STUDENT READINESS FOR TECHNOLOGY-ENHANCED HISTORY EDUCATION IN TURKISH HIGH SCHOOLS

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Submitted to the Graduate Faculty of
the School of Education in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

UNIVERSITY OF PITTSBURGH

SCHOOL OF EDUCATION

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This study examined whether the Turkish high school social sciences major students would feel adequate and fit in a technology-enhanced educational environment, particularly in history classrooms. To this extent, this study investigated high school students' level of proficiency in technology-use and their attitudes toward the use of educational technologies in classrooms. The study also examined the level of technology-use in social sciences courses and social sciences major students' learning style preferences. The data for this study was collected using Kolb's Learning Style Inventory (LSI Version-3) and a 27-item Technology Questionnaire. These instruments were administered to 1350 Turkish high school students from 15 schools located in 13 different cities.

The results showed that Turkish high school social sciences major students have the essential technology skills and knowledge to feel adequate in a technology-enhanced learning environment. They also have positive attitudes toward the use of educational technologies in history classrooms. Therefore they seem to be ready for technology-enhanced instruction. Unfortunately the level of technology-use in social sciences courses is very low. The study results revealed the need for an extensive reform in curriculum and instructional methods that focused on increased technology-use and better technology integration in classrooms. The study also found that any related reform proposition should be constructed to address different learning style preferences, since all the learning style preferences described by Kolb exist among Turkish high school students.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS OF SUPPORT

I would like to take this opportunity to thank people from whom I received respectable support and assistance during my study. I give my most sincere appreciation to my advisor, Dr. Kathryn S. Atman, for her continuous guidance, support and patience. I am truly honored to have had Dr. Louis A. Pingel, Dr. David M. Berman, Dr. Louis H. Berry, and Dr. Peter L. Brusilovsky on my research committee. Their insightful feedback and comments were very usefull.

I am very grateful to the Turkish Ministry of Education, administrators, teachers and students in the 15 secondary schools included in this study for their permission and participation. Endless thanks to Mr. Adem Cakar, Mr. Ali Akar, Mr. Ahmet Eren, Mr. Hikmet Eran, Mr. H. Nadir Ayag, Mr. Ahmet Sonmez, Mr. Yasar Turan, and Ms. Tuba Vatandas who helped me by administering the instruments of this study. I owe them a considerable debt of gratitude for their effort and patience for administering the instruments twice due to an unexpected incident I encountered during the study.

I thank my fellow classmate and outstanding teacher Ms. Elizabeth A. Svirbel, who coded part of the data on NUD*IST for me in order to perform a coder reliability test for this study, and who shared her deep insights with me. I also want to thank Dr. Elaine N. Rubinstein for her great support in statistics.

Finally, special thanks to my wife, Yasemin Turan, for her continuous support and endless patience, and to my kids, Ahmet and Azra for being understanding kids when I needed to study. I offer my sincere thanks to all of you.

Dedicated to my wife and my kids.

1.0 INTRODUCTION

1.1 BACKGROUND OF THE STUDY

When the Republic of Turkey was founded in 1923, the founding father, Mustafa Kemal Ataturk set a national goal for the young republic: to reach to the level of developed countries in every area. The Turkish revolution started with education; the Latin alphabet was adopted, a compulsory education system established for all children between the ages of 7–12, and education was secularized and unified. To modernize educational institutions, the Turkish government asked for help from well known educational theorists such as John Dewey, Alfred Kuhne, Omer Buyse, and Albert Malche (Guvenc, 1998). Recently, the Ministry of National Education (MNE) launched an extensive reform program as a part of Turkey's candidacy process to join the European Union (EU). This reform program includes; restructuring the educational organization, management, and teacher training programs, extending the period of compulsory education, developing new curriculum and re-writing textbooks based on EU standards, placing more emphasis on vocational technical education and technology education (MNE, 2001).

After all of these years and reforms, it seems that Turkey hasn't been able to reach her national goal yet. Therefore, it has been accepted and proclaimed by the present Turkish Prime Minister Tayyip Erdogan that Turkey has failed in her transition process from a traditional agricultural society to an industrialized one.[1] The Turkish Prime Minister declared his ideas during the 2nd Council of Informatics (November, 2004) and set a new objective for the Turkish nation:

[1] http://www.bilisimsurasi.org.tr

> *"Our new goal is to become an information society… A new educational reform is needed in order to fulfill this transition, which will be based on innovative thinking and production instead of memorization…Computer literacy will become an important part of formal education… Our goal is to train 500,000 new informatics manpower in next ten years."*[2]

The way to an information society passes through technology-enhanced education in which various media and computer related technologies are used in classrooms to support teaching and learning. The use of educational technology to support learning would revolutionize the traditional education system. It could expand learning resources, increase flexibility to reach out to students with various learning styles, and it also would have a positive effect on motivation and achievement (Reeves, 1998). The use of educational technologies in classroom activities and including technology literacy into curriculum can help to establish what is called "the information society."

Today, technology is fully integrated with our daily lives. This involvement had changed our life styles as well as the way we communicate, receive information, and learn, particularly for the younger generation. In order to meet these changes and make education more relevant to younger generation's life style, many countries are using educational technology to create effective learning environments for their students. They emphasize technology literacy in the curriculum and spend huge amounts of money to put new technological materials in classrooms. Despite their expenses these materials are necessary in technology-enhanced education, because they:

- arouse interest and stimulate learning;
- connect new information with what has been learned previously;
- relate subject matter to students' life experiences;
- provide opportunities for students accessing and evaluating information;
- respond to pressing needs of society;
- enable students to portray the world as they see it;
- condense information for ease of understanding; and
- increase self instruction (Hackbarth, 1996).

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[2] Ibid

1.1.1 Turkish Secondary School System

The secondary education system in Turkey includes 4-year general or vocational education institutions following the compulsory 8-year preliminary education program. Article 28 of Basic Law No.1735 on National Education states the aim of secondary school system is to provide all students with a scientific and cultural background appropriate to the secondary level, and to prepare them for higher education and a career in accordance with their interests and attitudes while trying to realize the general goals and basic principles of the Turkish National Education System (see Appendix-A).[3]

School Type	*# of Schools*	*# of Students*	*# of Teachers*	*Class-size*[4]
General High Schools	3406	2,075,617	102,581	33
Vocational and Technical High Schools	4029	1,182,637	82,736	29
Total	7075	3,258.254	185,317	31

Table 1: Numbers in Secondary Education

(2005-2006 Education Year)[5]

General high schools in the secondary school system prepare students for higher education. In order to help students better prepare for the undergraduate major they want to pursue, an "elective fields program" was put into practice in general high schools in 1996. In this program, 9th grade is assigned the role of "orientation," in which students are given the opportunity to take at least one course in each field to help them to have an idea about what these fields are. After the 9th grade (orientation year) general high school students are required to pick a major out of seven fields (Dogan, 2003). These fields are:

1- Natural Sciences
2- Literature and Mathematics
3- Social Sciences

[3] Outline of the Turkish Education System. Available at: http://www.yok.gov.tr/webeng/outline.html
[4] Open education students are not included. Statistical Institute of Turkey (TUIK). Retrieved from: http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=96
[5] Educational Statistics 2005-2006. Available at: http://sgb.meb.gov.tr/daireler/istatistik/TURKIYE_EGITIM_ISTATISTIKLERI_2005_2006.pdf

4- Foreign Language

5- Art (Music)

6- Art (Painting)

7- Sports

In the "elective fields program," course subjects in secondary education are divided into four groups:

1. Common general culture subjects: compulsory for all students;
2. Field subjects: vary according to major;
3. Field elective subjects: which also vary according to major; and
4. Elective subjects: which can be taken by students with any major [6] (see Appendix-B for complete list of compulsory and elective courses for social sciences majors).

On the other hand vocational and technical high schools in secondary school system train qualified manpower for various professions and also prepare students for higher education. The following schools are classified as vocational and technical schools in Turkey:

- Technical education schools for boys
- Technical education schools for girls
- Commerce and tourism schools
- Religious education schools,
- Special education vocational school, and
- Vocational high schools run by other ministries such as the Ministry of Agriculture and Forests.[7]

An academic year is comprised of 180 working days in Turkey, and the rest 185 days are the "holidays" such as summer, mid-term, national and religious holidays, and weekends. The academic year begins on the second week of September and ends at the end of the second week of June with some variations between urban and rural areas. The school day is comprised of a

[6] Outline of the Turkish Education System. Available at: http://www.yok.gov.tr/webeng/outline.html
[7] Educational Statistics 2005-2006. Available at: http://sgb.meb.gov.tr/daireler/istatistik/TURKIYE_EGITIM_ISTATISTIKLERI_2005_2006.pdf

morning and an afternoon session except in overcrowded schools, where a split session may be required. The number of the school hours (lessons) per week changes according to the type and level of the school (see Table 2).[8]

Type of School	*Total Number of Lesson per Week*
Primary School	30
High School	32
Science High School	Preparatory 34, Regular 40
Anatolian Fine Arts High School	Preparatory 38, Regular 40
Anatolian High School	Preparatory 34, Regular 37
Anatolian Teacher Training High School	Preparatory 34, Regular 40
Anatolian Vocational and Technical High School	45
High School with intensive foreign language program	Preparatory 34, Regular 37
Anatolian Technical High School	Preparatory 41, Regular 45
Industrial Vocational High School	41
Imam Preacher High School	Preparatory 35, Regular 36
Anatolian Imam Preacher High School	Preparatory 40, Regular 40

Table 2: Weekly School Hours of Various Schools[9]

1.1.2 Components of Secondary Education System

1.1.2.1 Curriculum

The centralized education system holds the Ministry of National Education (MNE) responsible for developing or approving curriculum programs in Turkey. Curriculum development for any common academic subject such as history, mathematics, and the science is entirely carried out at the Ministry level without much input from schools, teachers or parents. When the MNE decides to change a curriculum it employs a commission to develop the new curriculum. During this process MNE also asks non-governmental organizations and universities for their opinions. This process applies to most of the public schools except for vocational schools. Vocational schools can develop a new curriculum program and use it after approval from the MNE. This locally developed curriculum program can be also used by other vocational schools around the country.

[8] Outline of the Turkish Education System. Available at: http://www.yok.gov.tr/webeng/outline.html
[9] Ibid

Private schools also can develop their own curriculum programs as long as it adheres to general principals and standards, and is approved by the MNE (Ministry of National Education, 1999).

The review of literature shows that the history curriculum programs developed by MNE have met with heavy criticism by educators and researchers in recent years. These critics claim that history curriculum programs in Turkey;

- fail to follow the developments in teaching of history e.g. history teaching is dominated by the narrative approach (Ozbaran, 1994) and they are not designed to teach history in an active way (Demircioglu, 2002),
- fail to engage student interest (Aksin, 1975; Safran, 1993),
- focus on dictation and memorization (Aksin, 1975; Safran, 1993),
- have defects in terms of content and purpose (Ucyigit, 1975; Tuncay, 1975), e.g. nationalist views are dominant (Ozbaran, 1998),
- are too content-laden, requiring students to learn 5000 years of history in one course (Turan, 1975),
- are not structured based on students' level of understanding (Aksin, 1975; Parmaksizoglu, 1975).

Another drawback of the Turkish history curriculum is its failure to teach necessary historical skills to students. This is mostly because behaviorism is still operating in the Turkish education system and therefore behaviors are the focus in this system not the skills. This can be seen clearly in the following excerpt from History-II curriculum program (see Figure 1). Comparing Turkish history curriculum programs with Pennsylvania Academic Standards for History clearly indicates that, unlike Turkish history curriculum programs, Pennsylvania Academic Standards for History are skills oriented. It is clearly stated in the PA Academic Standards for History that the intent of the program is to help students "to comprehend chronology, to develop historical comprehension, to evaluate historical interpretation, and to understand historical research."[10]

[10] Academic Standards for History (2002). Pennsylvania Department of Education. Retrieved on 04/12/2005 from: http://www.pde.state.pa.us/stateboard_ed/lib/stateboard_ed/H.HISTOR Y .ST AND ARDS. pdf

UNIT-II

Unit Title: European History - 1(1300-1600)

Goal 11: Basic concept knowledge related to European history between the years of 1300 and 1600.

Behaviors:

1.To be able to tell and write definitions of following concepts; Renaissance, Protestantism, Calvinism, Catholic, Orthodox, inquisition, Papacy, church, dogmatism, and colonization.

2.To be able to explain given concepts by speaking and writing.

Goal 12: To comprehend political circumstances in Europe between the years of 1300 and 1600.

Behaviors:

1.To be able to explain political situation in Europe by using a map.

2.To be able to explain the reasons for feudalism become weak and kingdoms become stronger.

3.To be able to explain cause and effects of the contestation between Pope and kings.

4.To be able to explain contestations between European kingdoms and the path for political balance in Europe.

Figure 1: History Program (9th and 10th Grades)[11]

As stated above, one of the criticisms of Turkish history curriculum programs is that they fail to follow the developments in the teaching of history since history teaching in Turkish schools is dominated by the narrative approach (Ozbaran, 1994), and it is not designed to teach history in an active way (Demircioglu, 2002). Each curriculum program starts with explaining general goals of that subject and then suggests to teachers on which subjects to focus, and which

[11] Retrieved on 04/10/2005 from: http://ogretmenlersitesi.com/_mufredat_/lise.asp

methods to use. For example, 11th grade Ottoman History curriculum program[12] suggests followings to teachers:

> Method: Narrative, questioning, dialogue, group discussion, and the use of stories, memories, poems, and jokes (item# 29),
>
> Tools: Maps, plans, sketches, related literature, encyclopedias, magazines, brochures, movies and slides (item# 30),
>
> Out of class activities: Field trips (item# 31) [13]

Beside these suggestions curriculum programs also include a methods section after each unit that suggests specific methods for each subject. Unlike the number of methods and tools suggested above for the whole course subjects, the suggested methods and tools for specific units are quiete limited in 11th grade Ottoman History curriculum program. In fact the only suggested methods for any unit are "narration, questioning, group discussion, and field trips" in that curriculum program. Illustrating the level of adherence to these suggested methods in history curricula, a recent study shows that narration and questioning are the most frequently used teaching methods among the history teachers in Turkey (Demircioglu, 2004). This demonstrates Turkish history curriculum programs' failure to encourage teachers to use different methods that require students' active involvement in class activities. Active learning activities would help students relate to the content and develop critical thinking, analyzing, synthesizing, and evaluating skills.

These drawbacks found in Turkish history curriculum programs show the need for modernizing the Turkish high school history curriculum. This need seems to be recognized even by the Turkish Ministry of National Education itself. Therefore; ongoing educational reform proposed by the MNE promises to renew history curricula by focusing on critical thinking rather than memorizing. [14] But this proposal does not address all the of drawbacks mentioned above.

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[12] Ottoman History Program (11th grade). Retrieved on 04/10/2005 from: http://www.ogretmenlersitesi.com/_mufredat_/hise.asp
[13] Ibid.
[14] http://www.milliyet.com.tr/2005/01/13/yazar/zbirand.html

As stated by Demircioglu (2002) any renewing proposal of Turkish high school curriculum should be more broad and comprehensive:

> *"The Turkish secondary school history curriculum should be developed to take account of the ways in which children learn, think and develop and of the various kinds of differences among children. This development should stress historical enquiry, comprehension, analysis and synthesis to a large extent together with the concepts of change, continuity, cause and consequence. In addition, the Turkish secondary school history curriculum should be designed on the basis of history as an active study, using active imagination, active thinking and purposeful teaching."*
>
> (Demircioglu, 2002, n.p)

1.1.2.2 Teachers

Article 43 of the Basic Law on National Education defines "teaching" as a profession that requires special expertise. Article 45 of the same law states that any teacher training program should include knowledge and skills on general culture subjects, special field education, and pedagogical formation.[15] Teacher training is mostly given by education faculties in Turkey, but graduates of other schools such as schools of arts and science can be teachers as well, as long as they have completed the required pedagogical formation education. Moreover, there are also teacher training high schools in Turkey, which aim to provide more qualified students for higher teacher training institutions. Graduates of these schools can get additional points on the college entrance exam (OSYS) if they choose to attend any teacher training program.

Turkish education faculties include various courses in their teacher education programs in three major areas; subject area courses (62.5%), general culture courses (12.5%), and pedagogic formation courses (25%).[16] Furthermore, every senior in a school of education has to work as an intern teacher at an arranged primary or secondary school for one year. During this internship their teaching skills are evaluated by both their advisors who observe them in practice, and by assigned teachers at those schools.

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[15] http://ogm.meb.gov.tr/gos_kanun.asp
[16] Outline of the Turkish Education System. Available at: http://www.yok.gov.tr/webeng/outline.html

The Ministry of National Education hires new university graduates as candidate teachers, who are to take basic education, preparatory education, and practical training programs during their first year. The duration of these programs varies between three and ten months. During their practical training, candidate teachers work under the guidance of a senior teacher. Achievement upon the completion of the training is evaluated by the guiding teacher and the school administration. Those who have been successful after this training period are appointed as permanent teachers. Those who are not successful are entitled to repeat the same training once more.

Workloads of teachers differ based on the type and size of the school, number of teacher in their department (also in their school district since they supposed to cover other schools when needed), and planned curricular and extracurricular social and cultural activities. For example, primary school teachers who are assigned as classroom teachers are required to work at least 30 hours per week. However, in general high schools, teachers have to work 15 hours per week within their normal salaries and 6 hours on a paid basis if needed. In vocational/technical high schools, teachers have to work 15 to 20 hours within their normal salaries, and an additional 24-27 hours on a paid basis if needed. [17] In addition, some teachers are given the role as class teachers who are to spend another two hours in a week for educational activities and one hour for guidance activities with their appointed class. Teachers are also supposed to carry out extracurricular social and cultural activities such as national days and other special celebrations promoted by their schools.[18]

1.1.2.3 Textbooks

At the 1994 Buca conference on "History Education and History Textbooks" (one of the two most important conferences on Turkish history education) Turkish history textbooks were examined and discussed. According to some participants (Tuncay, 1994, Timucin, 1994) Turkish history textbooks have included some false and dogmatic statements, which have caused some problems between Turkey and other countries. Ozbaran (1998) stressed the following points as drawbacks of the history textbooks in Turkey:

[17]Technology in Education: the Turkish Experiment. http://www.worldbank.org/html/fpd/technet/turk-ed.htm
[18] Outline of the Turkish Education System. Available at: http://www.yok.gov.tr/webeng/outline.html

- Dimensions in history teaching are limited
- Textbooks are not up-to-date.
- Nationalist views are dominant.
- Contemporary history is not included.

Research on comparing Turkish and English history textbooks in terms of the issues of design, construction and usability (Kabapinar, 1998, quoted by Demircioglu, 2000) shows that English students seem to have more opportunities to develop their own "understanding, interpretation and imaginative pictures" of the historical past when compared with Turkish students. Also teaching of history in Turkey is centered on the memorization of facts and ideas rather than improving the students' cognitive skills (Kabapinar, 1998, quoted by Demircioglu, 2000).

Textbook writing, publication, and distribution in Turkey differ considerably from the United States. The characteristics of the Turkish school curriculum can be best described by the following three concepts: curriculum as law, centralization, and standardization.

First, the Turkish school curriculum is mandated in national legislation which specifies the educational goals and objectives, the subject areas to be covered, the number of school days, and the minimum instructional hours for each subject at each grade level. In addition, the educational law regulates the whole procedure of curriculum and textbook development. Because the curriculum is imposed as a law, it strongly regulates the educational practices of schools all over the country.

Second, the Ministry of National Education (MNE) centrally controls and authorizes the process of curriculum development. According to law, an agency commissioned by the MNE develops the curriculum in each subject area. Therefore, only one version of the curriculum can be administered in schools. Even private schools are required to follow the same rule.

The third characteristic of the Turkish curriculum is standardization. In Turkey, instruction is highly dependent on textbooks. Because only one version of history curriculum (with specific standards for each course and grade) is taught, instruction all over the country is highly standardized.

Based on the type of publisher, textbooks are categorized into two types: MNE-developed and those developed by private publishers. However they are not so different from

each other, because private publishers are also required to fulfill specific conditions imposed by the MNE. Their textbook drafts must be developed according to the national curriculum and the guidelines provided by the MNE. Therefore, the textbook content produced by different publishers is almost the same. Only textbooks approved by the Ministry of Education can be published. At the beginning of every education year, each public and private school selects one history textbook from a list of textbooks published or authorized by the Ministry of Education.

1.1.3 Educational Technology in Turkey

The effort of utilizing various technological materials in education goes back to the very foundation of Turkish Republic under the goal of modernizing educational system. In this context, a school museum was established by MNE to exhibit educational technology materials and equipment. Also those materials such as maps, projectors and laboratory equipment were sent to schools to be used in classrooms. In 1961 the Teaching Materials Center was founded in Ankara (Alkan, 1998). After long discussions and many proposals distance education was introduced to Turkish educational system in 1961 when the Instructional Center for Distance Learning was established. Through the distance education system Turkey was aiming to spread literacy nationwide at every level of education. In 1962 the Center of Educational Radio was founded to broadcast educational programs for students (Alkan, 1998). Distance education at the college level was started in 1983 with the establishment of Anatoly University's Open Education Faculty in Eskisehir. The goal was to offer college level programs to high school graduates who cannot attend regular colleges (Akkoyunlu, 2002).

Today many Turkish universities offer distance education through the Internet. Before the Internet, radio and TV were the main tools in distance education by which distance education programs were broadcasted by TRT (Turkish Radio and Television) with the support of MNE and Anatoly University. Today, TRT still broadcasts daily radio and TV programs on its educational channel, TRT-4, for primary, secondary and undergraduate education.

Through distance education principles of Basic Law of National Education were put into action such as "education everywhere" and "continuity."

> *"National education objectives will be pursued not only at educational institutions, but also at home, in the outer society, on the job, and everywhere and at every opportunity. It is essential that general and vocational education of individuals should continue throughout life. In addition to the education of younger generations, necessary measures will be taken to provide adults with continuing education to help them achieve constructive and productive adjustment to life and to their work environment."*
>
> (Principal Law of National Education, Article 24)

The last two decades witnessed the rapid spread of technology use for a great variety of applications in business, industry, science and education. Fortunately, the MNE is aware of these changes and developments (Akkoyunlu, 2002). The Sixth Five Year Development Plan (State Planning of 1991) suggested using various instructional methods and tools in order to increase productivity in education. This illustrates that the potential benefits of the use of educational technology are accepted as a government policy.

Computers have been used for commercial, industrial and scientific purposes in Turkey for a long time. But the use of computers in the educational system was limited to universities and a few technical schools until the 1980s. During 1980s, the Turkish Government started putting emphasis on the use of computers in primary and secondary schools. As the former Prime Minister Turgut Ozal stated: "Turkey is going to provide the schools of the nation with one million microcomputers in the next decade." It was the most costly and largest educational project in the history of the Turkish Republic, which was projected to cost 600 million US dollars at that time (Fidan, 1988).

In 1984 MNE launched a pilot study on computer-based education collaborating with 24 universities. With this pilot study, 750 teachers from various schools were trained on integration of computers into the curriculum, and 2400 computers were allocated at 121 secondary schools. After evaluating this pilot project, MNE signed an agreement with nine private computer companies in order to start computer-based education. These companies developed several courseware packages, and they co-operated with universities to train teachers on these courseware packages in the 1989–90 school year.[19] The General Directorate of Educational Technologies (EGITEK) was established in 1992 under the responsibility of MNE. It aimed for

[19] Technology in Education: the Turkish Experiment. http://www.worldbank.org/html/fpd/technet/turk-ed.htm

the integration of educational technology into schools, training the teachers, and improving computer-based education.[20] EGITEK supplies educational materials (video, audio, picture, graphs, and excerpts) and interactive resources (such as internet TV and internet radio) over the Internet for students in formal and informal education.[21]

In 1995 MNE co-operated with the Scientific and Technical Research Council of Turkey (TUBITAK) to produce educational software for geography, history, Turkish, and science. In 1999 all educational institutions were connected via intranet connection under the project called MEBSIS. This project made sharing information easier for school administrations, teachers and students. In 2003 MNE came to an agreement with Turkish Telecommunication Company (TT) to connect its 42,534 institutions around the country to the Internet via DSL. With this project 20,000 institutions and 300,000 computers were connected to the Internet in 2005 which means 86% of secondary schools and 95% of secondary school students have gained access to the Internet.[22] MNE has also made an agreement with a computer company to deliver a lap-top computer to each one of the 650,000 teachers.[23] MNE also works with international organizations and companies to expand the use of computers and the Internet at schools and home. In this context MNE works with Intel Corp. to translate their interactive learning portal called "Skoool" in Turkish for math and science,[24] MNE also made an agreement with Intel and Microsoft to produce less expensive personal computers for schools and lower income Turkish families.

