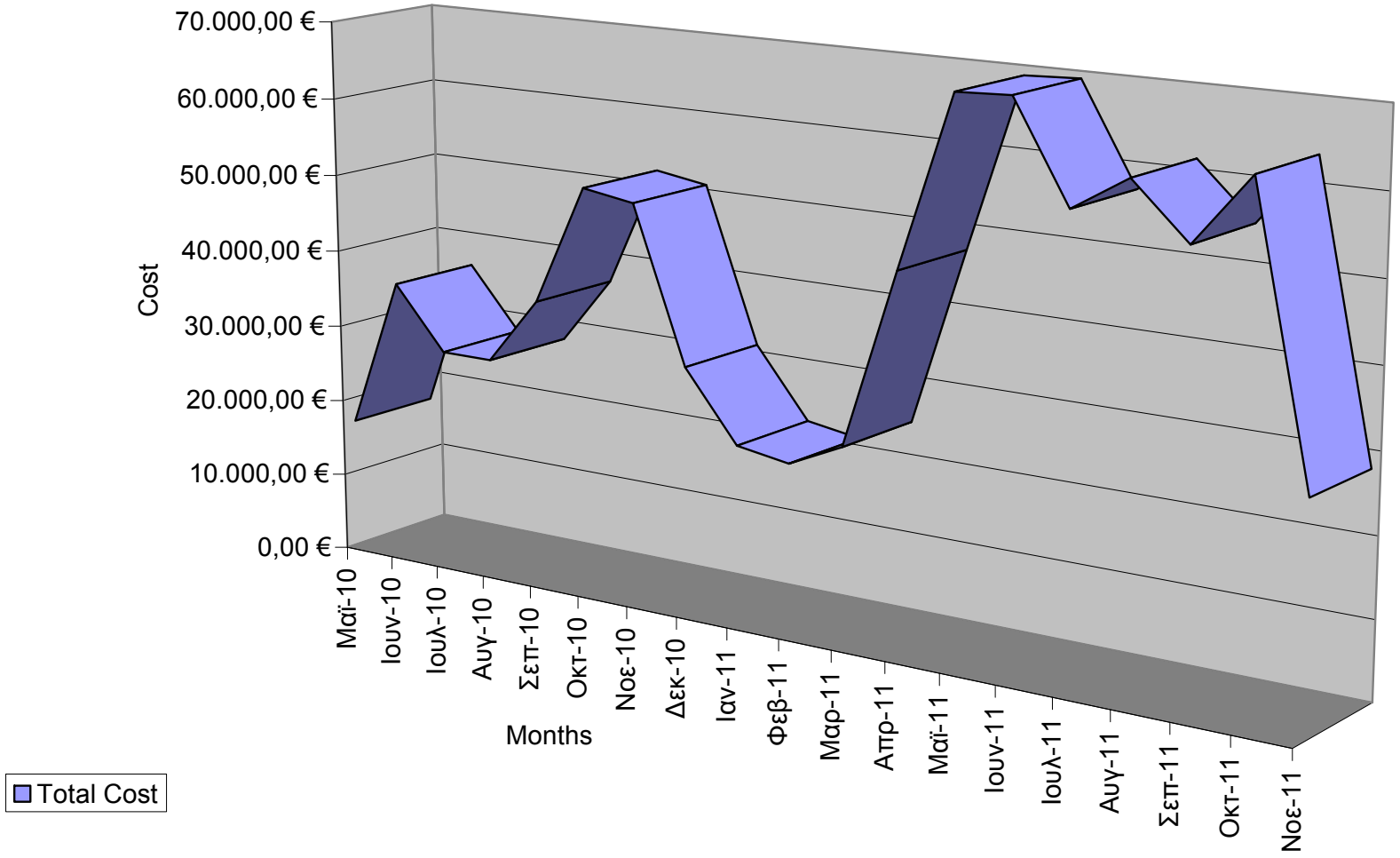

Figure 8 Project Change Control Form

Infinite Solutions Inc.	***Project Change Control Form***	
Project Information		
Request No.:	*Project Manager:*	
Project Name:	*Date:*	
Change Proposal		
Change Title:		
Change Description: *Business Analysis:*		
Project Impact		
Schedule Impact: *Budget Impact*:		
Status		
Status Details:		
By:	*Date:*	*Status (Approved/Rejected)*

List of Tables

Table I.