The reasons for placing computers in schools vary from country to country. The Turkish Ministry of National Education's policy is to meet the national need for catching up with the age of technology. The Ministry of National Education declared a policy of widespread introduction of computers in schools. However MNE needs time and huge amounts of funding to train personal and to buy expensive technological equipment and software in order to implement that policy.

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[20] http://egitek.meb.gov.tr/egitek/Mevzuat/EgitekKurulusYasasi.html
[21] http://uretim.meb.gov.tr/aokradyotv/aolhaftalikcont.html
[22] http://www.meb.gov.tr/ADSL/adsl_index.html
[23] www.meb.gov.tr
[24] http://skoool.meb.gov.tr/

1.1.4 Conclusion

Turkey is a country with a rapidly growing population. Half of the population in Turkey is younger than 25 years of age[25], and approximately 16 million students are attending either primary, secondary or higher education schools at this time. However, the educational level of the country's population is still insufficient. The schooling rate in primary schools has reached 95%, but it remains at 85% at secondary school level and the rate is 30% for higher education[26]. Also recent studies show that only 27% of Turkey's general population has completed secondary school education, compared with 65% in the EU, and 87% in the US (UNESCO, 2005). This situation points out that there is still a great amount of work to be done in Turkey if it is to fulfill its long term goal, which it has been pursuing since the foundation of the Republic.

Since the foundation of the Republic, Turkey has been pursuing a national goal: to become one of the modern, developed countries. Eighty-four years have passed and as declared by present Prime Minister, Turkey has not reached this goal yet. It seems that in order to fulfill this goal, Turkey needs to take one step ahead to catch up with the information age instead of persisting in reaching the stage of industrialism. This step requires a large investment in educational technology; buying necessary equipment and training personal. Unfortunately, the Turkish educational system is already facing a serious funding problem which results in: 1) a lack of infra-structure (school buildings and classroom), 2) a lack of teachers, and 3) the lack of educational technology materials. In 2004, 8.29% of the GNP was allocated for education, and for 2005 this rate had been proposed to increase to 9.7%, but 85% of it goes for personal expenditures.[27] Despite the fact that the share of education in the General Budget has increased in recent years, the need for more buildings, facilities and teachers, and the growing number of students makes it difficult to meet all existing needs. In order to reach MNE's aim to decrease class sizes to 30, MNE needs to build 95,441 new classrooms, 3,200 new school buildings, and hire another 110,000 teachers.[28]

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[25] Statistical Institute of Turkey. Retrieved from: http://www.tuik.gov.tr/PreIstatistikTablo.do?istab_id=226
[26] Educational Statistics 2005-2006. Available at: http://sgb.meb.gov.tr/daireler/istatistik/TURKIYE_EGITIM_ISTATISTIKLERI_2005_2006.pdf
[27] www.ntvmsnbc.com
[28] www.ntvmsnbc.com

These are quite expensive needs, and in a time of economical crisis one does not have the luxury of try-and-error to find the best working solution. To reach its goal from its current condition Turkey needs to make wise decisions and the very first step in this decision process is to know your target audience. Knowing Turkish students' learning style preferences and their levels of involvement with today's technology can help us to know better our target audience (students) and help us to choose the right materials and methods to prepare our young generations for the information age.

Recently Turkey has been making major efforts to establish an educational system to provide her youth (30% of whole population) with the broad range of knowledge and skills required to meet today's job market needs. These efforts include upgrading the curriculum and instructional materials, revising student achievement tests, improving the teacher training system, and conducting more research in technology-enhanced education. Turkey is not only trying to fulfill its transition to the information society but also trying to reach her long-time desire of joining European Union (EU). On December 17, 2004 European Union Council has officially invited Turkey to join EU, and the negotiations have started on October 4th 2005. In order to meet the requirements given by the EU there has been a big adaptation process going on in Turkey in all areas including education. As a part of this adaptation process general goals and basic principles of Turkish education have been revised, primary school curriculum has been renewed, a committee has been working on a new secondary school curriculum, and textbooks have been re-written based on EU standards.

All these reformist actions in education are necessary to accomplish the Turkish nation's two substantial goals: (a) to enter information age, and (b) to join European Union. But before launching the proposed reforms, policy makers and reformers should ask this question of themselves: "Are we really adapting or is what we are doing is actually copying?" In order to adapt things into your system you have to know your target very well. How much do we know about our school-age generation? What are their individual learning needs?

Today the most challenging goal for public education is to increase student achievement without "leaving any child behind". This goal can be met if the individual's learning needs and expectations are considered as the basis for any educational program. Children have diverse cognitive abilities, learning styles, early learning experiences, and they have varying socioeconomic and cultural backgrounds. Research shows that the role of culture in education is

essential and that various ethnic groups' cultural differences in the learning styles have been identified (Park, 1997; Dunn et al., 1993; and Reid, 1987). Research also shows that considering students learning styles and using various techniques to meet these preferences has a positive affect on student achievement and motivation (Slavin, 1983). Each student is unique and individualized programs that recognize this uniqueness can help to increase achievement at schools.

1.2 RATIONALE

As previously stated, entering the information age has become a new national goal for the Turkish nation. For that purpose the Turkish educational system has been given the role of preparing new generations for this transformation by 1) focusing on technology in education and 2) delivering essential technological knowledge. Yet as stated in the background of the study there are two main obstacles for the Turkish educational system to fulfill this goal: centralization and funding.

Transformation of a nation requires every individual to be instructed and educated toward the goal. Since a centralized education system does not see students as individuals and puts its emphasis on standardization (one national curriculum and standards for every subjects, national high school and university entrance exams, etc.) it is very hard to reach every individual within this system. Research shows that students are not all alike; in fact, they perceive and process information in different ways. If these individual differences are not addressed by instruction, many students may experience some degree of discomfort, disinterest, or anxiety which may lead them to failure or to give up on learning. Therefore, understanding individual differences is a crucial part of delivering desired skills and knowledge to the students (Montgomery & Groat, 2002). This understanding is also helpful in choosing the right methods and tools from which students could benefit most.

In the case of Turkey, where there is a huge funding problem in education[29] every reforming step should be taken with caution in order to not to waste national resources. This leaves no room for the use of a "trial and error method" choosing the right educational technology materials. Basically, one cannot transform a nation into the information age by simply putting computer labs in each school and adding a technology course to each school programs. Knowing the target audience better by defining and recognizing individual differences and choosing just the right tools and methods based on these individual differences would be extremely helpful in minimizing the funding problem.

1.3 SIGNIFICANCE OF STUDY

Data from this study will inform Turkish educational decision makers as they consider alternative curricular approaches that focus on technology education[30] in accordance with European Union priorities[31] for developing a technology-enhanced education program that fits the learning characteristics of Turkish high school students.

1.4 STATEMENT OF THE PROBLEM

The problem of this study was to identify the Turkish high school social sciences major students' readiness for technology-enhanced history education.

[29] For example, in order to decrease average classroom size to 30 (which was 33.43 in 2005), 91,738 new classrooms are needed, but without additional funding it seems impossible to fulfill this goal in near future with current budget (World Bank Report # 21831, www.meb.gov.tr/duyurular).
[30] http://www.meb.gov.tr/stats/apk2001ing/Section_11/EducationActivities.htm
[31] http://europa.eu.int/comm/education/policies

1.5 RESEARCH OBJECTIVES

The main objectives of this study were:

1. To determine if Turkish high school social sciences major students have adequate knowledge of using computer and the Internet to fit in a technology-enhanced environment.
2. To discover Turkish high school social sciences students' attitudes toward the use of educational technology in history classroom.
3. To explore the learning style preferences of Turkish high school social sciences students to determine what individual differences may exist.
4. To utilize the results of this study to make recommendations for developing technology-enhanced education programs for secondary history courses in Turkey.

In order to explore these main research objectives in depth, this study also examined following secondary research objectives:

1. To identify the reasons and expectations of Turkish high school students for choosing social sciences as major.
2. To determine the level of educational technology use in history courses compared with other social sciences subjects.
3. To explore Turkish high school social sciences major's attitudes toward history.

1.6 RESEARCH QUESTIONS

1. Do Turkish high school social sciences major (THSSSM) students have basic knowledge of how to use computer and the Internet? (Objective 1; Survey Questions 5-13).

   1a- Does gender, grade, residence or learning style preferences make difference on their level of knowledge?

   1b- Is there a correlation between THSSSM student's level of access to technology and their technology knowledge?

2. What are the THSSSM students' attitudes toward the use of technology in history classrooms? (Objective 2; Survey Questions 14, 20-26).

   2a- Does gender, grade, residence or learning style preferences make a difference in their attitudes?

3. What is the distribution of learning style preferences of THSSSM students as measured by Kolb LSI-3? (Objective 3; LSI-3).

   3a- Is there a difference in the distributions between males and females?

   3b- Is there a difference in the distributions between 10 grades and 11 graders?

   3c- Is there a difference in the distributions between students from big cities and students from small towns?

4. Why do THSSSM students choose this major? What do they anticipate from having social sciences as a major in high school? (Secondary Objective 1; Survey Questions 3).

   4a- Do gender, grade level or learning style preferences make a difference in students' reasons to choose this major or in their expectations?

   4b- Do these reasons and expectations differ for students from big cities or for those from small towns?

5. What is the reported level of educational technology use in history courses compared with other social sciences subjects? (Secondary objective 2; Survey Questions 15-19).

   5a- Does the level of technology use in history classrooms differ between the schools in big cities and the schools in small towns?

6. What are the THSSSM students' attitudes toward history? (Secondary Objectives: 3; Survey Question: 27)

7. What recommendations can be made to educational policy-makers in Turkey in order to assist them in fulfilling their goal? (Objective 4)

1.7 ASSUMPTIONS

This study assumed that:

1. The selected schools for use in this study exemplified the level of educational technology-use in average Turkish public high schools.

2. The survey used in this study was a reliable tool to assess the research questions of this study.
3. Kolb's Learning Style Inventory (LSI) was a reliable tool to identify individual learning preferences of high school students.
4. High school students had proper self-knowledge to be able to identify their own learning preferences.
5. Participated students took this study seriously and answered the self-report questions honestly.

1.8 LIMITATIONS

1. Available technological materials may vary from school to school.
2. Technological materials to which Turkish adolescents have access may vary based on their socio-economic status.
3. This study was based on students' self-reported answers.

1.9 DELIMITATIONS

1. This study was designed to be conducted at 17 high schools in 13 different cities. All of these schools are public high schools run directly by the Turkish Ministry of Education. No private or non-MNE schools were involved in this study.
2. Only 10^{th} and 11^{th} grade general high school students were included in this study.
3. Only social sciences major students were included in this study.

1.10 IMPLICATIONS

The results of this study will have implications in different areas, such as:

1. Purchase of educational technology materials,
2. Curriculum (how to integrate technology into curriculum and classroom activities),
3. Staff development for teachers,
4. Provision for individual student learning needs.

1.11 DEFINITIONS

Readiness: The state or quality of being fully prepared from the point of skill, proficiency, knowledge, aptitude, attitude, eagerness, and willingness.[32]

Proficiency: The state or quality of being proficient and competent, in other words having or showing knowledge, ability, experience, or skill, as in a profession or field of study.[33]

Attitude: In social psychology, attitude is described as the degree of aversion or attraction that reflects the classification and evaluation of objects and events. Attitudes may vary in direction (positive, negative or neutral), degree (amount of positive or negative feeling), and intensity (the level of commitment the individual has to the position) (Miller, 2005). While attitudes logically are hypothetical constructs (i.e., they are inferred but not objectively observable), they are expressed through verbal or written reports, observable behavior, and physiological indicators[34].

Social Sciences: One of the seven majors offered by general high schools in Turkey. The other majors are Science, Turkish-Mathematics, Foreign Language, Art (Painting or Music), and

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[32] Readiness. (n.d.). *Webster 1913 Dictionary*. Retrieved May 24, 2007, from Answers.com
[33] Proficiency. (n.d.). *The American Heritage® Dictionary of the English Language, Fourth Edition*. Retrieved May 24, 2007, from Answers.com.
[34] Encyclopedia Britannica. Retrieved from: http://www.britannica.com/eb/article-9011180/attitude

Sports. General high school students have to choose one of this major after 9th grade (Dogan, 2003).

Turkish Ministry of National Education (MNE): The ministry that is responsible for all educational services in centralized education system of Turkey.

Individualized Instruction: The type of instruction that considers the needs of the students in the design of instructional strategies to make used methods and materials better fit to their cognitive skills and learning styles (Gagne, et al., 1992).

Educational Technology: "The theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Seels & Richey, 1994).

Technology-Enhanced Education: A way of enhancing learning by connecting learners with the learning resources through educational technology.

Active Learning: The instructional activities involving students in by doing activities and reflecting upon what they are doing (Bonwell and Eison, 1991).

Learning Styles: "How a learner perceives, interacts with, and responds to the learning environment" (Keefe, 1989).

The Kolb Learning Style Inventory – Version 3 (LSI): The LSI version-3 measures an individual's relative emphasis on the four learning orientations and on two combination scores that indicate the extent to which the individual emphasizes abstractness over concreteness (AC - CE), and the extent to which they emphasize action over reflection (AE – RO).

2.0 LITERATURE REVIEW

2.1 TECHNOLOGY-ENHANCED EDUCATION

Technology-enhanced education connects learners of all ages and learning resources through educational technology, including, but not limited to TV, VCR, radio, projector, personal computer, CD-ROM, the Internet, cellular phone, and other audio visual or interactive tools that can be used in the process of education. Technology-enhanced education opens remarkable new avenues for learning and skills development. Today, information and communication technologies offer the possibility of radical changes within the school framework in which schools can fulfill their aims and missions. In this new framework technology can be a vital new tool for schools in helping individuals to develop their learning, critical and creative thinking skills.

2.1.1 Definition

"Educational technology" is a term widely used in the field of education (and other areas), but it is often used with different meanings. The word "technology" is used by some to mean “hardware” or “software” but for those working in the field technology is “a systematic process of solving problems by scientific means” (Ely, 1993). Therefore, educational technology properly refers to a particular "approach" to achieving the ends of education. "Instructional technology" refers to the use of such technological processes specifically for teaching and learning (Ely, 1993). Other terms, such as "instructional development" or "educational media," which refer to particular parts of the field, are also used by some to refer to the field as a whole (Ely, 1993).

Educational technology is not just a list of technological devices used in the classroom, but it is "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning" (Seels & Richey, 1994). The Association for Educational Communications and Technology (AECT) defines educational technology as:

> *"Educational technology is a term widely used in the field of education (and other areas), but it is often used with different meanings. The word technology is used by some to mean hardware--the devices that deliver information and serve as tools to accomplish a task--but those working in the field use technology to refer to a systematic process of solving problems by scientific means. Hence, educational technology properly refers to a particular approach to achieving the ends of education (n.p.)."*[35]

2.1.2 The History of Educational Technology

The notion of educational technology has been introduced in 20th century and gained attention especially during and after Second World War. During the war, number of psychologists and educators were called on to conduct research and develop audio-visual materials to train soldiers. Some of these researchers continued to work in the area of educational technology to solve instructional problems in general education (Dick, 1987).

The USSR's launching of Sputnik in 1957 started a series of events that would eventually have a major impact on the instructional technology. In response to the launching of Sputnik, the United States government, shocked by the success of the Soviet effort, poured millions of dollars into improving math and science education in the United States. The first instructional technology-based materials developed with the government funds were usually developed by subject matter experts without an extensive study on their effects on students. However, a few years later it was discovered that many of these materials were not particularly effective (Reiser, 2001).

During the 1970s, instructional technology became so popular all over the world from business to the military that many institutions developed an interest in the instructional design process. In the mid 1970s, several branches of the United States military adopted an instructional

[35] www.aect.org

design model, universities created instructional development centers to improve the quality of their instruction, many graduate programs were created in instructional technology, and finally many nations, such as South Korea, Liberia, and Indonesia, saw the benefits of using instructional technology to solve instructional problems in their countries (Reiser, 2001).

2.1.3 Why Technology-enhanced Education?

Research shows that successful technology-rich schools generate impressive results for students, including improved achievement; higher test scores; improved student attitude, enthusiasm, and engagement; richer classroom content; and improved student retention and job placement rates. Among the hundreds of studies that show positive benefits from the use of technology, two most referenced studies are those funded by U.S. Department of Education and Apple Computer, Inc. The first, a U.S. Department of Education-funded study of nine technology-rich schools, concluded that the use of technology resulted in educational gains for all students regardless of age, race, parental income, or other characteristics.[36] The second, a 10-year study ACOT, supported by Apple Computer, Inc., concluded that students provided with technology-rich learning environments "continued to perform well on standardized tests but were also developing a variety of competencies not usually measured. Students explored and represented information dynamically and in many forms; became socially aware and more confident; communicated effectively about complex processes; became independent learners and self-starters; and knew their areas of expertise and shared that expertise spontaneously."[37]

The benefits of use of technology in education are well known not only by researchers and educators but also the by general public, perceptions verified by a Microsoft / Intelliquest public survey conducted in 1995. The results of this public survey show that:

- 89% of parents (84% of general population) believe computer skills are important to educational success.
- 86% of computer-using children believe computers skills are important to getting good grades in school.

[36] www.inet.ed.gov
[37] http://www.apple.com/education

- 92% of children think computer skills will help them earn higher salaries in future jobs.
- 77% of teachers (67% of general public) think computers help each child learn at his/her own pace.
- 61% of American (56% of teachers) believe that computers help develop children's creativity.[38]

Reeves's (1998) study of examining fifty years of educational research show us that technology-use in schools has positive effects on teaching and learning. Reeves's extensive review revealed that:

- Television has positive effect on students' learning and school achievement especially with programs that were produced for instructional purposes, as long as students watch less than two hours TV in a day.
- Computers motivate students and students who use computers as tutors get higher scores on standardized achievement tests.
- Compared with traditional instruction, students can complete a given set of educational objectives in less time with computer-based instruction.
- Educational technology materials provide students an opportunity to involve actively in the learning process "rather than absorbing representations preconceived by others."
- Educational technology materials support reflective thinking which is necessary for meaningful learning.
- Educational technology materials enable "mindful, challenging learning rather than the effortless learning promised but rarely realized by other instructional innovations."

- The use of educational multimedia programs as cognitive tools engages many skills in learners such as: "project management skills, research skills, organization and representation skills, presentation skills, and reflection skills." (Reeves, 1998, p. 3).

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[38] *Importance of Technology*. http://www.nsba.org/sbot/toolkit/tiol.html

2.1.4 Benefits of Technology-enhanced Education

A review of the literature on this topic (and related topics such as technology-rich environments, educational technology, instructional technology, etc.) helps us narrow down the areas that generally benefit from technology-enhanced education:

- active learning / learning by doing (study at your own pace and on your own time),
- teaching content better,
- reaching out to students with different learning styles, skills, needs, cultural backgrounds, and
- motivation.

2.1.4.1 Active Learning

Active learning can be defined as instructional activities involving students in doing activities and reflecting upon what they are doing (Bonwell and Eison,1991). According to Connor at al (1996) active learning is a "hands-on and minds-on involvement in the learning process." Bonwell and Eison (1991) go into more depth with these descriptions of active learning and define active learning as a learning process that promotes:

- More students involvement in classroom activities rather than just listening
- more emphasis on skill development rather than transmitting information;
- more student involvement in higher order thinking (e.g., reflection, synthesis, evaluation, problem solving, and application), and
- greater emphasis on students' exploration of their own attitudes and values (Bonwell & Eison, 1991).

The use of active learning techniques in the classroom is vital because of their powerful impact upon students' learning. Research shows that there is a significant correlation between how much people are involved in the learning process and how much they remember as the time passes. For example, students who actively involve in classroom activities by giving a speech, participating in a discussion or simulation, etc., tend to remember 70%-90% of what they said or

did after two weeks. Whereas, students who passively involve in classroom activities by reading, listening and watching tend to remember only 10%-30% of what they read, heard, and saw after two weeks (Dale, 1969).

Several studies have shown that students prefer strategies promoting active learning to traditional lectures. Research evaluating students' achievement have demonstrated that active learning methods are "comparable to lectures in promoting the mastery of content but superior to lectures in promoting the development of students' skills in thinking and writing" (Bonwell and Eison,1991). Furthermore, some cognitive research has shown that "a significant number of individuals have learning styles that are better served by other pedagogical techniques other than lecturing" (Bonwell and Eison,1991).

According to the National Council for the Social Studies (1994), an effective way to engage students actively in 'authentic problem-tackling or decision-making context' is to incorporate technology into the social studies classroom. As for the essential nature of guiding learning and using technology to effectively engage learners, two leading educators have stated:

> *"Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves."*
>
> *(Chickering & Gamson, 1987, p. 3)*

2.1.4.2 Teaching Content Better

For decades educators and experts in history have recommended methods that go beyond text and teacher centered instruction to engage students actively in history courses. Despite these recommendations traditional teacher/text centered instruction still dominates history instruction. Over-reliance on textbooks, worksheets and lectures failed to stimulate students' interest and support higher level cognitive goals (Goodland, 1984). Due to the falling behind in educational

reform efforts, students' achievement and historical knowledge is very low in history courses (Nash, at all, 1997; Wineburg, 2001).

Technology has the capability to expand learning resources and open the classroom to the world. Computer and the Internet are the new gateways for teaching and learning. Instructors can use the Internet to find new resources and to share ideas with other teachers. Also, with the help of computer related technologies the content could be presented in various ways that teachers could not provide with traditional methods. By varying the methods in instruction teachers can teach the content better and fulfill their teaching objectives.

2.1.4.3 Reaching out to students with different learning styles, skills, needs, and cultural backgrounds

Students possess a variety of learning styles, but not every style is present to the same degree. Only about one-third of young people have a single dominant learning style, one-third have two, one-third have no clear preference (Lemire, 1995). Based on genetic background, parents' child rearing practices, educational experiences, career, and social interactions some learning style preferences are better developed and more relied on. The other preferences are somewhat stay ineffective, but they can be easily activated with sufficient support and exercise.

Due to the nature of multi-media devices involved, a technology-enhanced teaching model can provide more ways of addressing the different learning styles than traditional teaching methods (Gardner 1983). By doing so, it provides students a chance to exercise their non-dominant learning style preferences. David Diaz and Ryan Cartnal (1999), compared students in a traditional instruction setting with those in a technology-enhanced setting. Those in the technology-enhanced settings were less dependent on their dominant learning styles as learners.

That data sets the stage for a middle ground approach to the appropriate relationship between technology and learning style. This middle ground is illustrated in the work of Jonathan Ross and Robert Schulz (1999) in which they examined the relationship between the learning style and online education. They report that the online education can enhance different learning and thinking styles of students. They provide numerous illustrations of how an online course might structure information to make it compatible with the needs of various types of learners.

As stated before technology-enhanced environments provide various ways or tools for the presentation of information and the structuring of class activities or assignments in order to meet students' learning style preferences. Below is a list of the intelligences as defined by Gardner (1983) and the educational technology tools that can be used to help students improve these intelligences:[39]

Verbal/Linguistic intelligence: This intelligence addresses oral and written communication skills. Word processing, audio & video recording, web broadcasting, and communication (such as e-mail and internet messaging) programs can be used in the classrooms to help students improve their verbal/linguistic intelligences.

Logical/mathematical intelligences: This intelligence is defined as logical, mathematical and analytical thinking skills. Videos or math and science software can be used to graphically illustrate the concepts.

Visual/spatial intelligence: This intelligence is defined as the ability to understand the world through what we see and imagine and to express ideas through the graphic arts. Paint programs, camcorders & movie making programs, and virtual tours can be used in the classrooms to address this intelligence.

Bodily/kinesthetic intelligence: This intelligence is defined as the ability to learn and express oneself through physical activities. Educational games, robot construction and programming, and virtual tours can be used in classroom activities to address this intelligence.

Musical intelligence: The ability to understand, appreciate, perform, and create music by voice or instruments or dance. Dance teaching games and videos, music creating and editing software, and audio recording software can be included in classroom activities to address this intelligence.

Interpersonal intelligence: The ability to work, communicate and understand other people. E-mail and internet messaging programs can be used in classroom to address this intelligence.

[39] http://www.nsba.org/sbot/toolkit/tiol.html

Intrapersonal intelligence: The ability to act on the basis of self-knowledge and making decisions based on an accurate picture of oneself. Video diaries, videotaped interviews, ad multimedia portfolios can be included in classroom activities to address this intelligence.

2.1.4.4 Motivation

Research shows that student motivation and performance improves when instruction is adapted to student learning preferences and styles. For example, when computers were used in history classes, students demonstrated increased motivation and recall, and took less time to complete the unit (Yang, 1991-1992). Educational technology helps motivate the student, because it engages student enthusiasm and lets the student become actively involved in the education process. Active participation into the process of education is core to establishing a connection between the learner and the subject matter.

Wlodkowski (1984) described six steps to motivate learners in a time continuum model. The model identifies two steps to be used at the beginning of instruction, another two in the middle of instruction, and two at the end to enhance learning. Those six steps are;

1. ascertaining student needs;
2. ascertaining student attitudes toward learning;
3. creating stimulating instructional events;
4. paying attention to the classroom's affect;
5. providing assessment and recognition of personal competence and,
6. reinforcement for future learning whether self-directed or institutionally guided (Wlodkowski, 1984)

Implementation of Wlodkowski's motivation steps requires a radical change in the traditional teacher role, in which teachers would no longer be instructors, but they become the facilitators for students. High quality facilitation is necessary to optimize students' learning experiences (Fox *et al*., 2001). Rolfe (1993) states that the facilitator's role in any educational program requires the setting up of a physical, social and psychological environment appropriate for learners. This environment can be best created by technology enhancement. In a technology-enhanced environment teachers must be equipped not only with skills of facilitation, but also with the skills required to use information technology and confidence to use various educational

technology tools. With these facilitation skills and the use of technology skills, teachers can accomplish the "six steps of motivation" easily.

2.1.5 Critiques of Technology-enhanced Education

Despite its benefits stated above and the optimism expressed by research and government documents, there are also many criticisms of the use of media and technology in education. A cover story of *The Atlantic Monthly* entitled "The Computer Delusion" illustrates a critical view of technology in education, beginning with this opening sentence:

> *"There is no good evidence that most uses of computers significantly improve teaching and learning, yet school districts are cutting programs – music, art, physical education – that enrich children's lives to make room for this dubious nostrum, and the Clinton Administration has embraced the goal of "computers in every classroom" with credulous and costly enthusiasm."*
>
> *(Oppenheimer, 1997, p.45)*

Cuban (1986) states that research examining the effectiveness of media and technology in schools can be traced back almost eighty years and yet many questions about the value and impact of these approaches remain unanswered. Consider the following two quotes:

> *"Bringing the electronic media into the schools could capitalize on the strong motivation qualities that these media have for children. Many children who are turned off by school are not turned off by one or another of the electronic media; quite the opposite. An educational system that capitalized on this motivation would have a chance of much greater success. I think it would also make education more tied to the real world... Each medium has its own profile of cognitive advantages and disadvantages, and each medium can be used to enhance the impact of others."*
>
> *(Greenfield, 1984, p.178)*

> *"All in all, media's symbolic forms and computers' afforded activities often have skill-cultivating effects. However, to claim that these effects are specific to any one medium or media attribute is difficult..... There is growing consensus that past media comparison, media attribute, and motivation studies indicate that media do not influence whether someone learns from instruction. Learning seems to result from factors such as task differences, instructional methods, and learner traits (including attitudes) but not the choice of media for instruction."*
>
> *(Clark, 1992, p.806)*

Greenfield's (1984) comment of "e*ach medium has its own profile of cognitive advantages and disadvantages"* is true for any type of instructional method. Even the most criticized method, lecturing, has both advantages and disadvantages. Then what seems to make educational technology popular among other instruction methods may be the effect of modern life on people. As you can see on the following section, life-style and culture have an important impact on learners' learning style preferences.

2.1.6 Cultural Issues in Technology-enhanced Education

Culture can be viewed, very broadly, as the beliefs, philosophy, observed traditions, values, perceptions, and patterns of action performed by individuals and groups. In this broad view culture has a role in education which can be seen in the learning style preferences of students from different cultures. Recent developments in educational technologies have led some instructional designers to claim that technological tools are now available for culturally sensitive instructional design (Chen et al., 1999). The influence of culture on learning style preferences should be regarded as a significant concern in the design of technology-enhanced learning systems. In fact, it has been included as one of the five essential foundations of effective student-centered learning environments. The other foundations are psychological, pedagogical, technological, and pragmatic (Chen and Mashhadi, 1998, quoted by Chen et al., 1999).

Recognizing cultural differences is essential to meeting students' educational needs as well as to building trust between the teacher and the learner. The existence of trust will positively affect various aspects of education such as motivation, discipline, engagement, and reinforcement. It is also especially important for technology-enhanced education to design

appropriate (culturally sensitive) instruction and to buy the right equipment to support it. As stated by Harkrider;

> *"There is often a natural tendency to accept that rapidly emerging technology itself is the empowering agent. Quite the opposite is true. The computer is simply a tool that offers us expanded and alternative modes of communication. The computer does not generate meaning but simply provides the mode of transportation. Humans create the 'reflective space' for sharing ideas and generating solutions to challenges."*
>
> *(Harkrider, 1999, n.p.)*

Are these cultural differences and preferences being accepted and considered in the process of educational technology? Unfortunately, most of the time the answer is, NO! McIsaac (1993) points out that media materials and services are often inappropriately used without sufficient recognition of the recipient is cultural setting.

2.1.7 Conclusion

Today schools are trying to educate the generation of the information age. We all know how fast the technology is changing, and as educators most of us, somehow, are able to adapt to these changes. But the generation that we deal with is not adapting to those changes, they live with them; they grow with them. Today more than majority of adolescents in the USA (ages 13-18) have access to computers, cell phones and game consoles. [40] Also adolescents (ages 12-18) are the one that use the Internet more often than any other age group in the USA. [41] So the technology is a part of their life style now. No wonder they expect to see and use the same technology at school.

Technological developments spread much faster than educational revolutions. Therefore like the youth all over the world, Turkish youth are being involved with various technological

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[40] *Born to be Wired: The Role of New Media for Digital Generation; A new Media Landscape Comes of Age: Executive Summary. Yahoo and Carat Interactive, July 2003 (Press Relase). Available at: http://biz.yahoo.com/bw/030724/245198_1.html*

[41] Bailey, J., (2003). *Students in todays schools.* Avaliable at: http://nationaledtechplan.org

materials more and more in their daily lives, and they want to see these technological materials being used in their schools.

The use of educational technology is not only necessary to meet the young generation's needs or to make educational process more relevant to their life-style, but it also necessary to revolutionize the educational process itself. Technology-enhanced education can widen access to information, increase flexibility, motivation, and achievement. Information technology can change the instructional methods and materials that can be used to facilitate learning. The nature of technology-enhanced learning also provides the potential to change teacher and student roles in the educational process. In this role shift, the teacher will have a facilitating role rather than transmitting facts and students will become active participant of learning process rather than an observer. Such shift has the potential to enhance student learning and to bring satisfaction for teachers.

However, the planning and implementation of technology-enhanced learning requires attention if it is to be a comprehensive learning experience. We need well-planned and appropriately research-supported approaches to technology-assisted education in order to create a meaningful and complete learning experience for students. At the same time we need to consider the diversity of the students in order to accommodate all learners' learning preferences. Otherwise just filling up schools and classrooms with technological instruments will develop only space and funding problems not a revolution in the educational process. This situation will make things much harder for the Turkish educational system since it is already dealing with infra-structure and funding problems.

2.2 INDIVIDUALIZED INSTRUCTION

Individualization is described as "modifying a system to suit the needs and preferences of a particular individual."[42] Individualized instruction is the type of instruction that considers the needs of the students to make instruction and the materials suited to their cognitive skills and learning styles (Gagne et al., 1992). This term was introduced in the literature in the early twentieth century when the first individualized instruction plans were created between 1910 and 1920. But these plans were not successful.[43] Nonetheless, individualized instruction was re-introduced in the 1960s as a part of an educational reform that attempted to personalize education (Muse, 1998).

Individualized instruction is based on the assumptions that:

- Students differ in their learning styles, needs, strengths, and abilities.
- Classroom activities and teaching materials should be adapted to meet these differences.
- Classrooms in which students are active learners are more effective than those in which students are "passive recipients of information."
- Making meaning out of ideas is more important than just "covering information,[44]
- "One-size-fits-all" curriculum has no effect in mixed-ability classrooms

(Tomlinson, 1999),

> *"Differentiation seems a common-sense approach to addressing the needs of a wide variety of learners, promoting equity and excellence and focusing on best-practice instruction in mixed-ability classrooms. This makes more sense in today's schools than the timeworn method of aiming for students in the middle and hoping for the best for those on the upper and lower extremes."*
>
> (Tomlinson, 1999, n.p.)

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[42] American Heritage Dictionary

[43] http://www.coe.uh.edu/courses/cuin6373/idhistory/individualized_instruction.html

[44] http://www.scusd.edu/gate_ext_learning/differentiated.htm

Based on the assumptions given above, individualized instruction allows students to have multiple options for taking in information and making meaning of ideas. Individualized instruction requires teachers to be flexible in their methods. Teachers are expected to adjust their teaching rather than expecting students to modify themselves for the teacher and the curriculum (Hall, 2001). Individualization of instruction requires 1) appreciating each person's uniqueness,[45] and 2) recognizing students' varying backgrounds, prior knowledge, physical capabilities, cognitive abilities, and learning preferences.

As with any theory, educators have to face many challenges when implementing individualized instruction. In their study McKee and Clements (2000) listed 14 challenges for educators such as:

- *"Identifying effective materials and strategies that support individual instruction,*
- *Actively monitoring student progress,*
- *Creating independent learners."*

One other challenge might be identifying individuals' characteristics (background, prior knowledge, physical capabilities, cognitive abilities, and learning preferences, etc.). This can be accomplished through observation and conversations, and it can supply the researcher with more reliable data. However observation and conversations are quite time consuming. The easier way for researchers and educators to identify individuals' characteristics is by using inventories and surveys developed for that purpose.

2.3 IDENTFYING INDIVIDUALS' LEARNING PREFERENCES

Montgomery and Groat (2002) describe the process of identifying how students learn as a crucial part of selecting appropriate teaching strategies. As stated before this process of identification is a big challenge for educators who seek to individualize instruction especially when the class-sizes are high. Therefore, in Turkey's current situation, learning style inventories seem the only

[45] http://education.gallup.com/content/default.asp?ci=1060

usable tool for identifying high school students' learning style preferences since the average class-size at high schools is 31 (see Table 1, p. 3).

2.3.1 The Theory of Learning Styles

The National Association of Secondary School Principals (NASSP) defined "learning styles" as "the composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment" (Keefe, 1989). Keefe also describes learning style as both a student characteristic and an instructional strategy. As a student characteristic, learning style is an indicator of how a student learns and likes to learn. As an instructional strategy, it informs the cognition, context and content of learning (Keefe, 1991).

Learning style theory stems from the fact that individuals perceive and process information in very different ways. Every person learns in his/her own unique way. A learning style is not what a person learns but it is a person's preferred way to learn and the way that a person learns best. Litzinger & Osif (1993) describe learning styles as "the different ways in which children and adults think and learn." They see that each of us develops a preferred and consistent set of behaviors or approaches to learning. In order to better understand the learning process, they break it down into several processes:

a) Cognition: How a person acquires knowledge.
b) Conceptualization: How a person processes information. Some people always look for connections among unrelated events; meanwhile, for others; each event triggers a multitude of new ideas.
c) Affective: People's motivation, decision making styles, values and emotional preferences will also help to define their learning styles.

2.3.2 Learning Style Models

Learning styles have been the focus of considerable study. According to Claxton & Murrell (1988), those approaches to learning style can be examined in four categories according to their

focuses: (1) personality, (2) information processing, (3) social interaction, and (4) instructional methods.

a) Models stressing personality:
    - Witkin's Embedded Figures Test (1954),
    - Kagan, Matching Familiar Figures Test (MFFT) (1963),
    - Myers-Briggs Type Indicator (MBTI) (1975),
    - Keirsey's Temperaments and Characteristics (1978),
    - Katz and Henry's Omnibus Personality Inventory (1988).

b) Models emphasizing information processing (individual's preferred intellectual approach to assimilating information):
    - Pask (1976),
    - Hunt, Paragraph Completion Method (1978),
    - Gregorc's Mind Styles (1979),
    - Entwistle and Ramsden, Approaches to Studying (1981),
    - Gardner's Multiple Intelligence (MI) (1983),
    - Schmeck, Ribich, & Ramanaih's Inventory of Learning Process (1983),
    - Kolb's Learning Style Inventory (1984),
    - Felder and Soloman's Index of Learning Styles (1988),
    - Biggs's Study Process Questionnaire (1993),
    - Schroeder's Paragraph Completion Test (1993).

c) Models stressing social interaction (how students interact in classrooms):
    - Mann (1970),
    - Perry (1970),
    - Reichmann and Grasha's Student Learning Style Scales (1974),
    - Belenky et al., *Women's Ways of Knowing* (1986),
    - Baxter Magolda (1992).

d) Models stressing instruction:
    - Goldberg's Oregon Instructional Preference Inventory (1972),
    - Friedman and Stritter's Instructional Preference Questionnaire (1976),
    - Renzulli and Smith's Learning Style Inventory (1978),

- Dunn & Dunn's Learning Style Inventory (1978),
- Canfield's Learning Styles Inventory Manual (1980),
- Rezler and Rezmovic's Learning Preference Inventory (1981),
- Keefe (1989).

Among these numerous learning style theories and accompanying inventories Kolb's Learning Style Inventory (LSI- version 3) has been selected to be used in this study since it is accepted as the most popular and most often quoted approach to the theory of learning style (Jarvis et al, 1998).

2.3.2.1 Kolb's Theory of Experimental Learning (1984):

Kolb's Experiential Learning (1984) follows the works of Lewin, Dewey and Piaget on experiential learning, and defines learning as a "process of adaptation to the world." People gain knowledge, develop skills or attitude; in other words learn through four different kinds of abilities: concrete experience abilities (CE), reflective observation abilities (RO), abstract conceptualization abilities (AC), and active experimentation abilities (AE). In order to be an effective learner one needs to be able use these four kinds of abilities harmoniously. Which requires: involving oneself in new experiences fully, openly, and without any bias (CE), observing ones' own experiences from many perspectives and reflection on them (RO), integrating these observations into logical theories (AC), and using these theories to make decisions and solve problems (AE) (Kolb, 1984) (see Figure 2).

This learning model is two dimensional: perceiving and processing. Perceiving relates to either abstract conceptualization (AC) or concrete experience (CE), and processing relates to either active experimentation (AE) or reflective observation (RO). In other words, people perceive any information by experiencing or thinking, and they process this information by reflecting or doing. Learners continuously have to choose between "experiencing" and "thinking" to perceive data and between "reflecting" and "doing" to process data. These preferences determine ones learning style (see Figure 3).

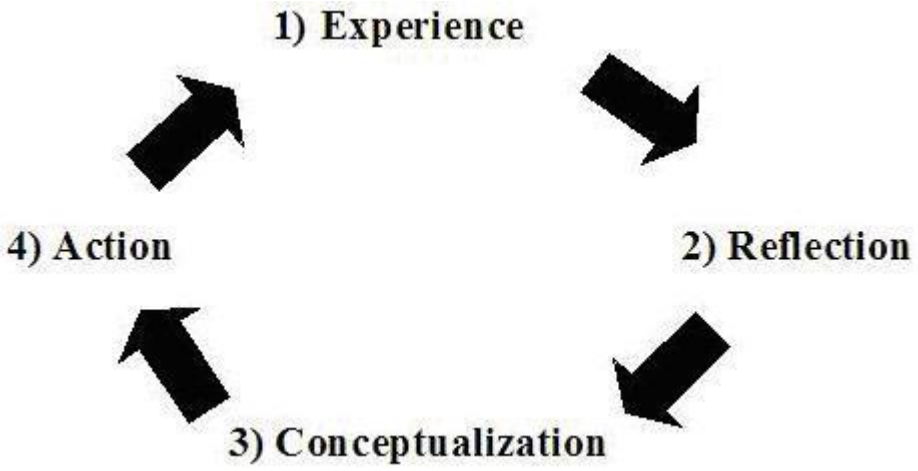

Figure 2: The Cycle of Learning[46]

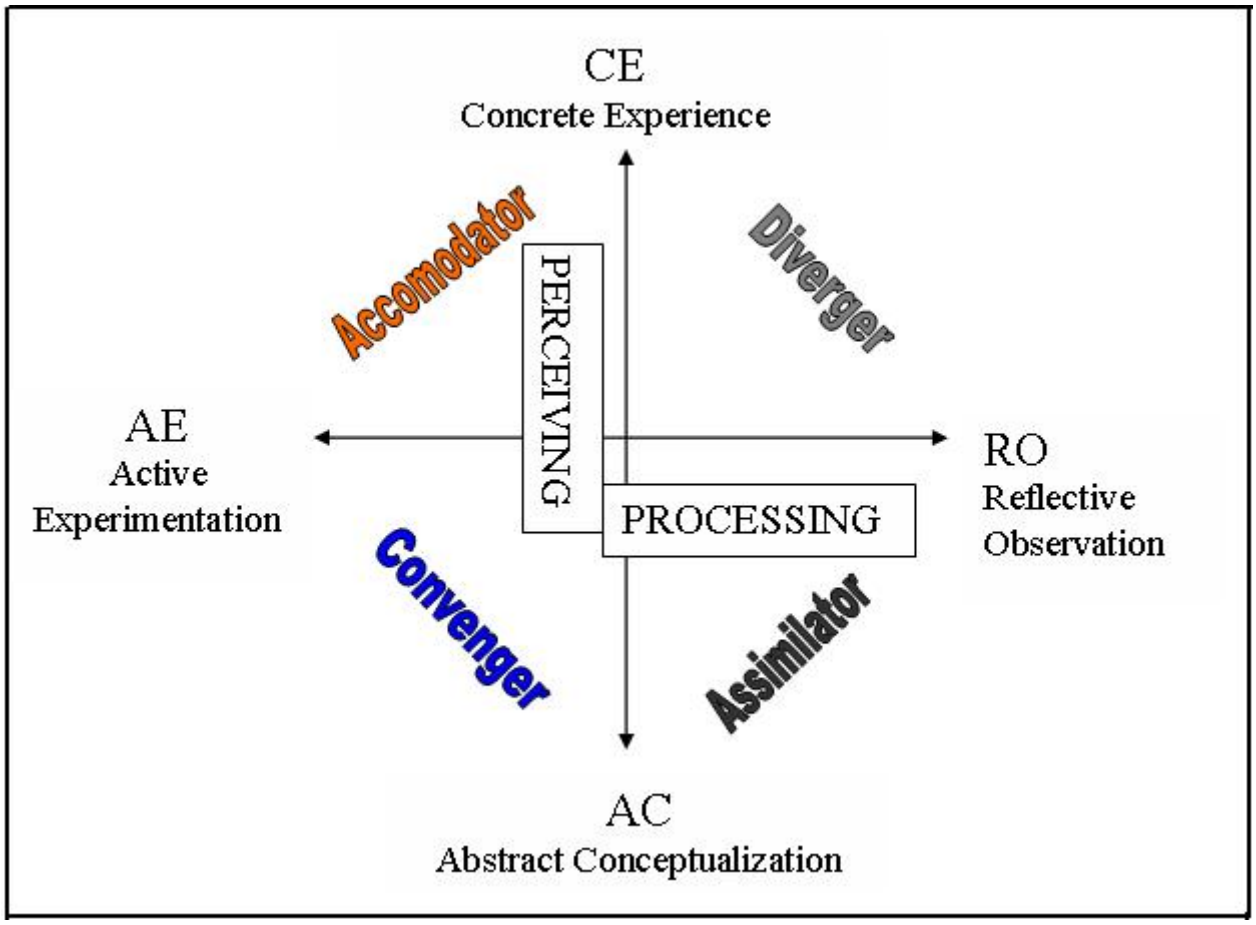

Figure 3: Learning Style Types

[46] http://www.bilk.ac.uk/college/research/allpd/TMP1001493393.htm

People develop preferences for different learning styles in the same way that they develop any other styles, such as management style, leadership style, and negotiating style etc. In the early stages of mature development, from birth to adolescence, people learn how to use these four learning abilities (acquisition stage). During the formal education, career training and then early years of adulthood people specialize on one learning mode (specialization stage). Specialization occurs in two ways: 1) "Environments (family, school, work, club, etc.) tend to change personal characteristics to fit them, and 2) people tend to select themselves into environments that are consistent with their personal characteristics" (Kolb, 1984). During the adulthood some people may recognize "themselves-as-object" (some may never) and change the way they evaluate things, experience life, and make choices by using all four learning modes together harmoniously (integration stage) (Kolb, 1984).

Kolb's Learning Style Inventory (LSI) was designed to describe the ways people learn and how they deal with ideas and day-to-day situations (Kolb's LSI version-3).The LSI was developed in 1976 and revised in 1985 and 1999. The only difference between LSI version-2 and 3 is the format: the order of the endings for each sentence. In version-2 each block of endings (A, B, C, and D) corresponds to one of the four learning modes (CE, RO, AC, and AE). In version-3 the endings has been reorganized so that the blocks (A, B, C, and D) no longer correspond to specific learning modes. The LSI version-3 is a 12-item questionnaire by which respondents attempt to categorize their learning style. Each item requires respondents to rank in order four sentence endings that correspond to the four learning modes described by Kolb. Kolb named these learning modes as; Reflective Observation (RO), Abstract Conceptualization (AC), Active Experimentation (AE), and Concrete Experience (CE). The LSI version-3 measures an individual's relative emphasis on the four learning orientations and on two combination scores that indicate the extent to which the individual emphasizes abstractness over concreteness (AC - CE), and the extent to which they emphasize action over reflection (AE – RO) (see Figure 3).

2.3.2.2 Characteristics of Kolb's Learning Modes:

1) Concrete Experience (CE) – Pragmatist: Learning from feeling and personal involvement. "How can I apply this in practice?" Using theories to solve problems and make decisions (Hartman, 1995). Pragmatists enjoy trying out new ideas, theories, and

techniques to see if they work in practice. They are practical, down-to-earth individuals who like making practical decisions and solving problems (Hartman, 1995).

Instructional Methods: laboratories, field work, observations, simulations, games, trigger videos, personal stories, role playing, and practical exercises (Hartman, 1995; Svinicki & Dixon, 1987). Teachers are suggested to use personalized teaching activities and peer feedback (Hartman, 1995; Sutliff & Badwin, 2001).

2) Reflective Observation (RO) - Reflector: Learning by watching and listening. "I'd like to have time to think about this." Watching others while they are involved in a new experience or reflecting on our own experience (Hartman, 1995). Reflectors prefer to rely on experiences and observe these experiences from a number of different perspectives. They thoroughly collect and analyze data about experiences and events as much as possible before reaching a conclusion possible. They are cautious, thoughtful people who like to consider all possible implications before making a decision (Hartman, 1995).

Instructional Methods: Lectures, logs, journals, discussion groups, reflective papers, observations, thought questions, creative problem solving, and brainstorming (Hartman, 1995; Sutliff & Badwin, 2001). Teacher should provide students with opportunities of reflective exercises (Sutliff & Badwin, 2001).

3) Abstract Conceptualization (AC) - Theorist: Learning by thinking. "How does this relate to that?" Creating concepts and theories to explain our observations (Hartman, 1995).Theorists try to adapt and integrate experiences and observations into logical, complex theories. They tend to be detached and analytical and are uncomfortable with anything subjective or ambiguous (Hartman, 1995).