Cost Estimation In Different Scenarios

Scenario	1	2	3	4	5	6	7	8
No of islands	1	1	2	2	3	3	4	4
No of pupils	1	5	6	10	11	15	16	20
Cost category								
PC(type I)	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
PC (type II)	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Camera	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Printer	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Data projector	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Infrastructure	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9
Technical support	5,6	6,4	6,4	7,2	7,2	8,0	8,0	5,6
Administration	4,0	4,0	4,8	4,8	5,6	5,6	3,2	3,2
Overhead	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Initial training	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Travel expenses	1,2	1,2	2,4	2,4	3,6	3,6	4,8	4,8
Maintenance	0,5	0,5	1,0	1,0	1,5	1,5	2,0	2,0
Administration	12,5	12,5	15,8	15,8	19,1	19,1	22,4	20,0
Educ. material	0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
Teaching	10,1	10,1	10,1	10,1	10,1	10,1	14,5	14,5
PC	0,5	2,5	3,0	5,0	5,5	7,5	8,0	10,0
Travel expenses	1,3	6,5	7,8	13,0	14,3	19,5	20,8	26,0
Learner’s expenses	1,8	9,0	10,8	18,0	19,8	27,0	28,8	36,0
Total cost	26,8	34,0	39,1	46,3	51,4	58,6	68,1	75,3
Total public cost	25,0	25,0	28,3	28,3	31,6	31,6	39,3	39,3
Total private cost	1,8	9,0	10,8	18,0	19,8	27,0	28,8	36,0

Table II

Cost of textbooks per student for each class in December 2007 prices

	1st Class	2nd Class	3rd Class
Gymnasio (lower secondary general education)	30,45 €	28,70 €	26,84 €
Geniko Lykeio – G.L. (general upper secondary schools) 15-18 years of age	25,00 €	24,00 €	25,20 €
Epangelmatiko Lykeio – EPA.L. (vocational upper secondary schools) 15-18 years of age	26,00 €	26,50 €	27,00 €
Epangelmatikes Scholes – EPA.S (vocational training schools) 15-18 years of age	26,45 €	27,20 €	

Table III

Cost (in euros and in December 2007 prices) of teaching in secondary education on the salaries of teachers per student annually

	1st Class (AVG.)	2nd Class (AVG.)	3rd Class (AVG.)
Gymnasio (lower secondary general education)	2.244,71 €	1.879,41 €	2.207,65 €
Geniko Lykeio – G.L. (general upper secondary schools) 15-18 years of age	1.985,29 €	2.276,47 €	2.927,65 €
Epangelmatiko Lykeio – EPA.L. (vocational upper secondary schools) 15-18 years of age	1.985,29 €	3.253,10 €	3.455,25 €
Epangelmatikes Scholes – EPA.S (vocational training schools) 15-18 years of age	2.855,45 €	3.356,15 €	

Table IV

Total cost of training annually per pupil

(In Euros at December 2007 prices)

	1st Class (AVG.)	2nd Class (AVG.)	3rd Class (AVG.)
Gymnasio (lower secondary general education)			
Teaching	2.244,71 €	1.879,41 €	2.207,65 €
Running Expenses	71,47 €	71,47 €	71,47 €
Books	30,45 €	28,70 €	26,84 €
Buildings	148,00 €	148,00 €	148,00 €
Total	**2.494,63 €**	**2.127,58 €**	**2.453,96 €**
Geniko Lykeio – G.L. (general upper secondary schools) 15-18 years of age			
Teaching	1.985,29 €	2.276,47 €	2.927,65 €
Running Expenses	76,76 €	76,76 €	76,76 €
Books	25,00 €	24,00 €	25,20 €
Buildings	148,00 €	148,00 €	148,00 €
Total	**2.235,06 €**	**2.525,24 €**	**3.177,61 €**
Epangelmatiko Lykeio – EPA.L. (vocational upper secondary schools) 15-18 years of age			
Teaching	1.985,29 €	3.253,10 €	3.455,25 €
Running Expenses	92,65 €	92,65 €	92,65 €
Books	26,00 €	26,50 €	27,00 €
Buildings	148,00 €	148,00 €	148,00 €
Total	**2.251,94 €**	**3.520,25 €**	**3.722,90 €**
Epangelmatikes Scholes – EPA.S (vocational training schools) 15-18 years of age			
Teaching	2.855,45 €	3.356,15 €	
Running Expenses	92,65 €	92,65 €	
Books	26,45 €	27,20 €	
Buildings	148,00 €	148,00 €	
Total	**3.122,55 €**	**3.624,00 €**	