Instructional Methods: Case studies, theory readings, theory construction, thinking alone, lecture, questioning, papers, and analogies (Hartman, 1995; Sutliff & Badwin, 2001). Other methods such as talking with experts, is not helpful (Hartman, 1995).

4) Active Experimentation (AE) - Activist: Learning by doing. Being involved in a new learning situation and experience. "What's new? I'm ready for anything" (Hartman,

1995). Activists are open-minded and enthusiastic about anything new; they tend to act first and consider consequences later. They enjoy the challenge of new experiences but get bored with implementation and longer-term consolidation. They like to involve themselves with others, but they also like to center activities around themselves as well (Hartman, 1995).

Instructional Methods: Simulations, case study, field work, homework, laboratories. Teacher should give students many opportunities for hands on activities while playing a model of a professional during these activities (Hartman, 1995; Sutliff & Badwin, 2001).

The abilities associated with each of these stages combine to form clusters. Although Kolb thought of these learning styles as a continuum that one moves through over time, usually people prefer and rely on one style above the others. As seen on the Figure 3, Kolb describes four different learning styles;

- Divergers: work best in the concrete experience and reflective observation stages of the learning cycle. They are good at generating ideas, brainstorming, grasping the whole picture, listening, sharing, and working with others. However, they can be too slow to reach solutions, indecisive, easily distracted, and forget important details.[47]
- Assimilators: prefer abstract conceptualization and reflective observation. They are precise, analytical, logical, interested in facts and details, sequential thinker, avid reader, well organized, and good at integrating ideas into models and theories. However they are relatively uninterested in the application of the theories in real life, reluctant to try anything new, overcautious (don't take risks), and not comfortable in group discussion. They do not trust feelings, trust only logic.[48]
- Convergers: prefer abstract conceptualization and active experimentation. They are decisive, precise, organized and systematic. They are good at integrating theory and practice, trying things out, arriving quickly at specific, concrete solutions. They know how to find information or drawing references from experience. However they tend to be

[47] http://www.garysturt.free-online.co.uk/learnsty.htm
[48] Ibid.

in control and unemotional. They prefer working with ideas rather than people. Getting the job done is more important for them than doing it well or presentation.[49]

- Accommodators: prefer concrete experience and active experimentation. They learn best by experience (trial and error), and from others. They are committed to action, very flexible, willing to take risks. They look for hidden possibilities and excitement, and get involved with anything that sparks they interest. However, they tend to try too many things at once. They are not good at planning ahead, time management, or dealing with details.[50]

2.3.2.3 Reliability and Validity of Kolb's Learning Style Inventory Version-3

The literature review indicates that there is general acceptance of the concept of learning styles but there is much disagreement over the validity of the instrument, and which one is the better tool to use. In the following section the limitations and critiques of learning style inventories are presented. Like other similar instruments Kolb's LSI has been questioned by many concerning its validity, especially his first version: LSI- 1976. Kolb himself accepted that test-retest scores of LSI-I (1976) were very low, which he said should be less than .1 (Kolb, 1976).

Therefore, Kolb updated his inventory in 1985 with improved test-retest reliability. Hickox's (1991) review of literature indicates that 83% of related research support for the validity of Kolb's experimental learning theory and his learning style inventory. Kolb made the last revision in 1999 with "good internal reliability on all six LSI scales" (LSI-3 Technical Manual, 1999). This version has improved reliability scores by newly added "randomized self scoring" format. Measures show that all four learning modes now have good internal consistency as measured by coefficient alpha and test-retest reliability as measured by zero-order correlations (LSI-3 Technical Manual, 1999).

In spite of these criticisms Kolb's LSI is still one of the most used and referred to learning style inventories (Jarvis et al, 1998; Robotham, 1995).

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[49] Ibid.
[50] Ibid.

2.3.3 Limitations and Critiques of Learning Style Theories

2.3.3.1 Limitations:

The popularity of the theory of learning styles in twentieth century has ended up with more than 30 theories of learning styles and accompanying inventories. Those theories and inventories, even the most popular, have raised many questions psychologists and educationalists. Researchers criticized learning style theories for having following limitations and weaknesses:

> *"Like the blind men in the fable about the elephant, learning style researchers tend to investigate a part of the whole and thus we have yet to provide a definite picture of the matter before them."*
>
> *(Curry, 1990, p.50)*

> *"Student's chances for success in school may be jeopardized by teachers who use learning styles as a basis for determining methods of initial reading instruction. The idea of learning styles is appealing, but a critical examination of this approach should cause educators to be skeptical."*
>
> *(Snider, 1990, p.53)*

As expressed in the quotes above many educational psychologists and cognitive scientists reject the notion of learning styles (Denzie, 2003). In her review of the research on learning styles, Lynn Curry (1990) has identified three general problems associated with learning style theories as follow:

1) Confusion in definition:

Birkey & Rodman (1995) point out that, just as there are "striking differences in the way people learn and process information...there are significant differences in how learning styles are defined and measured." Some definitions claim to predict only an individual's free choice between a lecture style instructional method versus small-group instructional method (Curry, 1990).

2) Weakness in reliability and validity of measurement:

Researchers (Curry, 1990; Stellwagen, 2001) claim that many learning style theories have been introduced to the public without being validated by supportive research. "The tendency among the learning styles researchers has been to rush prematurely into print and marketing with

very early and preliminary indications of factor loadings based on one dataset (Curry, 1990).” Since they are not supported by research we cannot assume about their overall effects in education.

Rosenshine (1998, quoted by Stellwagen, 2001) states that although there have been many claims that one should teach according to a student's learning style, the balance of the research does not support those claims. He concludes, "Although there are individual studies that support teaching to learning styles, there is no consistent evidence and the overall effect size, across these studies, is zero" After reviewing the research in the 1980s and 1990s, Barbara Nicoll (quoted by Collier, 2000), believes that learning styles-based teaching does not improve students' progress in school. She states, "my concern is that we're starting to jump on another bandwagon, which educators do a lot, without enough research to back it up."

3) Identification of relevant characteristics in learners and instructional settings:

Some learning style theorists have conducted studies on the adoption of their findings into the educational process. However Doyle & Rutherford (1984) claim that those studies were badly designed and did not involve wide enough samples. With these “built-in biases no single learner preference pattern unambiguously indicates a specific instructional design” (Doyle & Rutherford, 1984).

2.3.3.2 Critiques of Kolb’s Theory of Experimental Learning:

Kolb’s theory of experimental learning is about learning rather than about development. Kolb himself has brought attention to the fact that his 'learning cycle' model and his 'learning styles' model concern learning rather than development. He has another theory about development which he calls "the experiential learning theory of development" (Kolb, 1984: Chapter 6). Kolb also clarifies the limitations of his Learning Style Inventory, pointing out that it only represents "elementary learning orientations" which he sees as being in a different dimension to that of development (Kolb, 1984). As for the Inventory, Kolb, himself, points out its greatest limitation. The results are based solely on the way learners rate themselves. It does not rate learning style preferences through standards or behavior, as some other personal style inventories do, and it only gives relative strengths within the individual learner, not in relation to others (Rogers,

1996). Rogers also points out that "learning includes goals, purposes, intentions, choice and decision-making, and it is not at all clear where these elements fit into the learning cycle."

Sheehan and Kearns (1995) state that the original Kolb's LSI-1976 instrument has been criticized for its "psychometric weaknesses such as poor construct and face validity, poor reliability, and an abnormal distribution and general psychometric limitations." This criticism has continued to other similar instruments. The authors continue to say, however, "as a solution to providing some reference for analyzing a person's learning profile without recourse...we decided to continue using the Kolb learning model...." (Sheehan and Kearns, 1995).

Despite the criticisms the Kolb's LSI-1976 and the updated 1985 version are commonly used instruments and continue to be used in current research, as demonstrated by Sheehan and Kearns. Robotham (1995) states that Kolb's and Honey & Mumford's inventories are the two "most widely used" learning styles inventories.

2.3.4 Popularity of Learning Style Theories

As discussed in previous section, some critics think learning style models have inherent biases and lack of research support. However despite those critiques learning style approaches are quiete popular today from kindergarten to adult education. Learning style models are popular because they are being seen as both appealing and democratic. They support:

- developing children's natural potential or talent rather than requiring them to master different academic information,
- allowing children's natural talents, intuition and interests to guide them when they learn, and
- providing an environment in which children can learn to think rather than to memorize (Dunn et al., 2001).

Moreover, not every researcher agrees that learning style models have lack of research support. St. John's University's Center for the Study of Learning- and Teaching-Style's web site[51]

[51] www.learningstyles.net

reports three decades of experimental research based on Dunn and Dunn Learning-Style Model. Those studies were conducted at every grade level K-12 with a variety of model-related instructional approaches. The data from those studies indicates that when academic underachievers are taught new and relatively difficult content for them through their learning style preferences, they achieve statistically higher on standardized achievement tests than they did when the teaching style was unrelated to their learning style (Research on the Dunn and Dunn Learning-Style Model, 2000). Another study conducted at more than 116 higher education institutions documented that learning style approaches produced statistically higher achievement on standardized test than traditional teaching methods (Research on the Dunn & Dunn Model 2000).

In 1986, Brightwood Elementary School, a predominantly African American school in North Carolina, launched its 4-year learning style program based on Dunn & Dunn theory as a school-wide effort especially responding to the learning styles of underachieving children. During this 4-year program teachers introduced each day's lesson through children's primary preferences. They started with tactile and kinesthetic activities; this followed by 10-to-12 minute long activities responding underachieving students identified secondary learning preference; and then finally teachers had students engage in verbal reinforcement. After 2 years of its implementation, the number of discipline problems declined dramatically. During the 1985-1986 school year, there had been 143 discipline referrals. However, there were only 14 in the 1988-1989 school year and 6 in the 1990-1991 school year. The school's reading and mathematics test scores on the California Achievement Tests rose from the 30th percentile in 1986 to the 83rd in 1988 and to the 90th percentile in 1989. At that time the rest of the black student population in the state of North Carolina scored in the 37th percentile (Klavas, 1994).

Based on their experimental research findings, Dunn et al., (1992) summarizes the benefits of learning style based teaching as follow:

- Students with strong preferences made greatest academic gains when their preferences were addressed.
- College and adult learners responded with greater gains than elementary or secondary school learners when instruction was matched to their preferences.

- Middle class students were more responsive to style-responsive accommodations than lower, lower/middle, or upper/middle class students.
- Average students were more responsive to style-matched instruction than high, low, or mixed groups of students.
- Studies of one year's duration showed greater student gains than shorter studies.
- Mathematics was the most responsive to learning style accommodation (Dunn, et al., 1992).

2.3.5 Impact of Cultural Differences on Learning Style Preferences

Child rearing practices of different cultures have a direct impact on children personality and learning style preferences. After an extensive review of literature, Worthley (1987, quoted by Sandhu & Fongb 1996) summarized following five cultural factors from various sources that influence the learning styles:

1) Socialization process: The more parents exercise control over their children, the more field dependent the children become.
2) Sociocultural tightness: The less pressure is placed on people to conform to the social customs, the more field independent they become.
3) Ecological adaptation: Perceptual skills are developed in people according to the degree they use their particular sensors. For example, in the society where careful observation of the environment is necessary for survival, most of the people become visual.
4) Biological Effect: Biological factors also contribute to the development of specific cognitive styles; the children who lack protein tend to become field dependent.
5) Effect of language: The visual nature of written languages used in most modern literate societies influences the people to become more visual. The people who are not literate or belong to the societies where communication takes place orally, are less visual but more auditory (Worthley, 1987, quoted by Sandhu & Fong 1996).

Research has identified cultural differences in the learning styles of various ethnic groups. Park (1997a) conducted a comparative study of Chinese, Filipino, Korean, Vietnamese, and Caucasian students in secondary schools. Park concluded that Korean, Chinese, and Filipino

students tend to have more visual learning preferences than Caucasians; that there was no gender difference in visual learning. He also states that Korean, Chinese, and Caucasian students showed negative preferences for group learning, whereas Vietnamese showed major preference and Filipino students showed minor preference for group learning, showing significant ethnic group differences.

In a separate study of Mexican, Armenian, Korean American, and Anglo American students in secondary schools, Park (1997b) also found significant ethnic group differences in visual and group learning styles. He states that Korean American students have the most visual preferences whereas Anglo American students have the least visual preferences among the four groups. When it comes to group learning, Armenian, Korean American, and Anglo American students showed negative preferences for group learning, whereas Mexican American students showed minor preference for group learning. Park also observed that across the four ethnic groups, girls had statistically significantly higher preference for kinesthetic learning style than boys, although both boys and girls had major preferences.

In another study, Dunn et al. (1993) found gender differences in their study of learning styles of Mexican and Anglo-American children in elementary schools. They concluded that both Mexican and Anglo American female students were more persistent than male students. This study showed that male Mexican American students had the strongest tactile preferences, whereas Mexican American girls in general have the weakest tactile learning preferences. They also found that the female Mexican American students were more peer oriented than the male Mexican American students.

Reid (1987) conducted a comparative study of college students' learning style preferences in English as a second language (ESL) program. He reported that there were significant cultural differences in visual, auditory, kinesthetic, tactile, group, and individual learning styles among Korean, Chinese, Japanese, Malay, Arabic, and Spanish students. Reid found that college ESL students strongly preferred kinesthetic and tactile learning styles and most groups showed a negative preference for group learning. Reid also found that students who had been in the United States for more than 3 years were significantly more auditory in their learning style preferences than those students who had been in the United States for shorter periods of time. Reid states that the more the students had lived and studied in the United States the more their learning style preferences resemble the preferences of native speakers of English.

In addition, Korean students were the most visual in their learning style preferences and were significantly more visual than the U.S. and Japanese students. Chinese and Arabic American groups were also strong visual learners. Japanese students were the least auditory of all learners and were significantly less auditory than Chinese and Arabic Americans, who expressed a strong preference for auditory learning. English speakers rated group work lower than all other language groups and significantly lower than Malay speakers.

2.3.6 Academic Disciplines and Learning Styles

Kolb (1988) claimed that not only do individuals have different learning style preferences but also academic disciplines have different ways of working. In his study on "learning styles and disciplinary differences" Kolb examined undergraduate students and found out that students in the same academic disciplines show similar learning style preferences so he concluded that students tend to choose the academic disciplines where their preferred learning style is favored.
Cross-cultural comparison of disciplinary differences on the issue of learning style preferences was studied by Bradbeer, J., Healey, M., and Kneale, P. (2003). This study was conducted at various universities in four different countries (USA, Australia, UK, and New Zealand) with undergraduate geography students. Bradbeer et al found that assimilators (based on Kolb LSI) were the largest group in all four countries (see Table 3).

Country	*Assimilator* %	*Converger* %	*Diverger* %	*Accomodator* %
Australia	47.9	21	18.5	12.6
New Zealand	44.1	26.3	13.9	15.7
U.K.	51.8	27.1	9.9	15.7
USA	44.6	13.3	26.5	15.7
All	47.6	24.4	14.5	15.7

Table 3: Geography Students' Learning Style Preferences[52]

[52] Bradbeer, J., Healey, M., and Kneale, P. (2003).

2.3.7 Conclusion

Learning Style Theory is a relatively new concept, therefore it has been getting both support and criticism from researchers simultaneously. This type of careful examination has improved and sharpened the theory. Today the statement that "learning styles is the foundation of successful teaching and teaching for thinking" (Keefe, 1991) is generally accepted. Therefore the idea of teaching across students' learning style preferences has been adopted in areas such as business and the military as well as in formal education. Kolb (1984) originated the idea of teaching across the learning styles. He proposed that learners learn most efficiently when the material is presented in a manner consistent with their learning style. Kolb concludes that educational background is a determinant of learning style, that is, the students develop their orientation towards a certain learning style within the education process, and this becomes their preferred learning style. However, learners also need to be exposed to material which is not consistent with their learning style as it helps them to develop "mental dexterity, which will help their academic and professional development" (Kolb, 1984).

The issue of maturational development should be examined carefully in-conjunction with learning style theories before any implication. It is good to help young students to explore their potential. However, potential is different from, and more than talent. When potential has been developed and demonstrated over time, it is recognized as a talent. When talent is unusual and has been demonstrated over time, it is recognized as giftedness (Dunn, Dunn & Treffinger, 1992). If a student is taught only with the teaching methods that speak to his/her learning style, then this student will be using his/her strongest intelligence only and weaker intelligences won't have any chance to become a talent.

The goal of education should be providing balanced instruction. Only about one-third of young people have a single dominant learning style, one-third has two, one-third have no clear preference (Lemire, 1995). Therefore students should be taught sometimes with their most preferred style when the subject is hard for them to understand. This procedure will keep them from being uncomfortable with learning. Sometimes they should be taught with their less preferred style when they deal with relatively easy subjects. This will help them develop the various strengths they will need to function effectively in their future lives.

The key is balanced instruction. To achieve balanced instruction a basic, meanwhile broad goal needs to be determined. For the Turkish educational system this basic and broad goal would be "preparing young generations for the information age." This goal requires that the schooling process focus on all intelligences necessary for a person to have successful career and healthy social life. In his speech Turkish Prime Minister sets a new goal for the Turkish nation "to become an information society." He also says that education will have an important role in this transition. But he failed to establish a basic and broad goal for the Turkish educational system such as "preparing young generations for the information age." Instead he set a goal for Turkish educational system to "*train 500,000 new informatics manpower in next ten years.*"[53] Once again the focus of public education is affected by the demands of economy and politics. This narrow goal will prevent Turkish educational system from being able to serve balanced instruction to meet learners' different needs and to help them develop the various strengths they will need to function effectively in their future lives.

2.4 SUMMARY OF LITERATURE REVIEW

A student's achievement is influenced by his/her personal characteristics, the curriculum and standards identified by state, and the educational environment and activities supplied by the school and teacher. A healthy combination of these three factors will bring academic success to all individual learners. A model that proposes a harmonious combination of factors of student achievement will discussed in the recommendations section (see Figure 11, p. 94).

The literature review of this study examined these three factors of student achievement for Turkish high school students. The first section of the literature review titled the Turkish Educational System examines the goals of Turkish educational system, expected outcomes that this system tries to give students and the learning environment supplied for students. The second section, titled Technology-enhanced Education examines the role of technology-use in creating educational environments and activities that can address learning characteristics and needs of all individuals. The third section titled Individualized Instruction examines student-centered

[53] http://www.bilisimsurasi.org.tr

education theory based on differentiating the curriculum, classroom activities, and examination in order to reach out to every student. Finally the fourth section, titled Identifying Individuals' Learning Preferences identifies selected learning style theories, also in this section Kolb Learning Style Inventory (LSI) is described in details since it has been selected for use in this study to identify Turkish high school social sciences students' learning style preferences.

To sum up, Turkey has two long-term objectives; 1) Joining European Union and 2) Catching up with developed countries / Entering Information Era. In order to enter the information age and to fulfill the requirements of entering the European Union, and also to solve recent problems in education, Turkey has to accomplish an educational reform. The planned educational reform package announced by Minister of National Education Huseyin Celik proposes to;

1) re-design educational environments,
2) assist schools and teachers with computers and the Internet,
3) renew secondary school history, geography, science, math and literature curricula,
4) be student-centered,
5) be based on critical thinking rather than memorizing,
6) identify students' social intelligences and job tendencies in order to direct them toward the carrier opportunity that fits their characteristics.[54]

This reform package proposes to be student centered but it does not mention identifying student characteristics, which is the first step for creating a student-centered educational environment. In this context the reform package above only proposes identifying students' social intelligences and job tendencies, while leaving aside identifying students' cognitive, affective and psychomotor capabilities, early learning experiences, learning style preferences, cultural and socio-economic backgrounds, etc. Any reform proposal would be a trial and error attempt if it is not constructed based on students' characteristics. Therefore, this study aims to identify Turkish secondary school social sciences major students characteristics (learning style preferences, technology access levels, computer and the Internet knowledge, attitudes toward technology,

[54] http://www.milliyet.com.tr/2005/01/13/yazar/zbirand.html

attitudes toward history, etc.) in order to provide a useful data-base for designing a student centered technology-enhanced history education program based on students' characteristics.

3.0 RESEARCH DESIGN

3.1 POPULATION AND SAMPLE

The target population for this descriptive study was tenth and eleventh grade Turkish high school students majoring in social sciences. To obtain the maximum number of participants from the targeted population involved in this study, help was needed to administer the instrumentations in different provinces and cities. Seven people were asked to help administer these instruments at the schools accessible for them. Therefore, students from 15 high schools in 13 cities in 8 provinces (see Appendix-G for the list and locations) became the convenience sample of this study. Wallen and Sawin (1999) describe the convenience sample as "a group of subjects selected not because they are representative of a specific population, but because they are (conveniently) available" (p.36).

3.2 INSTRUMENTATION

Required data for this study was collected by a "Technology Questionnaire" and "Kolb's Learning Style Inventory, Version-3."

a) Technology Questionnaire: The 27 item "Technology Questionnaire" was developed by this researcher to gather data on six of the seven research questions. Therefore the questionnaire consists of six sections:

1) Demographic information, which had 3 items related to participants' gender, education level, and access to various technologies.

2) Reasons to choose social sciences as major, which included one open ended question aiming to gather information on participants' reasons and expectations for choosing social sciences as high school major.
3) Computer and Internet knowledge, which included 9 items related to participants' level of knowledge and experience on how to use computer and the Internet.
4) Technology use in history classrooms, which had 5 items aiming to gather data on level of technology use in history classrooms, compared with other SS subjects at participants' schools.
5) Attitudes toward use of educational technology, which included 7 items related to participants' attitude toward the use of educational technology in history classrooms.
6) Attitude toward history, which had one question aimed to gather information on participant's attitude toward history in general.

This questionnaire included 26 Likert scale questions and one open ended question where participants were expected to give one or two sentences answers (see Appendix–D). The estimated time to answer this survey was 15 minutes.

b) The Kolb's Learning Style Inventory-Version-3 (LSI-3): The LSI was designed to describe the ways people learn and how they deal with ideas and day-to-day situations (Kolb's LSI version-3). Kolb (1984) theorized that the process of learning has two dimensions; perceiving and processing. Perceiving relates to either Abstract Conceptualization (AC) or Concrete Experience (CE), and processing relates to either Active Experimentation (AE) or Reflective Observation (RO). In this model people perceive data by experiencing or thinking, and they process this data by reflecting or doing, and these preferences determine ones learning style.

The LSI version-3 is a 12-item questionnaire by which respondents attempt to categorize their learning style. Each item requires respondents to rank the given endings from 4 (most like you) to 1 (least like you). By adding these scores in a given order respondents can find their strong and weak learning modes described by Kolb. Kolb named these learning modes as; Reflective Observation (RO) - Reflector, Abstract Conceptualization (AC) - Theorist, Active Experimentation (AE) - Activist, and Concrete Experience (CE) - Pragmatist. The LSI version-3 measures an individual's relative emphasis on the four learning orientations and on two combination scores that indicate the extent to which the individual emphasizes abstractness over

concreteness (AC - CE), and the extent to which he/she emphasizes action over reflection (AE – RO).

Permission to translate and reproduce Kolb Learning Style Inventory – Version 3 (LSI-3) was granted by the Hay Group in 2004 (see Appendix–F). Under this permission the LSI-3 was translated into Turkish for use in this study (see Appendix–E).

3.3 TRANSLATION OF INSTRUMENTS

Since the study was conducted in Turkey the Technology Questionnaire and Kolb's Learning Style Inventory, Version-3 were translated into Turkish by the researcher. To make sure that the translation was correct, these translations were reviewed by two doctoral students who are Turkish-English speakers. The translated instruments were then translated back into English by the same doctoral students and compared with the originals to ensure backward translation. Both original and the translated version of the instruments can be found in Appendix, section D and E.

3.4 RELIABILITY

The internal consistency reliability of a survey instrument is defined as the degree of reliability of different survey items which intended to measure the same characteristics.[55] Cronbach's Alpha Reliability Coefficient method was used to assess Technology Questionnaire's subsections for internal consistency reliability. In this method, a scale that has an alpha above .70 is usually considered to be internally consistent.[56]

Three of the six subsections in Technology Questionnaire that uses multiple questions to collect data on a specific subject were checked for internal reliability by using Cronbach's Alpha Reliability Coefficient. Two of them had a high alpha coefficient (over .90) which can be

[55] http://www.statistics.com/resources/glossary/intcreliab.php
[56] http://www2.chass.ncsu.edu/garson/PA765/standard.htm

considered as a "good" scale, and one subsection had a alpha coefficient of around .70 which can be considered as "adequate" scale (see Table 4).[57]

Item	*Cronbach's Alpha*	*Cronbach's Alpha Based on Standardized Items*	*N of Items*	*N of Valid Subjects*
Computer and Internet Knowledge (Item # 6-13)	.911	.913	8	1188
Use of Educational Technology in SS Courses (item # 15-19)	.957	.959	35	544*
Attitudes toward use of Technology (item # 20-26)	.698	.709	12	1108

Table 4: Reliability Coefficient of Technology Questionnaire

3.5 DATA COLLECTION AND ANALYSIS PROCEDURES

Upon the approval from the University of Pittsburgh Institutional Review Board (IRB) (see Appendix-C) and from the National Education Directorates of seven provinces, the instruments of this study (The Kolb's LSI-3 and the Technology Questionnaire) were administered during the fall term of 2005-2006 academic year. A total 1350 responses were returned from 15 high schools. Each participant was given a numeric ID based on their schools in order to make a comparison between schools and residences (big cities and small towns). A population of 200,000 was chosen as the division between big cities and small towns. Any city that has over 200,000 of general population was classified as a "big city" and cities that has less than a population of 200,000 classified as a "small town." Based on this criteria 3 cities, where 7 high schools included in this study are located, were classified as big cities; and 4 cities, where 8 high

[57] http://www2.chass.ncsu.edu/garson/pa765/reliab.htm

* The average return rate for these questions (questions 15-19) is 52%. Probably some of the participant students thought it would take too long to answer all these questions in proper way. Therefore 48% of the participant students decided not to answer these questions or answer them all with "0"s. In order to produce more healthier conclusion from these questions, participants who did not answer any of these questions at all or answer them with nothing but "0"s are not included in this analyze. Check Appendix-K.1.1 to see how much difference this excluding process made on the results.

schools included in this study are located, were classified as small towns by using population numbers from the last census in Turkey (census 2000)[58] (see Appendix-G).

The Kolb Learning Style Inventory Version-3 was used in this study to determine participants' learning style preferences in which participants rank four endings for each of the 12 sentences from 4 (most like you) to 1 (least like you). As described by LSI Version-3 manual, published by the Hay Group, participants' responses for the each item were added in a given order to find out their total scores for each mode (CE, RO, AC, and AE). Then this scores were entered into SPSS (Statistical Packages for the Social Sciences, 14.0) and NUD*IST (Non-numerical Unstructed Data Indexing Searching and Theorizing, N6)[59] software for further analysis.

The Technology Questionnaire includes 26 Likert scale questions and one open ended question. Participants' responses to the Likert scale type questions on the questionnaire were coded into numeric values for each item. These numeric values were entered into SPSS 14.0 to perform descriptive statistics on the data such as frequency, mean, standard deviation, and statistical significance. The Alpha level of 0.05 was used as criteria for statistical significance.

Item # 3 in Technology Questionnaire is an open ended question, which aims to describe Turkish students' reasons and expectations for choosing Social Sciences as a high school major. Responses for this question were translated into English. Both original responses and English translations were entered into NUD*IST for coding and analyzing. NUD*IST (N6) was chosen as a data management tool in this study because it helps researchers analyze qualitative data by allowing them to explore themes, ideas and patterns within the text and creating reports and visual displays to interpret the study.

Since this is a descriptive study, no hypothesis was set for item #3 in Technology Questionnaire. Therefore the code derivation process for this question in NUD*IST started directly from the data itself. Each given reason and expectation was coded as a "tree node" in NUD*IST software, and a "coding tree" structure was created (see Appendix-I). After all responses were coded, the coding tree was revised for clarifying theme and better presentation purposes. To make sure that the coding schema was reliable, "coder-reliability" check was performed before the analysis. In this kind of content analysis the degree of coder-reliability is

[58] http://www.die.gov.tr/konularr/nufusSayimi.htm
[59] http://www.qsrinternational.com/

usually determined by having several coders coding the same set of data. If all of the coders can produce similar coding schema the coding system and the coders are called reliable. Neuendorf (2002) states that "without the establishment of reliability, content analysis measures are useless." In general 70% of coder-reliability is accepted as the minimum level, 80% and above is considered as a good rate of reliability (Neuendorf, 2002).

To perform coder-reliability check, 20% of the data was coded by a fellow graduate student using the coding tree created by the researcher. Two coding schemas were compared by using "coder reliability" function built in NUD*IST N6. As Table 5 shows, the comparison between coder-1 and coder-2 turned out with a good degree of coder reliability (high number of agreement) rates.

	Item Numbers	*Percentages*
Agreement (a)	587	79%
Disagreement	157	21%
Missing (m)*	89	12%
Over (o)**	68	9%
Total	744	100%

Table 5: Coder Reliability Results (coder 2 compared with coder 1)

* Missing (m) stands for the number of text coded by coder 1 (researcher) but not coded by coder 2.
** Over (o) stands for the number of text coded by coder 2 but not coded by coder 1 (researcher).

4.0 RESULTS

The results of this study are presented in this chapter under three major sections: 1) demographic information; 2) students' readiness toward technology-enhanced history education; and 3) students attitudes toward use of educational technology in history classrooms.

4.1 DEMOGRAFIC INFORMATION

The Technology Questionnaire and Kolb's Learning Style Inventory were used in this study to collect background information on the participating students. These two instruments supplied demographic information such as gender, education level, and participants' reasons to choose social sciences as a high school major, learning style preferences, learning method preferences, access level to various technologies at home, and the level of technology use in social sciences courses.

A total number of 1350 high school students participated in this study from 15 high schools in 7 provinces. Both small towns, which had a population as low as 13,000, and major big cities were included in this study to get clearer picture of the situation. Among the 1350 participant students 68% (n= 922) were from big cities, and 32% (n= 428) were from small towns. Since high school students pick their major after 9th grade, only 10th and 11th graders were included in this study. Among the 1350 participants of this study 64% (n= 865) were 10th graders, and 36% (n= 462) were 11th graders. With regard to gender 46% (n= 622) of the participants were female, and 54% (n= 721) were male (see Appendix-J.1).

4.1.1 Reasoning behind students' major selection

High schools students' reasons and expectations for selecting social sciences as a high school majors were examined in this study in order to help policy makers prepare better curriculum and educational programs that fit students' needs and expectations. The data for this section was gathered by an open ended question in Technology Questionnaire which was analyzed thoroughly by using NUD*IST N6 program.

Out of 1350 participants of this study 1225 students answered this question, which makes the response rate 90.7%. Respondents gave more than a hundred reasons to these questions, which were then revised and categorized to answer the following questions:

1) Who picks the major?
2) Which factors are involved in this decision making process?
3) Why do students choose social sciences as a high school major?

4.1.1.1 Who picks the major?

Majority of the respondents (85%) stated that they picked this major with their own will for various reasons. And the rest (13%) stated that either the school or their parents picked this major for them so it wasn't their choice, or gave other reasons (2%) that cannot fit either categories (see Figure 4). These results were examined to see if gender, grade, residency, or learning style preferences make a difference. Chi-square test (df= 2, p= 0.001) shows that more females (90%) tend to say it was their choice then males (81%), also fewer females (9%) tend to say that it wasn't their choice than males (17%) (see Appendix-I.5). Grade also makes a difference, where more 11^{th} graders (88%) tend to say it was their choice than 10^{th} graders (84%), and fewer 11^{th} graders (10%) tend to say it wasn't their choice than 10^{th} graders (15%) (df= 2, p= 0.025). When it comes to residency and students learning style preferences no significant difference has been identified at 0.05 level between students living in big cities and small towns or between students with different learning style preferences (see Appendix-J.2.5 and J.2.6).

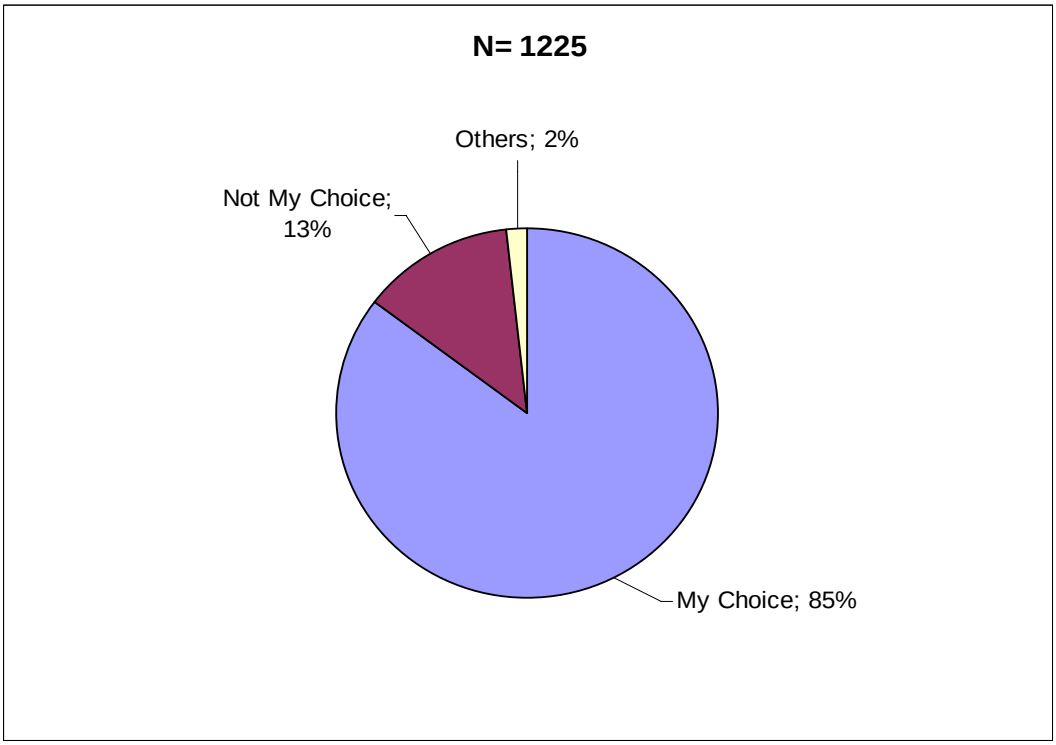


Figure 4: Who picks the major?

4.1.1.2 Factors involved in choosing a high school major process

The data shows that the most effective factor in choosing a high school major is the students' attitudes towards and expectations from the major (85%). Other factors such as family, school, and GPA play less important role in this process (13%). Interestingly, the family seems to be least important factor in this process, since only three male participants stated that their family had somehow an impact on their decision.

Responses showed that a school may have two kinds of impact on this process. First, it may not offer the major demanded by students. There are seven majors that can be offered as a major by general high schools such as natural sciences, social sciences, foreign language, art, and sports. Due to lack of teachers in some areas or low demand by the students schools don't offer all seven of them, leaving students with two choices; either transfer to another school or pick a major that they don't want. Schools' second impact on this decision making process is being accomplished through the counseling services. The counseling services try to help students to choose a major that would be best fit for them. But the participant students' responses showed

that sometime the counseling services put success before students' interests. They guide the students to choose a major that they could be more successful other than choosing the major they would prefer or fit them better. However, schools' overall impact on the process of choosing a high school major is very low, since it's reported by only 3% of participant students.

In order to choose a major, students need to reach a certain point of GPA on related courses at 9th grade. This makes GPA another factor in choosing a major. Among the participant students 5.6% of them stated that they could not get into the major they wanted, because of their low GPA's. Natural sciences is the most stated major by those students that they could not get in, followed by sports. Natural sciences is also the most stated major when it comes to comparing social sciences with other majors, which should be expected because natural sciences is seen as the most favorite major in Turkey since it is the key to getting into the most desired programs at college.

4.1.1.3 Rationale for student selection of social sciences major

Social Sciences major students chose this major because of their positive attitudes toward social sciences and negative attitudes toward other majors, especially natural sciences. As it can be seen in Figure 5 that 50% of participants who chose this major with their own will (n= 1091), specifically stated that they chose this major because they like social sciences. Among the students surveyed, 17% chose this major for career purposes; 19% stated that they chose this major because they are not good in natural sciences (NS); 11% said they don't like natural sciences; and 3% of them gave no reason for their choice. When this distribution is compared by grade, gender, residence, and learning style preferences we see that grade (*df*= 4, p= 0.10) and learning style (*df*= 4, p= 1.) have no significant effect on students' reasons to choose social sciences as a major (see Appendix-J.2.7).

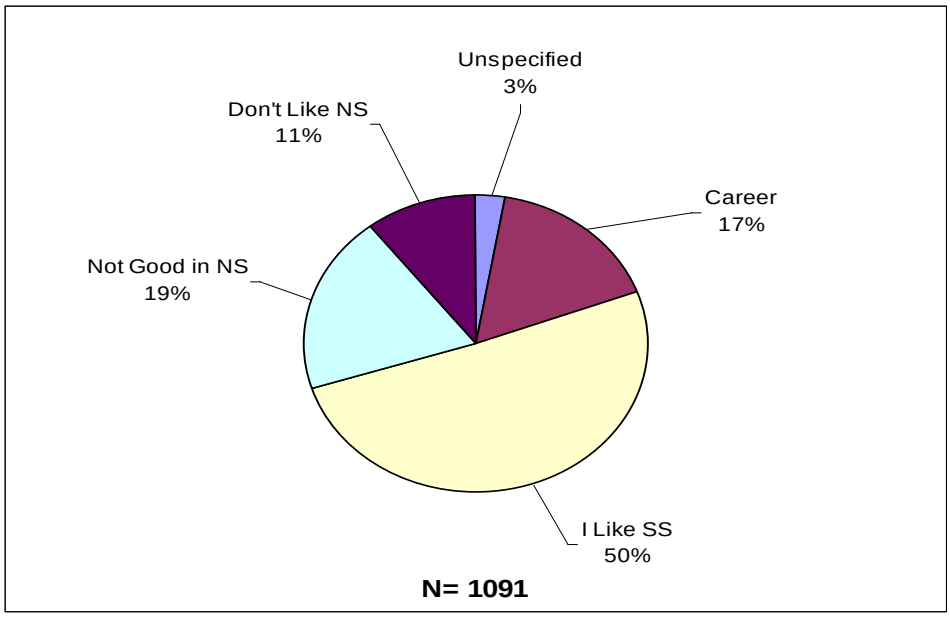


Figure 5: Rationale for student selection of social sciences major

Gender makes a difference in students' reasons since females (22%) seem to be more career-oriented than males (11%) (*df*= 4, p= 0.001). Also residence makes a difference in career orientation where more students living in big cities (18%) said they chose this major because of the career they want to pursue than students living in small towns (10%) (*df*= 4, p= 0.05) (see Appendix-J.2.7). Participating students mentioned fourteen areas related to the social sciences in which they want to build their careers such as literature, history, psychology, art, law, and radio and television. Among these, a career in history was the most frequently mentioned one, followed by literature (either as writer or literature teacher) and geography.

The study showed that around 30% of the social sciences major students had relatively negative attitudes toward natural sciences which led them to choose social sciences as their high school major. In general, participant students have given three major reasons for this negative attitude; 1) natural sciences courses are harder, 2) they are not good with numbers and calculations, and 3) they don't like (sometimes hate) natural sciences courses. When they specifically given a course name that they don't like or have hard time to be successful, mathematics is the most frequently mentioned subject followed by science.

Students who like social sciences gave four major reasons for their positive attitudes toward this major. They like social sciences mostly because they think they do better in this area (55%) followed by course content (25%); it fits their personal character better (5%), and

educational process involved in SS courses (2%) (see Figure 6). Significance test shows that gender, grade, residence, and learning style preferences make no difference on this distribution (see Appendix-J.2.8).

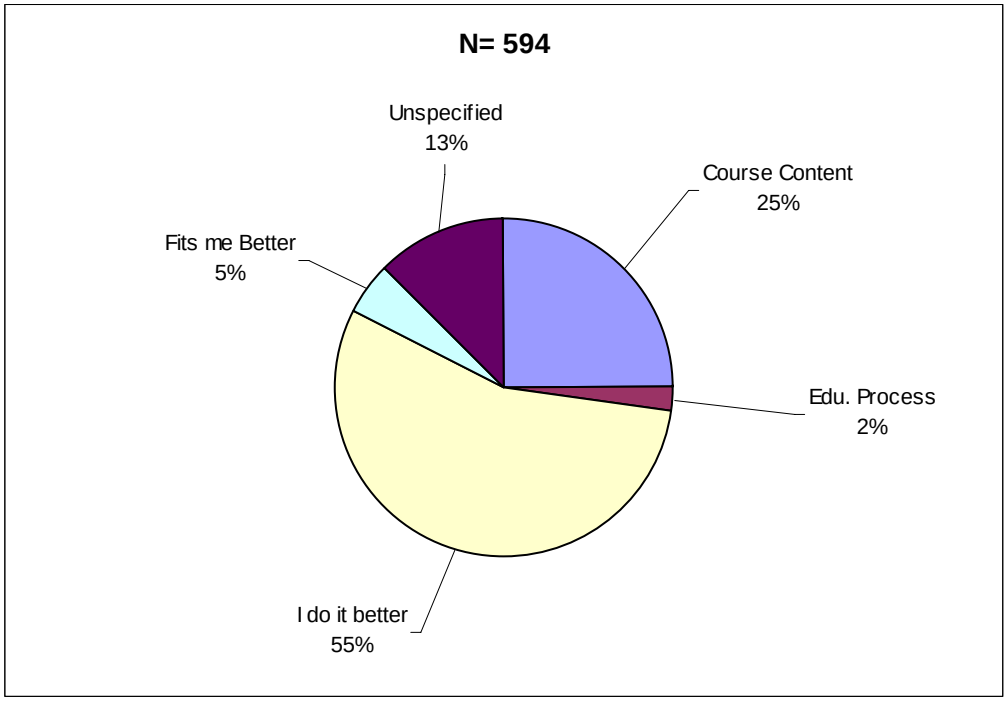


Figure 6: Rationale for student preference

Among the students surveyed, 25% of them who like social sciences turned out to like this major because of its content, which they described as "joyful," "not boring," "related to daily life," and "fits their interests." When they specifically indicated the course that they like because of its content they stated history most, followed by literature, geography, and psychology. Some students (5%) also indicated social sciences as the best fit (suitable) for their personal characters since they see it as a "relevant," "important," "comfortable," "respected," "suitable," and "happier" major. For some it's the educational processes involved in social sciences courses that appeal them (2%) most in this major. These processes include writing, reading, discussion, critical thinking, interpretation, analyzing, and lecture.

The desire for success (at school, at college entrance exam, or in life) plays a very important role on social sciences major students' decision of major. More than one half (55%) of the students who like social sciences stated that they can do better in this major. Figure 7 shows their reasons for this prediction. Among them 33% think they can do better in social sciences

because they were and they would be successful in this area; 22% stated that they did better in social sciences courses compared with courses in other majors; 16% found social sciences easier than other majors; 11% think they understand social sciences courses better than other courses; and 8% believe they are talented in this area. Finally, and most interestingly, 9% of students think they can do better in social sciences courses all because these courses involve more memorization and they are good in memorization.

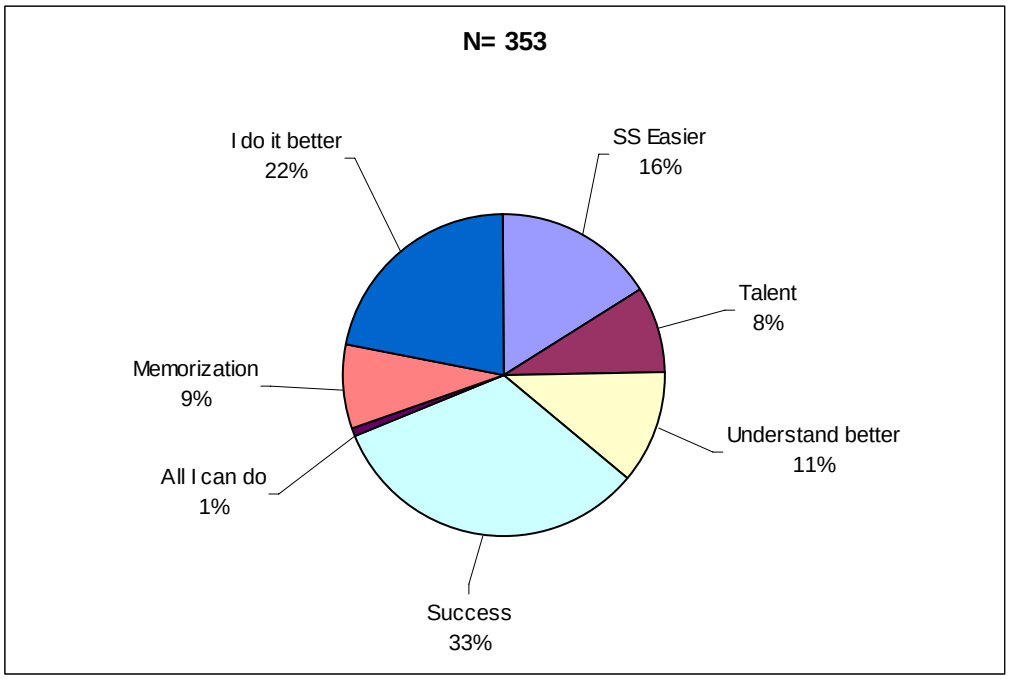


Figure 7: Motivational rationale for choosing social sciences major

4.1.2 Learning Style Preferences

Kolb's Learning Style Inventory, Version-3 was used in this study in order to identify Turkish high school students' learning style preferences. This inventory requires participants to finish all of the 12 sentences by ranking given endings from 4 (most like you) to 1 (least like you). If one or more sentences are left unanswered or answered wrong the inventory is accepted as incomplete, therefore it cannot be used. Among the 1350 participants of this study, 879 (65%) of

the responses turned out as either not answered, partially answered or answered incorrectly. Therefore, the response rate for LSI was only 35% (n=471)[60].

Responses to Learning Style Inventory were added in given order to find out participants' Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AC) scores. Table 6 shows mean scores and standard deviation for each mode. Turkish students' mean scores for each mode were also compared with USA sample, which also conducted by using Kolb's LSI, Version-3 in 2005 with a sample of 1,446 adults between the ages of 18 and 60 (LSI Version-3 Manual). The comparison shows that mean scores for each mode are quite similar in both studies.

	Mean		*Standard Deviation*	
	USA	*Turkish Students*	*USA*	*Turkish Students*
CE	26.00	25.85	6.8	5.69
RO	29.94	30.18	6.5	5.05
AC	30.28	30.68	6.7	4.76
AE	35.37	32.94	6.9	5.45
AC-CE	4.28	4.83	11.4	8.48
AE-RO	5.92	2.42	11.0	8.49
Chi-square	0.0748			
p	1.			

Table 6: Learning Modes (Comparison between the USA and Turkey)

The result of the learning style inventory shows that all four learning style preferences are present among the Turkish high school students. The distribution of Turkish high school students' learning style preferences is displayed in Figure 8. Learning style preferences of Turkish high school students were compared to see if any difference exists in the distribution between females and males, 10th graders and 11th graders, and students living in big cities and those living in small towns. At the 0.05 level significance tests show that gender, grade and residency make no significant difference on students' learning style preferences (see Appendix-J.3).

[60] It's turned out that the instructions on Kolb's LSI Version-3 were not clear enough to get proper responses from Turksih high school students. More examples and clearer instrustions were needed.