Table V

Risk Assessment Matrix

Risk Matrix						
Risk ID	Risk Description	Impact	Probability	Impact	Effect	Strategy
2.1	Unable to find hardware up to the specifications in the desired price range	This risk could impact budget	3	5	*15*	**4**
3.2	Longer time in designing of the educational software	This risk could impact schedule	3	4	*12*	**1**
4.2	Problems from the long distance software during testing time	This risk could impact schedule and budget	4	4	*16*	**5**
4.3	Problems from the website during testing time	This risk could impact schedule and budget	3	3	*9*	**3**
5.2	Incompatibility problems during hardware setup	This risk could impact schedule and budget	3	5	*15*	**5**

Strategy	
1	Accept the risk
2	Avoid the risk
3	Monitor the risk and prepare contingency plans
4	Transfer the Risk
5	Mitigate the Risk

Infinite Solutions Inc.
Project: Distance Learning Application
Date: 18/5/2010
Prepared by :SL
Risk matrix spreadsheet

Table VI

Cost estimating Sheet

Resurce name	Group	Max. units	Std. Rate	Ovt. Rate	Work	Material	Cost	Cost including overhead
Pitsos Kitsos	Project Manager	100%	100,00 €/hr	150,00 €/hr	3.120 hrs	-	312.000,00 €	468.000,00 €
Vasilis Tokas	Software Department	100%	30,00 €/hr	45,00 €/hr	320 hrs	-	9.600,00 €	14.400,00 €
George Mitsos	Software Department	100%	28,00 €/hr	42,00 €/hr	320 hrs	-	8.960,00 €	13.440,00 €
Nick Lalos	Hardware Department	100%	20,00 €/hr	25,00 €/hr	120 hrs	-	2.400,00 €	3.600,00 €
Spiros Kalos	R&D Department	100%	85,00 €/hr	127,50 €/hr	560 hrs	-	47.600,00 €	71.400,00 €
Akis Panos	Telecommunications Department	100%	30,00 €/hr	43,00 €/hr	120 hrs	-	3.600,00 €	5.400,00 €
Manolis Papadopoulos	Accounting Department	100%	25,00 €/hr	45,00 €/hr	140 hrs	-	3.500,00 €	5.250,00 €
George Pappas	Quality Control Department	100%	45,00 €/hr	67,50 €/hr	360 hrs	-	16.200,00 €	24.300,00 €
Nick Profis	Training Department	100%	25,00 €/hr	37,50 €/hr	1.200 hrs	-	30.000,00 €	45.000,00 €
Lola Lalou	Secretary	100%	10,00 €/hr	15,00 €/hr	3.120 hrs	-	31.200,00 €	46.800,00 €
Pedagogical Institute	Project Stakeholder	100%	100,00 €/hr	150,00 €/hr	2.000 hrs	-	200.000,00 €	300.000,00 €
Aegean University	Project Stakeholder	100%	100,00 €/hr	150,00 €/hr	1.440 hrs	-	144.000,00 €	216.000,00 €
OTE	Project Stakeholder	100%	670,00 €	-	-	1		670,00 €
HellasSat	Project Stakeholder	100%	1.305,00 €	-	-	1		1.305,00 €
INTRAKOM	Project Stakeholder	100%	550,00 €	-	-	1		550,00 €
Personal Computers		100%	550,00 €	-	-	5		2.750,00 €
							Total	1.218.865,00 €