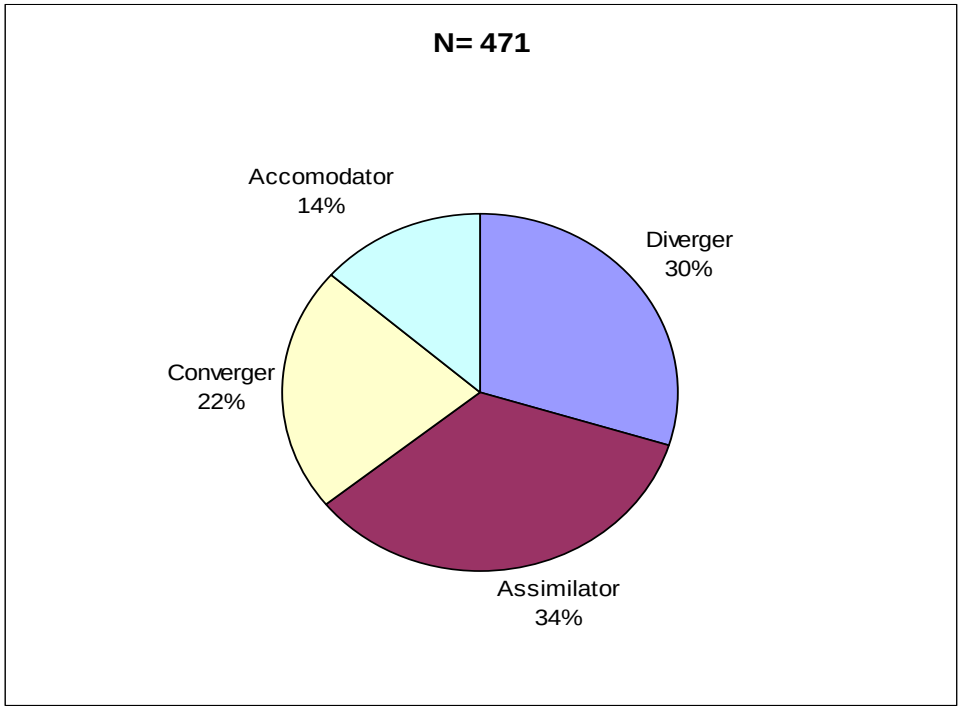


Figure 8: Learning Style Preferences (Turkey Average)

4.1.3 Learning Method Preferences

Participants were asked to answer by which learning method they think they learn better. The response rate for this question was 84% (n= 1137). Among the participants who responded to this question 32% think they learn better by listening, 31% by doing, 20% by reading, and 13% by watching. Significance tests were performed on these findings to see if gender, grade or residence had an effect on students' learning method preferences. The significance test showed that gender makes a difference on learning method preference, where more females tend to prefer "reading" then males, and more males tend to prefer "watching" then females (see Appendix J.4). Preference rates for "listening" and "doing" are about the same for both genders. On the other hand grade or residency makes no significant difference on students' learning method preferences.

4.1.4 Technology Access Levels

Participants were asked to answer which of the given technological devices they have access to at home. The responses showed that among the given technological devices the majority of the participants have access to TV, phone, Video CD or DVD player, and radio. Access level to PC, Internet and game console turned out to be relatively low (see Figure 9).

These findings of access levels seem to be consistent with other studies. NSI (National Statistics Institute, TUIK) statistics shows the internet usage level of general Turkish population is 18.57% in urban areas and 6.05% in rural areas between the ages of 16 and 74 in year 2005. The use on internet rate is 11.5 for females and 23.9 for males. In this study the Internet usage rate is 11% for females and 19% for males among the participant students.

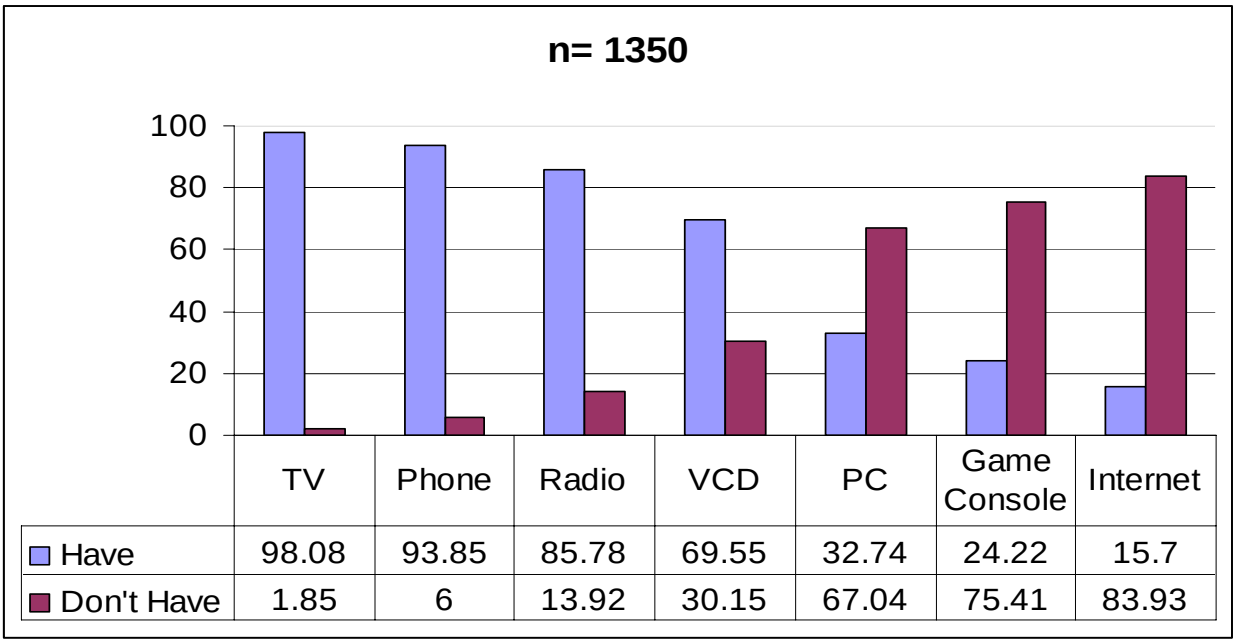


Figure 9: Technology Access Levels (%)

Comparing participants' access levels to these technological devices by their residence shows that residence makes a difference in access levels for all given devices except for game console (see Appendix-J.5). The level of difference is especially bigger on PC access levels.

Significance test shows that (Table 7) students living in big cities have significantly higher access levels to given technological devices except for game consoles.

Device	*Big Cities*		*Small Towns*			
	N (Have)	*%*	*N (Have)*	*%*	*Chi-square*	*p*
TV	911	98.8	413	96.7	6.979	0.01
Phone	874	94.9	393	92	4.223	0.05
PC	349	37.9	93	21.8	34.524	0.001
CD/VCD	666	70.9	273	63.9	10.069	0.01
Internet	160	17.4	52	12.2	5.936	0.025
Radio	814	88.5	344	80.2	14.467	0.001
Game Console	236	25.7	91	21.4	2.951	0.10

Table 7: Access Level to Various Technological Devices by Residence

4.1.5 Level of Technology-use in Social Sciences Courses

Even though the use of technology in education goes back as early as 1961 the levels of use for various educational technology materials are still low (see Table 8). Based on participant students' responses, most of the time educational technology materials (TV, VCR, audio tapes, PC, Internet, and overhead projector) are not being used in social sciences classrooms (see Appendix-J.6). For any of the listed educational technology materials included in this study, the level of usage at any frequency (including rarely usage) never exceeded 48% and it dropped as low as 19% (see Appendix-J.6.4).

This low level of educational technology usage was consistent across big cities and small towns, although it was higher in big cities than in small towns (see Appendix-J.6.3). The highest educational technology usage level was found for a school located in a big city with a "1.72" mean score (out of 4) for overall educational technology usage, and the lowest educational technology usage level was found for a school located in a small town with a "0.15" mean score for overall educational technology usage (see Appendix-J.6.3).

	N[61]	Score Range		Mean	Standard Deviation
		Min.	Max.		
History	766	0	4	1.0206	1.13385
Geography	746	0	4	.9608	1.14834
Foreign Language	729	0	4	.9470	1.16348
Turkish Literature	744	0	4	.9211	1.17086
Philosophy & Psychology	740	0	4	.7212	1.09931

Table 8: Level of Educational Technology Use in Social Sciences Courses
(Ranked by mean scores)

When compared with other courses, history turned out to have the highest educational technology usage level among social sciences courses (see Table 8). History is followed by geography (in general and in small towns) or by foreign language (in big cities). Among the given educational technology materials, the overhead projector is most often used in history courses (followed in order by TV and PC, CD/VCD, the Internet, VCR, and audio tapes). In social sciences courses in general, however, TV is the most often used educational technology material followed in order by PC, CD/VCD, the Internet, VCR, overhead projector, and audio tapes (see Appendix-J.6.5).

4.2 STUDENT READINESS

One of the objectives of this study was to examine Turkish social sciences major students' levels of readiness for technology-enhanced education. In this study both cognitive (thinking, knowledge), affective (feeling, attitude), and psychomotor (acting, skills) abilities of students were targeted under student readiness. These abilities altogether play a key role in determining students' levels of fitness in a technology-enhanced educational environment, which will have dramatic effects on their motivation and achievement. If the students lack cognitive and psychomotor abilities in computer-use and the internet-use, they may feel deficient when they

[61] The average return rate for these questions (questions 15-19) was 52%. Probably some of the participant students thought it would take too long to answer all these questions in proper way. Therefore 48% of the participant students decided not to answer these questions or answer them all with "0"s. In order to produce a healthier conclusion from these questions, participants who did not answer any of these questions at all or answer them with nothing but "0"s were not included in this analysis. Check Appendix-K.1.1 to see how much difference this excluding process made on the results.

are asked to use relatively complicated educational technology materials (such as Word, Excel, Power-point etc.). Or if the students have negative attitudes toward the use of technology in education then they might develop a dislike toward a technology-enhanced education approach.

4.2.1 Level of Proficiency

The most important technical knowledge students need to acquire in order to feel proficient in a technology-enhanced educational environment is the knowledge of how to use a computer and the Internet. In the Technology Questionnaire students were asked to rate their level of proficiency (from never tried to expert) on both computer and the Internet knowledge.

a) Computer Knowledge:

Students' level of computer knowledge is examined under four areas;

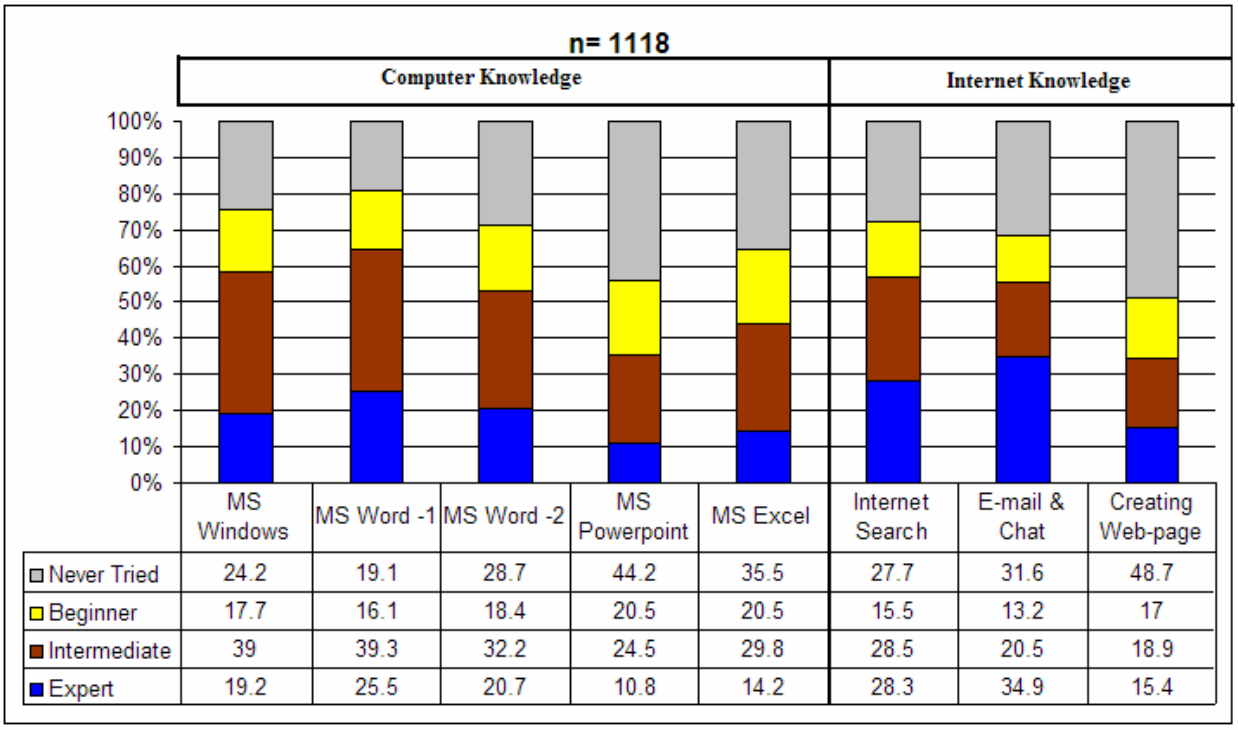
1) Basic computer knowledge; exploring through the files, finding, opening, and carrying a file on a Windows-based operation system.
2) MS Word knowledge; students' expertise on using MS Word was examined with two questions in Technology Questionnaire, one targeting creating a basic word document, and second one targeting creating a more complex word document with tables, figures, and pictures.
3) MS Power-point knowledge; creating a presentation by using MS Power-point.
4) MS Excel knowledge; creating datasheets, tables and figures, and making calculations by using MS Excel.

Most of the participant social sciences major students rated themselves very well experienced on the four areas of computer knowledge examined in this study. The rate of students who rated themselves as having no experience on the given four areas of computer knowledge was always under 50% (the lowest is MS Word with 19.1% and the highest is MS Power-point with 44.2%) (see Figure 10). The effect of gender, learning style preferences and residence on students' computer knowledge was examined. Gender was correlated with computer knowledge, since fewer males rated their level as beginner than females, and more males rated their level as expert than females (df= 3, p= 0.001). There were no significant correlations between learning style preferences and residence with basic computer knowledge (see Appendix-K.1.3 and K.1.4).

b) The Internet Knowledge:

Students' knowledge of the Internet is examined under three areas;

1) Research: searching course related information on the Internet.
2) Communication: communicating over the internet with e-mail and chat.
3) Creating a web-page.



	MS Windows	MS Word -1	MS Word -2	MS Powerpoint	MS Excel	Internet Search	E-mail & Chat	Creating Web-page
Never Tried	24.2	19.1	28.7	44.2	35.5	27.7	31.6	48.7
Beginner	17.7	16.1	18.4	20.5	20.5	15.5	13.2	17
Intermediate	39	39.3	32.2	24.5	29.8	28.5	20.5	18.9
Expert	19.2	25.5	20.7	10.8	14.2	28.3	34.9	15.4

Figure 10: Computer and the Internet Knowledge

Social sciences major students also rated themselves well experienced on the three given areas of the Internet knowledge (see Figure 10). Creating a web-page seems to be the area in which Turkish social sciences students have the least experience, which is reasonable since it is a skill that requires a good combination of all of the skills examined in this study. Still less than half (48.7%) of the students stated that they never tried to create a web-page, the rate is much lower for other Internet related skills. Once again fewer males rated their level as beginner than females, and more males rated their level as expert than females (df= 3, p= 0.001) on the Internet knowledge (see Appendix-K.1.2). No significant effect was found on this distribution for learning style preferences or residence with the internet knowledge (see Appendix-K.1.3 and K.1.4).

Results showed that there was a consistent difference between female and male students on the levels of computer and the Internet knowledge. This finding is also coherent with other studies such as the National Statistics Institute's (NSI, TUIK) findings on technology use, where the average internet use in Turkey is 11.5 % for females, and 23.9% for males[62].

Results from this study also showed that Turkish high school students have a high proficiency level on computer and the Internet use. But the question is: where do they learn how to use these technologies? As previously mentioned, participating students' access levels to personal computer and the Internet connection at home is very low; 32.% for personal computer and 15.7 percent for the Internet (Figure 9, p 73). In this case they are learning/using these technologies either at school or at the Internet cafes. The level of technology use in Turkish high school will be discussed extensively in the next section, but the NSI's findings show that only 8.77% of the students reported they get access to computer and the Internet at school. The insufficiency of access to the computer and the Internet at school or home is filled by internet cafes in Turkey. NSI's statistics reported that 36.6% of the Turkish population have access to computer and the Internet at internet cafes. This rate is higher for people living in rural areas (where there are fewer computers in homes), where 47.37% of the population have access to computer and the Internet through internet cafes compared with 34.56% in urban areas[63].

These results were also compared with participant students' technology access levels to see if higher access levels of technology lead to better computer and the Internet knowledge. It can be seen in Figure 9 (p. 73) that 32.7% of the participating students have access to personal computer and 15.7% have access to the Internet at home. A measure using the Pearson Product Moment Correlation showed that there was a significant correlation between technology access level and computer and the Internet knowledge (Table 9).

[62] http://www.tuik.gov.tr/AltKategori.do?ust_id=2&ust_adi=Bilim,%20Teknoloji%20ve%20Bili%FEim
[63] http://www.tuik.gov.tr/AltKategori.do?ust_id=2&ust_adi=Bilim,%20Teknoloji%20ve%20Bili%FEim

		Technology Access Level	*Computer Knowledge*
Technology Access Level	Pearson Correlation	1	.406(**)
	Sig. (2-tailed)		.000
	N	1349	1314
Computer Knowledge	Pearson Correlation	.406(**)	1
	Sig. (2-tailed)	.000	
	N	1314	1315

** Correlation is significant at the 0.01 level (2-tailed).

Table 9: Correlation between Technology Access Level and Computer and the Internet Knowledge

4.2.2 Attitudes

As discussed in the literature review, even though modern and varied teaching methods are encouraged by the Ministry of Education, traditional teaching methods such as lecture are vastly used in Turkish schools. The traditional teaching method gives the most important role to teachers. This study examined this notion, and tried to discover the most important element of education in the eyes of Turkish high school students.

On the Technology Questionnaire participating students were asked to rank the seven elements of education (teacher, textbooks, educational technology materials, school building, library, sports, and social activities) from least important to most important. Table 10 summarizes that social sciences major students perceive 'teacher' as the most important element of education followed by textbooks. Educational technology materials came in third in their ranking.

		Score Range			*Std.*
	N	*Minimum*	*Maximum*	*Mean*	*Deviation*
Teacher	1280	0	4	3.55	.932
Textbooks	1267	0	4	2.93	1.037
Educational Tech. Materials	1254	0	4	2.85	1.172
School Building	1235	0	4	2.74	1.290
Library	1246	0	4	2.66	1.193
Social Activities	1227	0	4	2.51	1.213
Sports	1243	0	4	2.45	1.303
Valid N (listwise)	1151				

Table 10: Elements of education (level of importance for students)
(Ranked by mean scores)

When compared by gender the rank changes, for example educational technology materials comes in second in male students' ranking after teacher while it ranked in fourth in females' ranking after teacher, textbooks, and library (see Appendix-L.1.2). Also female students gave more emphasis on teacher, textbooks, and library than male students, while male students gave more emphasis on sports than females (see Appendix-L.1.2). The top three in this ranking did not change when compared by grade, residence, and learning style preferences (see Appendix-L.1.3, L.1.4, and L.1.5). Some significant differences on degree of emphasis were found for these factors such as tenth graders gave more emphasis on textbooks than eleventh graders (see Appendix-L.1.3), or students in small cities gave more emphasis on teachers than students living in big cities (see Appendix-L.1.4). These results were also compared with participant students' learning method preferences. In this comparison students who prefer learning by 'watching' and 'doing' put educational technology materials in second place in their ranking after teacher. Also students who preferred 'reading' gave more emphasis to textbooks than others; students who preferred 'listening' gave more emphasis to teacher than others; and students who preferred 'watching' placed more emphasis on educational technology materials than others (see Appendix-L.1.6).

So the students still see educational technologies as less essential than the teacher (in some cases teacher and textbooks) in the educational process. On the other hand, a majority of participant students agreed that involving more educational technologies in classroom activities would help them focus their attention, learn the content better, and improve their academic achievement (see Table 11). When they were asked about their opinions on involving more educational technologies in classroom activities 77% agreed (strongly agree and agree) that they can learn better with technology assistance compared with 4% disagreed (disagree and strongly disagree) (see Appendix-L.2.1). Among the participating students 65% agreed that involving educational technologies in classroom activities would help them focus their attention compared with 7% who disagreed (see Appendix-L.2.2). Also 65% of participant students agreed that involving more educational technology in classroom activities would improve their academic achievement compared with 8% who disagreed (see Appendix-L.2.3). Participant students were also asked if they saw educational technologies as wasting time and money. Only 11% believed so, while 70% of participant students did not see educational technologies as wasting time and money (see Appendix-L.2.4).

When students were asked their opinions on involving more educational technologies, specifically in history classrooms, 81% stated that they can understand a historical topic better if they watched a movie or documentary on it, only 6% disagreed with this statement (see Appendix-L.2.5). Even though many students saw the textbook as more essential than educational technologies in general, only 27% of them believed that history can only be learned from books, and 43% of participant students disagreed with this statement (see Appendix-L.2.6).

Item #	*Statement*	*N*	*Score Range*		*Mean*	*Std. Deviation*
			Min.	*Max.*		
21	I can learn better with educational technology	1324	0	4	3.27	.959
22	Educational tech. helps me focus my attention	1322	0	4	2.94	.994
23	Educational technology improves my academic achievement	1309	0	4	2.92	1.041
24	Educational technology is (NOT) wasting time and money (revised)	1297	0	4	3.05	1.111
25	I can understand history better with movies and documentaries	1306	0	4	3.30	.992
26	History is (NOT) learned only from books (revised)	1313	0	4	2.21	1.200

Table 11: Attitudes toward the use of Educational Technology

Overall the responses show that Turkish high school social sciences major students have positive attitudes toward using educational technologies in classroom activities. As Table 11 shows, the mean scores for every item listed was above 2 out of 4. When compared by gender the level of agreement on item #21 (learn better) was higher for females than males; the level of agreement on item #22 (Focus) is higher for males than females; the level of agreement on item #24 (Not waste) was higher for females than males; and the level of agreement on item #26 (not only books) was higher for females than males (see Appendix-L.2.8). Comparison by grade showed no significant difference between the attitudes of tenth and eleventh graders except for one item. On item number #26 (history is not learned only from books) the level of agreement is higher for eleventh graders than tenth graders (see Appendix-L.2.7). No significant difference was found across residence and learning style preferences (see Appendix-L.2.9 and L.2.10). But comparison by learning methods showed significant differences: for example, students who preferred learning by "watching" always had the highest agreement level on any item (21-26) followed by students who preferred learning by "doing," and not surprisingly students who preferred "reading" always have the lowest agreement level on any item (see Appendix-L.2.11). A statistical analysis also indicated that there was a significant correlation at 0.05 level between

the students" technology access level and attitude scores, where the higher technology access level leads the higher positive attitude scores (see Appendix-L.2.12). Similar correlation was revealed between students' computer and the internet knowledge and attitudes at 0.01 level, which indicated that higher computer and the internet knowledge leads the higher positive attitude score (see Appendix-L.2.13).

As examined in the literature review section, educational technology contributes to both educators' and students' lives in various ways. For students, these contributions include, but are not limited to, improved retention, attitude, and achievement; higher engagement and test scores; and richer classroom content. In this study, social sciences students were also asked in what areas (such as; finding resources, reinforcing what they learned in school, or putting fun in learning) they found educational technology to be most helpful in their daily and school lives. In general, students found educational technology to be helpful in all of the given areas since the lowest mean score for any of the five areas is 2.5 out of 4 (see Table 12). Students consider educational technology to be most helpful in reinforcing the content being taught in the class followed by finding resources.

		Score Range			*Std.*
Contributions	*N*	*Min.*	*Max.*	*Mean*	*Deviation*
Reinforcing the content being taught in the class	1295	0	4	3.31	1.034
Finding resources	1285	0	4	3.23	1.017
Putting fun in learning	1275	0	4	2.99	1.074
Learning content better	1274	0	4	2.97	1.019
Making learning easier	1289	0	4	2.97	1.107
Making students more independent in learning	1262	0	4	2.50	1.279

Table 12: Contributions of Educational Technology in Students' Lives.
(Ranked by mean scores)

Female students considered educational technology more helpful than males in areas like learning the content better, making learning easier, reinforcing the content being taught in the class, and putting fun in learning (see Appendix-L.3.2). When compared by grade, tenth graders considered educational technology more helpful than eleventh graders in areas like making learning easier and reinforcing the content being taught in the class (see Appendix-L.3.1). When compared by residence more students living in big cities considered educational technology putting fun in learning than students living in small towns (see Appendix-L.3.3). No significant

difference was found when compared by learning style preferences with any of the item in this section (see Appendix-L.3.4).

5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 DISCUSSION

Turkey has attempted many reforms in education in order to close the gap with developed countries. An extensive educational reform program was launched in 1997 as a part of Turkey's candidacy process to join the European Union (EU). This reform program includes; 1) restructuring organizational management, and teacher training programs, 2) extending the period of compulsory education, 3) developing new curriculum and re-writing textbooks based on EU standards, and 4) putting more emphasize on vocational technical education and technology education (MNE, 2001). Even the EU sees the use of educational technology in so called developed European countries' schools as still low and plans to increase the use of educational technology by equipping schools with educational hardware and software programs and by making teachers and student digitally literate (Commission of the European Communities, 2001).

When it comes to the use of educational technology in Turkey; distance education practices through radio and TV started in Turkey as early as 1961, and computers have been used in secondary schools since 1984. Today 86% of secondary schools and 95% of secondary school students have gained access to the Internet through 300,000 computers placed in schools.[64] Yet the computer to student ratio (1/53) and use of educational technology in classroom is still low.

In the following section, findings will be discussed based on the objectives of this study that they address.

[64] http://www.meb.gov.tr/ADSL/adsl_index.html

5.1.1 Main Objective -1: Level of Proficiency

The first objective of the study was to determine if Turkish high school social sciences major students have adequate knowledge for using the computer and the Internet to fit in a technology-enhanced environment. Results show that regardless of their grade, gender or residence most of the Turkish high school students have a high level of proficiency in basic computer (MS word, MS Excel, and MS Power-point) and the Internet (communication and research) use. With these results it can be concluded that Turkish high school social sciences students have the necessary skills and knowledge to feel adequate/fit in a technology-enhanced education environment.

Interestingly, however, Turkish high school students appear to have developed this proficiency in computer and the Internet use without much help from their schools since the level of educational technology use is very low in Turkish high schools. The data show that there is a significant correlation between the level of technology use at schools and the level of computer and the Internet knowledge of their students (see Table 13). In other words, higher educational technology usage levels in the schools leads to higher technology literacy in the students. Thus, if the Turkish education system continues to fail in making educational technology more accessible for students, it will also fail in its goal to prepare younger generations for the information age by increasing their technology literacy.

		Proficiency	*Technology Use*
Computer and the Internet Knowledge	Pearson Correlation	1	.132(**)
	Sig. (2-tailed)		.000
	N	1315	756
Technology Use	Pearson Correlation	.132(**)	1
	Sig. (2-tailed)	.000	
	N	756	772

** Correlation is significant at the 0.01 level (2-tailed).

Table 13: Relation between Schools' Technology Use and Students' Proficiency

As stated previously, Turkish students' access level to computer and the Internet at home is also low; 33% of participant students have access to PC and 16% have access to the Internet at home. As a developing country, it would take quite long time for Turkey to provide all students

with access to a personal computer and the Internet connection at home even with the "$100 laptop computer project."[65] It would be much easier and less expensive if Turkey were to put more computer labs in schools and libraries especially in lower income areas. This would also help to diminish the role of internet cafes in offering access to computers and the Internet for young generations in Turkey. Right now 47% of the general population in rural areas and 35% in urban areas have access to computer and the Internet through the internet cafes. Internet cafes carry out a very important public service in Turkey for the general population. But for the younger generation their service is controversial. First of all, minors are out of their parents' or teachers' supervision in internet cafes, where they can easily access to inappropriate web-pages or games. According to current regulations, internet cafes must be smoke-free areas, minors under 12 years old should not be allowed to use these facilities, and any access to inappropriate web-pages or games must be prevented. But recent inspections show that many internet cafes do not obey these regulations.[66] In fact most of the time children (even under 12 years old) use these facilities to play violent multiplayer video games. In a country where the violence in schools is becoming a very big problem, it would be very wise to prevent youths' access to inappropriate web-pages and violent games. Since, it is not an easy task to control the thousands of internet cafes that are spread out across the country, a better way to do it is to offer access to computers and the Internet for the younger generation in places that are more reliable and secure, that is in schools and libraries.

Giving schools a more active role in offering access to technology is also a requirement for the Turkish educational system due to the "equal opportunity" principal of national education (see Appendix-A). From the point of the young generations' technology access and technology knowledge, the current situation does not grant equal opportunities especially for females and students from lower income families. As stated in the results section, male students have higher proficiency levels in computer and the Internet use than females. The difference results from more technology access opportunities. Even though there was no gender difference on technology access levels at home or at schools, access levels are different for males and females at internet cafes. Internet cafes in Turkey are mostly used by males. Therefore the overall

[65] http://laptop.org/
[66] http://www.tiev.net/

technology access level of females is lower than males, which is possibly the main reason why females have lower proficiency levels in computer and the Internet use. Similar to females, students living in rural areas have less access levels to computer and the Internet at home than students living in urban areas. They also have lower proficiency levels in computer and the Internet use when compared with students living in urban areas. Therefore in order to prepare the nation as a whole (across from gender and socio economic status) for the information age the Turkish educational system should consider increasing available educational technologies in schools especially in rural areas.

5.1.2 Main Objective -2: Students' attitudes toward educational technology

The second objective of this study was to determine Turkish high school social sciences major students' attitudes toward the use of educational technology in history classrooms. Participant students of this study believe that they can learn and understand history better if more educational technology materials are integrated in classroom activities. They also believe that the use of educational technology can help them focus better and improve their academic achievement. Social sciences students support the effort to put more educational technology in classrooms, and they do not see these efforts as wasting time or money. And finally they do not see textbooks as a main (most of time the only) resource to learn history. Overall Turkish high school social sciences major students have positive attitudes toward involving and using more educational technology materials in history classrooms.

5.1.3 Main Objective -3: Students' learning style preferences

The third objective of this study was to explore the learning style preferences of Turkish high school social sciences students to determine what individual differences might exist. This objective was chosen because the literature shows that history teaching in Turkey is dominated by the narrative approach (Ozbaran, 1994); it focuses on dictation and memorization[67] (Aksin,

[67] Some of the participant students (9%) who picked up social sciences thinking that they can do better in this area (n= 353) did so because social sciences courses involves more memorization (p. 97).

1975; Safran, 1993); and it is not designed to teach history in an active way (Demircioglu, 2002). By looking at these characteristics it can be easily interpreted that history teaching in Turkey is not designed to serve students with different learning style preferences. This type of teaching can only be effective for students who prefer abstract conceptualization and reflective observation (as described by Kolb) while learning. Kolb defines this type of learners as "assimilators," and it is the assimilator who prefers learning through lectures, theory readings, thinking alone, case studies, papers, and analogies. If other learning style preferences exist among Turkish students, current history teaching which focuses on lecture, narration, dictation and memorization would not be as effective for them as much as it is for students with the assimilator type learning style preference. Based on Kolb's Learning Style Inventory (Version-3) that was used in this study only 1/3 (34%) of the participant students (n= 471) have an assimilator type learning style preference, the rest (2/3) have other types of learning style preferences; diverger (30%), converger (22%), and accommodator (14%). That means the style of current history teaching in Turkey does not address 2/3 of the students' preferred mode of learning in an appropriate way.

5.2 CONCLUSIONS

Four fundamental findings have been emerged from the data collected for this study. Theses are;

1. Turkish high school social sciences students have the necessary skills and knowledge to feel adequate/fit in a technology-enhanced education environment.
2. They have positive attitudes toward use of educational technologies in history classrooms.
3. Current history education program in Turkish high schools (which mostly use lecture, narration, and dictation) favors only 1/3 of the students preferred learning style while ignoring learning styles of 2/3 of the students.
4. Schools need to provide more access to computers and the Internet in order to
    a) Ensure equal opportunity for all students
    b) Decrease the negative effects of internet cafes

As discussed in the literature review, technology-enhanced education provides various ways and tools for presentation of information as well as for structuring instruction and class activities in order to meet students' learning style preferences. That way it helps to reach out to students with different learning styles, skills, needs, and cultural backgrounds. By properly integrating educational technology in class activities, history teaching in Turkey would reach out to all of the students, which will definitely improve the level of education they receive. Besides improving the quality of education and increasing students' achievement by reaching out students with different learning styles, the use of educational technology in classrooms will also increase Turkish students' technology literacy, which will help Turkey to take a strong stand in the information age.

Educational technology is not a magical tool that, all by itself, will solve all the problems that we have in education today. If it were, then "filling up' classrooms with the latest educational technology materials would be enough to create better learning environments and would result in higher academic achievement. Conversely, without proper integration it would only add up more problems (such as funding and space problems). Therefore, the integration of technology is more important than the quantity or the quality of technology. In other words,

educational technology is a highly effective and successful tool depending upon how it is used (Wenglinsky, 1998).

Next section of this paper will discuss what is needed for better technology integration in Turkey, such as re-structuring educational technology standards, curriculum, instruction and classroom activities, and teacher education programs. Next chapter will also introduce some practical ways to create technology-enhanced student centered educational environments in which individuals with different learning style preferences will have equal opportunity for better learning.

5.3 RECOMMENDATIONS

As discussed previously a student's achievement is influenced by his/her characteristics, the curriculum and standards identified by state, and the educational environment and activities supplied by the school and teacher. A healthy combination of these three factors will bring academic success to all individual learners. The model presented in Figure 11 based on the work of Rama et al. (2000) addresses all three factors of student achievement: 1) student's characteristics, 2) curriculum and standards, and 3) instructional method and activities. In a student centered education system, everything starts with the student and other factors (curriculum and instruction) are designed to fit students' characteristics in order to promote higher academic achievement of the students. The Figure 11 model depicts three interactive steps: 1) to identify students' characteristics (early learning experiences, physical capabilities, cognitive abilities, learning style preferences, cultural and socio-economic background, etc.), 2) to develop the curriculum and standards while taking into account student characteristics in order to make desired learning outcomes appropriate for students, and 3) to choose right instructional methods and materials to address curriculum and standards, and students with different characteristics.

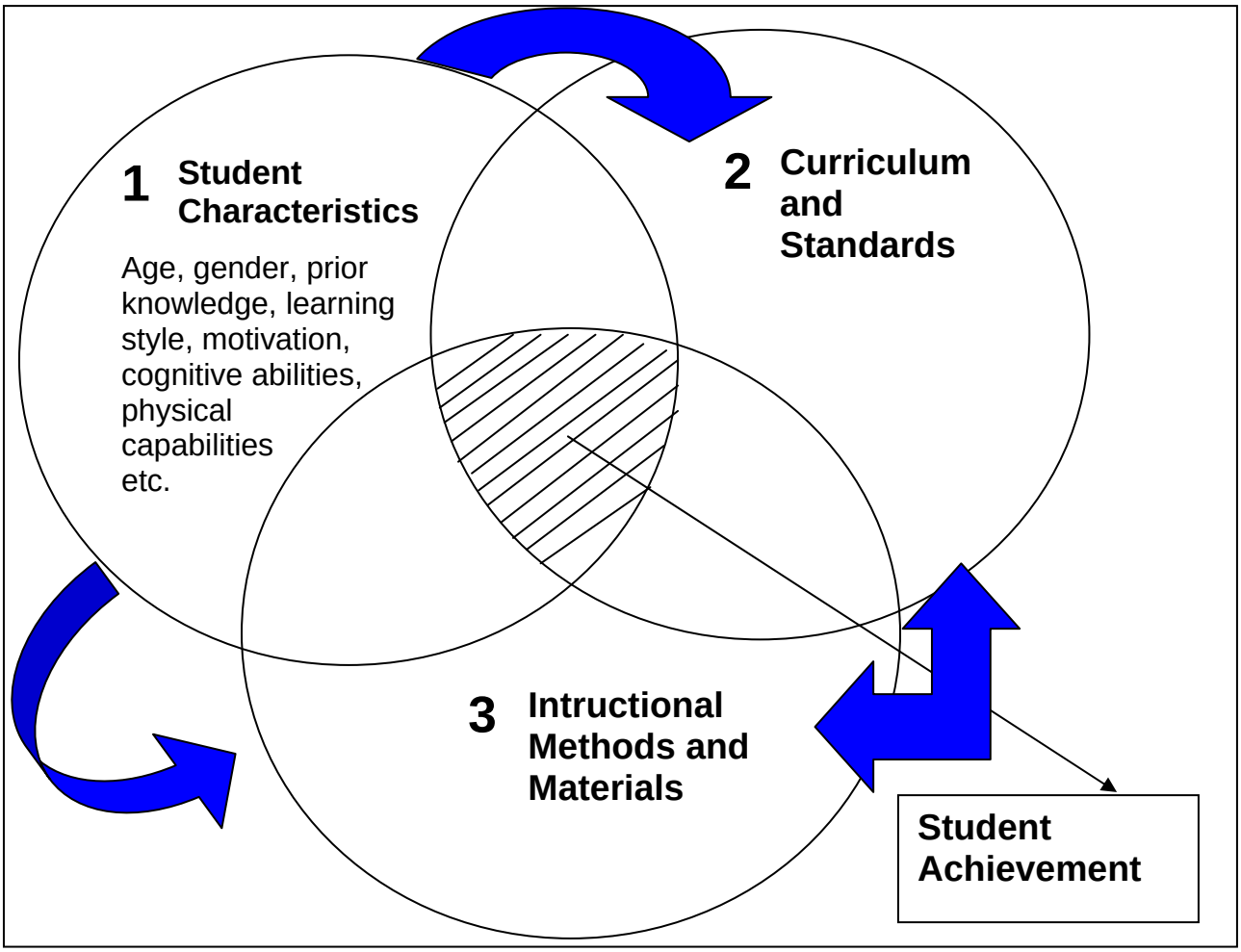


Figure 11: Factors of Student Achievement[68]

In the following section, recommendations are presented that have been designed to address all three factors impacting student achievement as found in Figure 11.

[68] Adapted from: Rama, D.V., Ravenscroft, S. P., Wolcott, S. K., and Zlotkowiski, E. (2000).

5.3.1 Recommendations-1: Student Characteristics

Grasha and Yangarber-Hicks claim it is essential to take students' learning style preferences into consideration when using educational technology:

> "*Questioning how a particular type of technology influences the learning styles of students and using that information in designing a course provide a theoretical justification for the method. And there is no question that learning styles should be taken into account when teaching with technology*" (2000, p. 17).

The following four steps would be very helpful for teachers as they create student centered technology-enhanced educational environments:

1. Diagnose learning style preferences of your students: Kolb's LSI (Version-3) can be used in this diagnosis since it is a very simple (only 12 questions) yet an effective tool. Also it can be hand-scored by students; therefore they can be more involved in this process of finding their preferred learning styles. Students also need to learn what their learning preferences are in order to take advantage of them and make necessary adjustments when needed.

2. Diagnose your own teaching style: Teachers tend to teach according to their preferred learning styles (Sandhu & Fong, 1996). Therefore it is very important for teachers to diagnose their own teaching styles and try to improve any weaknesses associated with that style in order to have a more balanced teaching style (Dunn & Dunn, 1992).

3. Redesign classrooms into multi-instructional areas: Instead of using one format of classroom design, classrooms can be redesigned with numerous instructional areas depending on existing learning style preferences. With this new design one area can be used for independent learning, one for small group study, and one for group discussion (Dunn & Dunn, 1992).

4. Use learning activity packages: When it is necessary, exclusive individual approaches can be used for students who do not fit any of the instructional areas explained above. Dunn and Dunn (1992) have suggested the following learning packages to meet the special learning style needs of the students:

a) Programmed Learning Sequences: These learning packages are useful for students who prefer to study independently. When planning these packages teachers

should include different educational technology materials for students who prefer experience, reflection, conceptualization, and action while learning.

b) Contract Activity Packages: These packages are useful for above average or gifted students, which permit the students to work at their own pace. For example, the advanced students don't have to wait for others and get bored, they can move to the next activity when they are finished.

c) Multisensory Instructional Packages: These packages are useful for students who are not persistent with their work and take frequent breaks. For example, these students can sit on the floor, eat during classes, and take tests at their best time of day (Dunn & Dunn, 1992).

5.3.2 Recommendations-2: Curriculum and Standards

Technology integration starts with goal setting and planning. There are two main goals of integrating technology into education. The first goal is to make education more active and student centered, and the second goal is to make students technologically literate. As discussed in the literature review, the use of technology in education changes the teacher's role from instructor to guide by increasing students' active involvement in the education process. Research shows that this role change for the teacher is one of the main obstacles in successful technology integration since teachers, especially ones who are "accustomed to using a teacher-centered approach" (Price, Cates & Bodzin, 2002), are reluctant to give up their roles. This is mainly because they have little knowledge of effective and practical ways to create student-centered technology-enhanced environments in their classrooms without creating classroom management problems or the feeling of being useless. For this reason, teacher education programs must be restructured in a way not only to empower prospective teachers with technology literacy, but also with practical and effective ways to integrate technology in their classrooms. Teacher education programs should also help prospective teachers to determine their teaching styles and teach them how to improve potential weaknesses in their teaching styles in order to turn their classrooms into student centered educational environments.

The concept of technological literacy must be defined as well. Therefore, national educational technology standards must be developed for students (one for primary schools and

one for secondary schools) and for teachers (based on school type; primary or secondary). These standards will clarify what kind of skills and knowledge related to technology, students and prospective teachers should master prior to graduation. A good example of technology education standards both for students and teachers can be found at ISTE's (International Society for Technology in Education) web-page[69] (see Appendix-H).

Beside improved teacher education programs and clear goals for technology integration, teachers need full curriculum, technology and administrative support for effective technology integration. The school administrations and the curriculum should encourage teachers to utilize technology in their classrooms. Even though preparing younger generations for the information age by increasing their technology literacy is a goal for the Turkish education system, this goal has not been emphasized enough in current curriculum programs. The present history curriculum in Turkey fails to encourage teachers 1) to use different methods other than narration and questioning, and 2) to actively involve students in class activities. Therefore, a new curriculum is needed, which will:

1) take into account all of the levels of the domains of educational objectives (cognitive, affective and psychomotor),
2) focus on skills rather than "behaviors" (such as telling, writing, showing, defining, explaining, see page 8 for history curriculum program),
3) encourage teachers to use more student-centered, technology-enhanced approaches,
4) support teachers in technology integration by suggesting specific methods and tools for each subject,
5) accept students as individuals,
6) allow teachers to use different assessment tools based on individual students' capacity and learning styles.

Technology advances so fast that it is very hard to keep up with it. Every day new technological devices, hardware, and software are introduced for public use. Therefore it is very hard for teachers to devote extra time reviewing new hardware and software for their educational use or deal with everyday crashes and problems with those devices. Thus, there is a strong need

[69] http://cnets.iste.org/index.shtml

for technology support. Unfortunately right now most of schools in Turkey do not have technology trained staff to help teachers (Ozer, 2004). Also teachers complain about not having enough educational technology resources for their courses such as movies, documentaries, audio records, games, and software (Ozer, 2004). MNE's General Directorate of Educational Technologies supplies teachers with VCR's, audio tapes, movies, CD's, VCD's, and audio CD's on various subjects. But these technology resources are quite limited to some topics (do not cover the whole course content) and not accessible in every school[70]. In order to meet the strong demand in Turkey a thorough technology support plan should be developed, which should include;

1) sponsoring the production of various educational technology resources (movies, cartoons, documentaries, programs, games, audio, and slide shows,
2) creating educational technology departments in schools in order to help teachers with the setup, troubleshooting, and maintenance (depends on the area and the population of the schools one department could be responsible for a few neighboring schools),
3) creating an internet forum for teachers where they can share ideas, methods, and lesson plans related to technology integration, and
4) holding local educational technology meetings in the summer where teachers share ideas, discuss problems, review new hardware and software, and plan for the upcoming education year.

As suggested by Bloom and his colleagues, educational objectives in Turkish curriculum programs try to address levels in the cognitive domain starting from the simplest level of knowledge acquisition to the more complex levels of analyzing, synthesizing, and evaluating. However, Bloom's taxonomy explains only cognitive domain (thinking, knowledge) of educational objectives (Bloom, et al., 1956). The other two domains, affective (feeling, attitude) domain (Krathwohl, 1964), and psychomotor (acting, skills) domain (Harrow, 1972), are not emphasized as much in Turkish curriculum programs.

[70] http://egitek.meb.gov.tr

Turkish curriculum programs also fail to establish the interconnectedness between taxonomies of educational objectives and students' learning styles. Krathwohl et al. (1964) emphasize this interconnection by stating:

> "*... reconciliation between the classification of objectives and theories of personality and learning is likely to come in the ways of dealing with individual children and the interaction between teachers and students, rather than in the forcing of a set of classification procedures to agree with particular views about the functioning of human organism*" (1964, p. 8).

Figure 12 portrays a model for a creating a technology-enhanced, student-centered learning environment which tries to realize educational objectives addressing all three domains of educational objectives (cognitive, affective and psychomotor). The technology-enhanced, student centered learning environment given in this model has been created based on the model presented in Figure 11 (p. 94). The Figure 12 model takes into account all three taxonomies of educational objectives while establishing an interconnection between the taxonomies of educational objectives and students' learning styles in a technology-enhanced education environment. All three domains of educational objectives are needed for broad-based student education. Plus, taking all three domains into account when developing educational objectives will support student achievement. For example, any curriculum programs may fail in the area of student motivation and involvement if the affective domain is not taken into account (Atman, 1971). Educational technology plays two roles in this model. First, it assures that students will reach the goal of technology literacy. And second, by enriching classroom instruction it helps students develop cognitive, affective and psychomotor abilities at the same time. Finally, learning styles leads toward success in this model, since it makes this model fit students' characteristics.

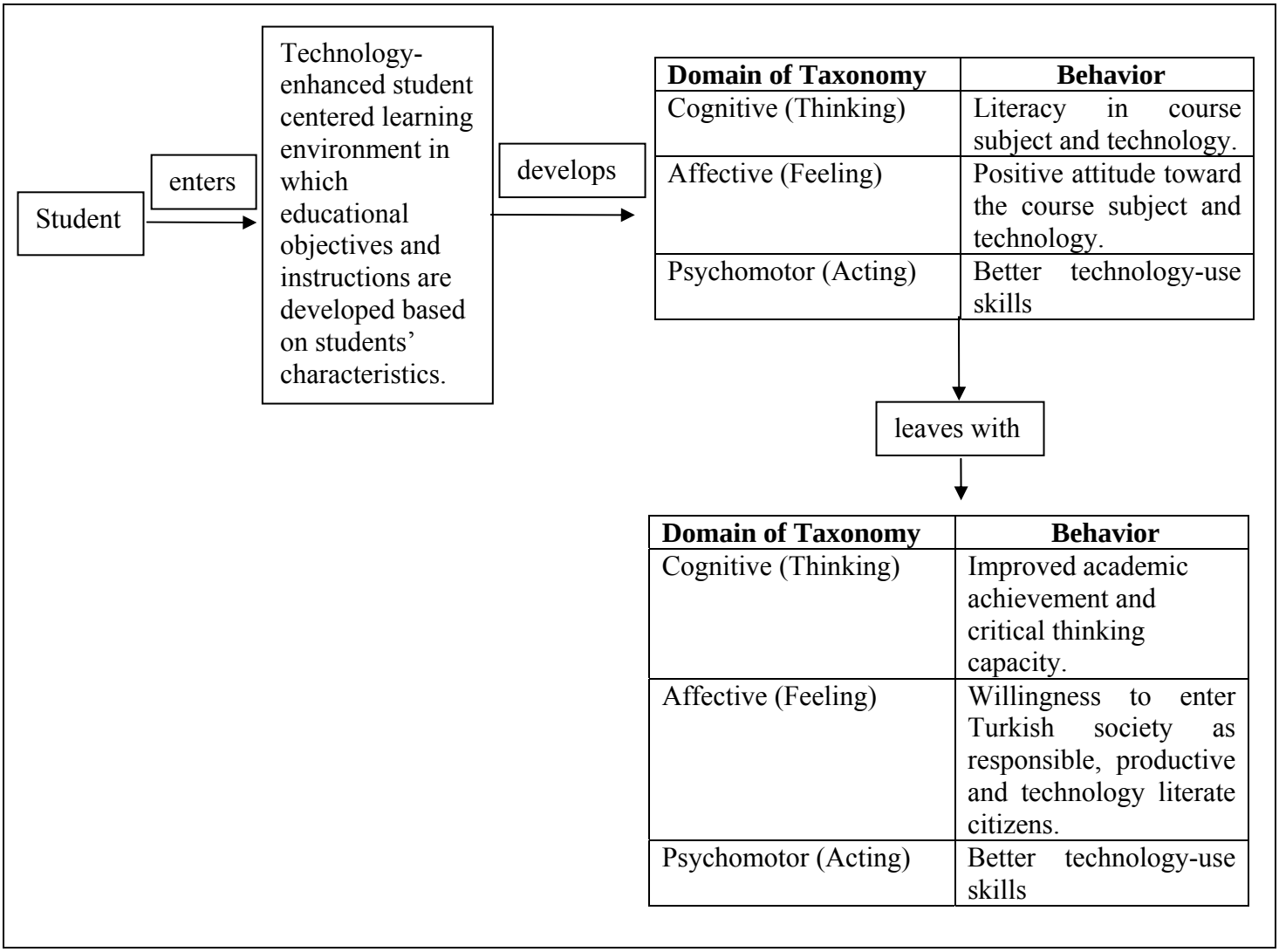


Figure 12: Educational objectives of technology-enhanced student centered education

5.3.3 Recommendations-3: Instructional Methods and Materials

In a student-centered educational environment, various instructional activities should be used in the classroom in order to address students with different learning style preferences. After determining the existing learning style preferences among their students, teachers can include one or more (preferably more) instructional activities and tools in each class depends on the nature of the topic and existing learning style preferences of the students. Figure 13 demonstrates some of the instructional activities preferred by each learning mode defined by Kolb.

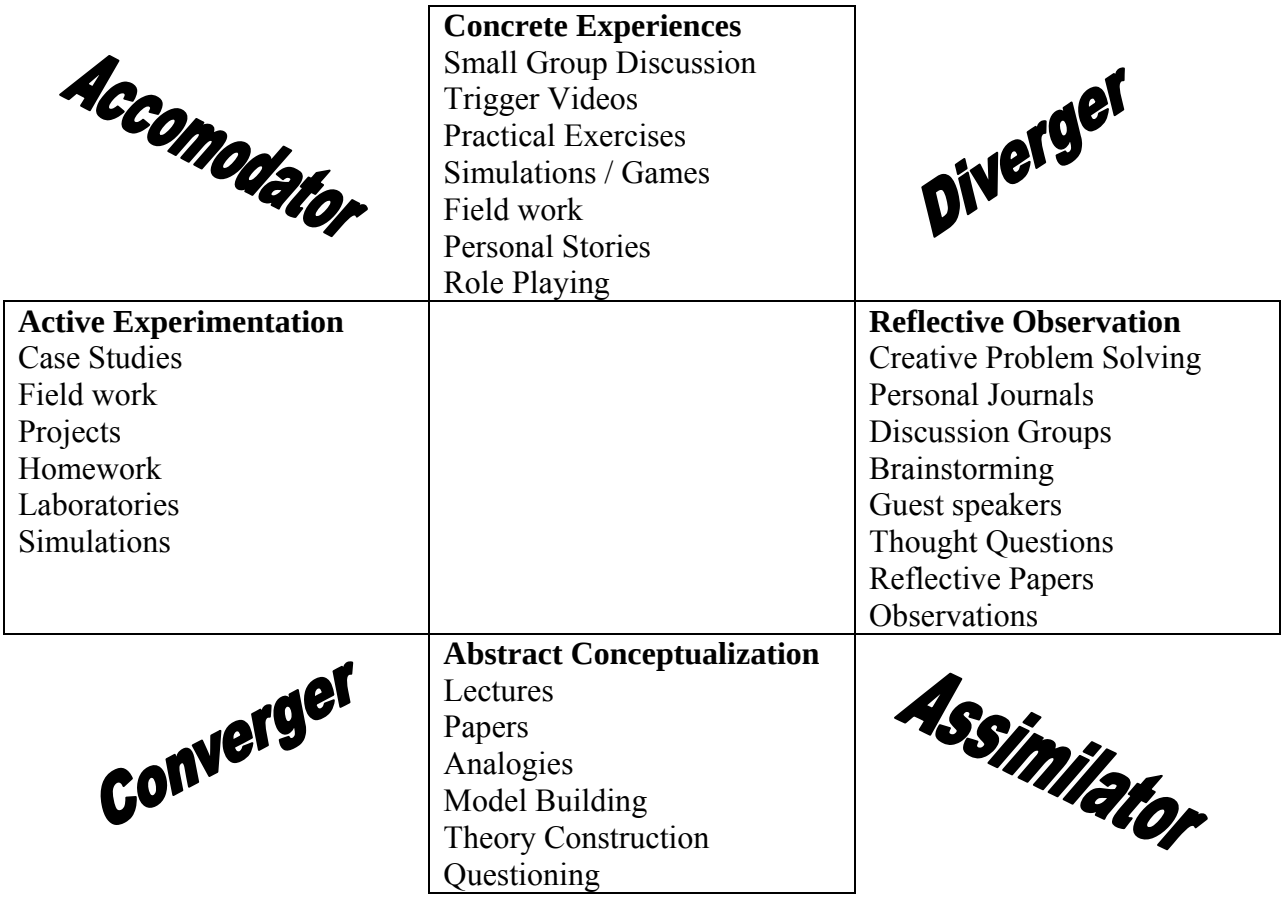


Figure 13: Instructional Activities for Learning Modes
(adapted from Svinicki & Dixon, 1987, p. 142)

Basically, divergers' dominant learning abilities are concrete experience and reflective observation. They like brainstorming tools and activities that involve people and emotions[71]. Therefore educational materials such as movies, documentaries, role playing video games, simulation video games, and 3D simulations of historical places would work best for them.

Assimilators' dominant learning abilities include abstract conceptualization and reflective observation. They like facts and theories, but they are not practical and they are reluctant to try anything new. They enjoy lectures and programmed instruction, therefore educational materials such as the power-point slides, slide projectors, overhead, online lecture notes, online research, and lectures on CD's or audio tapes would work best for them.

Convergers' dominant learning abilities are abstract conceptualization and active experimentation. They are good at integrating theory and practice, finding information or

[71] Ibid.

drawing references from experience. However, they prefer working with ideas rather than people, therefore online research, simulation video games, and detective-like video games would work best for them.

Accommodators' dominant learning abilities are concrete experience and active experimentation. They learn best by experience (trial and error), and from others. Therefore interactive games, documentaries, online group research, online forums, and reviewing new games, software and web-pages for their peers would work best for them.

Beside all these general suggestions above related to curriculum, teacher education and technology support programs, the real success of technology integration in the history classroom is up to the teacher's determination and talent. Teachers should not be discouraged by the challenges stemming from the educational system, school, students, and the course itself, or even themselves. After all, they should know that their students do like history (59% participant student agreed on this statement versus 18% who disagreed, see Appendix-M), educational technologies, and the changes in roles when the classroom teaching is restructured to be more student centered (Price, Cates & Bodzin, 2002), and that the students have various learning style preferences. All they need to do is bring together what students like and treat them as individuals based on their learning styles. Then students will demonstrate higher academic achievement and improved attitudes toward the instruction (Dunn & Dunn, 1992; Klavas, 1994).

It should not be forgotten that none of the learning style preferences is superior to others (Sutliff & Baldwin, 2001). Therefore depending on the nature of the topic as many of the instructional methods and instruments listed above as reasonable should be included in class activities in order to "hit" every learning style preference in each class. Teacher education programs should be designed in a way that will empower prospective teachers with the ability to use various educational methods and educational technology materials in the proper way. They also need to provide prospective teachers with the knowledge of the advantages and limitations of each type of educational technology material (Grasha and Yangarber-Hicks, 2000). Teachers should use these instructional methods and instruments correspondingly with existing learning style preference of students in their classes. The proper application of learning style theory into technology-enhanced history education would provide students with maximal learning and significantly reduce students' boredom and alienation (Sutliff & Baldwin, 2001).

While performing an extensive educational reform program as a part of Turkey's candidacy process to join the European Union (EU) Turkish educational policy makers should avoid importing curriculum and educational technology programs developed by European countries. They should always remember that culturally specific learning styles exist and that they should be taken into consideration in education (Dunn et al., 1993; Park, 1997; Reid, 1987). This study examined secondary school social sciences major students' expectations and learning style preferences. Before any educational reform is implemented, Turkish students' expectations of education and their learning style preferences should be examined extensively and the proposed reform program should be structured accordingly. Turkish students' learning style preferences also should be taken into account when developing educational software and buying educational technology materials. Only in this way can educational policy makers be sure that they are producing or buying right the materials for the job. In doing so large amounts of money and time can be saved.

Finally the main idea behind learning style theory is not to teach students with their preferred learning styles all the time which will make them more dependant on one preferred learning style. The overall goal is to make students and educators be aware of the notion of learning styles, and promote the use of various classroom activities which target different learning styles. In this way students will have chance to use their less preferred learning style types, which eventually help them to become better learners at school and throughout their lives.

5.4 DIRECTIONS FOR FUTURE RESEARCH

This study examined social sciences major high school students' readiness for the use of educational technology in history classrooms. Findings of this study point out that Turkish social sciences major students are prepared in terms of both technology literacy and positive attitude toward technology-enhanced education. But it would be wrong to imply that all Turkish students are technologically literate and have positive attitudes toward technology- enhanced education. Therefore further research in other major fields and at other grade levels is needed to determine Turkish students' readiness for and attitudes toward technology-enhanced education.

This study also explored social sciences major high school students' learning style preferences. Studies on learning style preferences are quite limited in Turkey. For example there is no learning style preferences profile of Turkish students or of the general population. In order to better serve educators and education policy makers, a learning style preferences profile of Turkish students (across grade, gender and residence) should be created through future research. And these findings should be compared with other research done in EU countries in order to determine how to make Turkey's integration to EU in education a better fit for the Turkish students.

Similar studies are needed to be conducted with teachers, school administrations and curriculum specialists in order to get a clearer picture of current level of technology use in history classrooms and attitudes toward the use of educational technology.

Finally, the effect of technology-enhanced instruction on Turkish students' achievement and historical knowledge should be studied. Such study could help educational policy makers and teachers determine which materials and methods work better to increase Turkish students' academic achievement and historical knowledge. It also will provide practical examples for teachers in the integration of technology in history classrooms.

APPENDIX

APPENDIX A

GOALS AND PRINCIPLES OF TURKISH NATIONAL EDUCATION

A.1 GENERAL GOALS OF TURKISH NATIONAL EDUCATION[72]

The general goals of the Turkish National Education are;

1. *"to raise all individuals as citizens who are committed to the principles and reforms of Atatürk and to the nationalism of Atatürk as expressed in the Constitution, who adopt, protect and promote the national, moral, human, spiritual and cultural values of the Turkish Nation, who love and always seek to exalt their family, country and nation, who know their duties and responsibilities towards the Republic of Turkey which is a democratic, secular and social state governed by the rule of law, founded on human rights and on the tenets laid down in the preamble to the Constitution, and who have internalized these in their behavior;"*

2. *"to raise them as constructive, creative and productive persons who are physically, mentally, morally, spiritually and emotionally balanced, have a sound personality and character, with the ability to think freely and scientifically and have a broad worldview, that are respectful for human rights, value personality and enterprise, and feel responsibility towards society; and"*

3. *"to prepare them for life by developing their interests, talents and capabilities and providing them with the necessary knowledge, skills and attitudes and the habit of working with others and to ensure that they acquire a profession which shall make them happy and contribute to the happiness of society."*

---

[72] Basic law of national education no: 1739 (1973 reviewed in 1983). Retrieved from: http://www.meb.gov.tr/Stats/apk2001ing/Section_1/1Generalprincipals.htm

A.2 BASIC PRINCIPLES OF TURKISH NATIONAL EDUCATION[73]

1. *"Generality and Equality: Education institutions are open to all citizens, no matter their sex, religion, language and race. No concessions shall be provided to any individual, family, group or class in education."*

2. *"Needs of the Individual and Society: National education service shall be arranged in accordance with the desires and abilities of Turkish citizens and necessities of Turkish society."*

3. *"Orientation: The individuals shall be oriented to various schools and programs in accordance with their desires and abilities. The national education system shall be arranged to realize this orientation in every way. With this purpose, preparatory classes may be opened at secondary education institutions suitable with the targets of the national education programs. In management and evaluation of success guiding services and objective assessment and evaluation methods shall be used."*

4. *"Right to Education: Every Turkish individual is entitled to basic education. The citizens shall benefit from the education institutions following the primary education according to their abilities, talents and interests."*

5. *"Equal Opportunities: Equal opportunities shall be provided to every woman and man in education. Necessary assistance shall be provided through grants, scholarships, credits and other ways to successful students with weak economic conditions so that they can have higher education. Special measures shall be taken in order to raise children in need of protection and special education."*

6. *"Continuity: It is principal that the general and vocational education of individuals should continue for a lifetime. In addition to education of the youngsters, in order to help them in adapting to life and business areas positively, it is an educational duty to take necessary precautions to provide lifelong education of adults."*

7. *"The Reforms and Principles of Ataturk and the Nationalism of Ataturk: In preparation and implementation of textbooks in our education system of all grades and types and in all educational activities, Ataturk's Reforms and Principles and Ataturk Nationalism as expressed in the Constitution shall be taken as basis. Importance is attributed to protect, develop and teach the authentic national morality and culture without corruption within the universal culture."*
   "Importance is attributed to teaching of Turkish language, which is one of the basic elements of national unity and integrity, without extremism and abuse. The language is tried to be enriched as an educational and scientific one and for this purpose, necessary measures shall be taken by the Ministry of National Education in cooperation with Ataturk Higher Board of Culture, Language and History."

---

[73] http://www.meb.gov.tr/Stats/apk2001ing/Section_1/1Generalprincipals.htm

8. *"Democracy Education: The democratic consciousness, knowledge, understanding and behaviors about the country's governance, feeling of responsibility and respect to moral values that the citizens should have in order to attain and maintain strong and stable order of society shall be tried to be developed in the students. However, political and ideological provocations against Ataturk nationalism as expressed in the Constitution and participation to daily political affairs and such discussions shall never be allowed."*

9. *"Secularism: Secularism is principal in Turkish national education. Religious culture and moral teachings are among the compulsory lessons in primary, secondary schools and schools of same level."*

10. *"Scientific Approach to Education: Course programs of all levels and types, education methods and education materials and equipment shall be developed in accordance with scientific and technological principles and innovations, needs of the country and environment. Increasing efficiency in education and provision of continuous development and innovation shall be attained on the basis of scientific research and evaluations. Education institutions responsible to produce technology and science and to develop our culture shall be sufficiently equipped and strengthened."*

11. *"Planning: Development of national education shall be planned and realized in accordance with economic, social and cultural development targets by taking into account human force and employment relations and by giving emphasis on vocational and technical education that shall provide necessary technological developments in agriculture and modernization."*
    "The standards on location, building, facilities, personnel, auxiliary units, tools, equipment and capacities of education institutions shall be predetermined and optimal establishment and management of institutions according to these standards and their effective management shall be realized."

12. *"Co-education: It is obligatory to have girl and boy students at schools. However, due to type, obligations and possibilities, some schools may be reserved for only girls or boys."*

13. *"School-Family Cooperation: In order to contribute to operation of education institutions, cooperation shall be established between the school and family. With this purpose, school - family unions are established at schools. The establishment and operation of these unions is arranged by a regulation to be issued by the Ministry of National Education."*

14. *"Education Everywhere: The goals of national education are to be realized not only by formal (public and private) education institutions but also informal education institutions. Educational activities of public, private and voluntary organizations are subject to the control of the Ministry of National Education with regard to their suitability to the goals of national education."*

APPENDIX B

COURSES OFFERED FOR SOCIAL SCIENCES MAJOR STUDENTS.[74]

	10th Grade	11th Grade
Common General Information Subjects	Turkish Language and Literature Religious Literacy and Moral Knowledge History National Security Foreign Language	Turkish Language and Literature Religious Literacy and Moral Knowledge Turkish Rep. Revolution History & Kemalism Philosophy Foreign Language
Field Subjects	Literature General Turkish History Turkey Geography World Geography Psychology	Literature Ottoman History Turkey Human and Economical Geography Logic Sociology
Field Elective Subjects	Art History Turkish Literature History Islam History Mathematics Geometry Foreign Language Computer	Tourism History of Philosophy Art History Turkish Literature History Foreign Language Computer
Elective Subjects	Painting Music Physical Education Science History Second Foreign Language Advanced Foreign Language Environment and Human	Painting Music Physical Education Democracy and Human Rights Human Relations Information Technologies & Librarianship Second Foreign Language Advanced Foreign Language

[74] Retrieved on 04/0912005 from: http://www.yok.gov.tr/duyuru/rektorleckomitesi.pdf

APPENDIX C

IRB APPROVAL LETTER

University of Pittsburgh
Institutional Review Board

Exempt and Expedited Reviews

University of Pittsburgh FWA: 00006790
University of Pittsburgh Medical Center: FWA 00006735
Children's Hospital of Pittsburgh: FWA 00000600

3500 Fifth Avenue
Suite 100
Pittsburgh, PA 15213
Phone: 412.383.1480
Fax: 412.383.1508

TO: Ibrahim Turan

FROM: Sue R. Beers, Ph.D., Vice Chair

DATE: May 26, 2005

PROTOCOL: Turkish High School Social Science Major Students' Attitudes Towards the Use of Educational Technology in the Classroom

IRB Number: 0505062

The above-referenced protocol has been reviewed by the University of Pittsburgh Institutional Review Board. Based on the information provided in the IRB protocol, this project meets all the necessary criteria for an exemption, and is hereby designated as "exempt" under section 45 CFR 46.101(b)(1).

The regulations of the University of Pittsburgh IRB require that exempt protocols be re-reviewed every three years. If you wish to continue the research after that time, a new application must be submitted.

- If any modifications are made to this project, please submit an 'exempt modification' form to the IRB.
- Please advise the IRB when your project has been completed so that it may be officially terminated in the IRB database.
- This research study may be audited by the University of Pittsburgh Research Conduct and Compliance Office.

Approval Date: May 26, 2005
Expiration Date: May 26, 2008 (corrected letter)

SRB: ky

APPENDIX D

TECHNOLOGY QUESTIONNAIRE

D.1 ENGLISH VERSION

TECHNOLOGY QUESTIONNAIRE

Dear Participant,

In this questionnaire you will find questions related place of technology in school and daily life. No individual personal information will take place in report or publication, and the anonymity of all participants will be protected. Please place an "X" to indicate your answers to the multiple choice questions, and write one or two sentences to answer the free response question (question 3).

---

1. Education status:
☐ 10th grade ☐ 11th grade

2. Gender:
☐ Female ☐ Male

3. Why did you choose social sciences?

4. By which method do you think you learn best?
☐ Reading ☐ Listening ☐ Watching ☐ Doing ☐ I am not sure

5. Which of the followings do you have at home?
☐ TV ☐ Phone ☐ PC ☐ VCD/DVD Player
☐ Internet connection ☐ Radio ☐ Game console (Xbox, Play Station, etc.)

For the following questions please rate your level of experience with using the computer and the Internet.

		Never Tried	Beginner	Intermediate	Expert
6.	Locating, opening or carrying files in MS Windows.				
7.	Creating a document by using MS Word.				
8.	Inserting picture or table to a word document.				
9.	Creating presentation by using MS Power-point.				
10.	Making calculations or creating tables by using MS Excel.				
11.	Finding information on the Internet for your courses.				
12.	Interacting with other people by using a pc and the Internet (e-mail, chat, etc.)				
13.	Creating a web-page.				

14. Please rate each items listed below from "4" (most important) to "0" (least important) in terms of their level of importance in educational process.

4= Most Important, 3= Very Important, 2= Important, 1= Somewhat Important, 0= Least Important

☐ Teacher ☐ Textbook ☐ Educational technology materials
☐ School building ☐ Social activities ☐ Sports ☐ Library

Proceed to next page

For the following questions please rate the each technological devices below from "4" (almost always) to "0" (almost never) in terms of their usage in given courses.

4= Almost Always 3= Frequently 2= Sometimes 1= Rarely 0= Almost Never

		TV VCR	Audio Tapes	CD / VCD	PC	Internet	Overhead Projector
15.	History						
16.	Geography						
17.	Turkish Literature						
18.	Philosophy & Psychology						
19.	Foreign Language						

20. When considering the contributions of technology to your life, in what areas have you found technology to be helpful? Please indicate for each area listed below the level of help you have received from technology sources from "4" (most helpful) to "0" (least helpful).

4= Most Helpful, 3= Very Helpful, 2= Helpful, 1= Somewhat Helpful, 0= Least Helpful

☐ Finding Resources ☐ Learning content better ☐ Making learning easier

☐ Reinforcing the content being taught in the class ☐ Putting fun in learning

☐ Making student more independent in learning

For the following questions select one level of agreement for each statement to indicate how you feel.

		Strongly Agree	Agree	I am not sure	Disagree	Strongly Disagree
21.	I can learn better if various technological instruments are used in classroom activities.					
22.	I think the use of technology in classroom activities helps me focus may attention.					
23.	I think the use of technology in classroom activities helps me improve my academic achievement.					
24.	I think the use of technology in classroom activities is nothing but wasting time and money.					
25.	I understand a historical subject better if I watch movie or a documentary about that subject.					
26.	History can only be learned from books.					
27.	I like history courses.					

Thank you for participating in this questionnaire.

D.2 TURKISH VERSION

TEKNOLOJİ ANKETİ

Değerli katılımcı,

Bu ankette teknolojinin günlük hayatınızdaki ve okulunuzdaki yeri hakkında sorular bulacaksınız. Bu araştırma ile ilgili hiçbir rapor veya yayında bu bilgileriniz yer almayacak ve katılımcı gizliliği korunacaktır. Lütfen her soruyu dikkatlice okuyup bütün soruları cevaplandırmaya çalışınız. Çoktan seçmeli sorularda cevap olarak seçtiğiniz şıkkı bir "X" ile işaretleyiniz, anlatım sorusuna (3. soru) ise bir veya iki cümlelik kısa cevaplar veriniz.

1. Eğitim durumunuz?
   ☐ Lise-2 ☐ Lise-3

2. Cinsiyetiniz?
   ☐ Kız ☐ Erkek

3. Niçin sözel bölümü seçtiniz?

4. Hangi yöntemle daha iyi öğreniyorsunuz?
   ☐ Okuyarak ☐ Dinleyerek ☐ İzleyerek ☐ Yaparak ☐ Emin Değilim

5. Aşağıdaki ürünlerden hangileri evinizde bulunmaktadır?
   ☐ Televizyon ☐ Telefon ☐ Bilgisayar ☐ VCD/DVD Oynatıcı
   ☐ İnternet bağlantısı ☐ Radyo/Müzik seti ☐ Oyun Konsolu (Xbox, Play Station vs.)

Aşağıdaki sorularda bilgisayar ve internet ile ilgili bilgi seviyenizi sıralayınız.

		Hiç Denemedim	Acemi	Orta	Uzman
6.	Microsoft Windows'u kullanarak dosyalara ulaşmak, bunları açmak veya taşımak.				
7.	Microsoft Word'u kullanarak yazı yazmak.				
8.	Microsoft Word'de oluşturulan bir belgeye resim, tablo vs. ekleyebilmek.				
9.	Microsoft Powerpoint'i kullanarak sunum hazırlamak.				
10.	Microsoft Excel'i kullanarak hesaplamalar yapmak veya tablo ve grafikler oluşturmak.				
11.	İnternet'te dersleriniz ile ilgili bilgiler bulabilmek.				
12.	Bilgisayar yoluyla iletişim kurabilmek (sohbet veya e-posta).				
13.	İnternet sayfası oluşturmak.				

14. Eğitimin aşağıda sayılan unsurlarını önemlerine göre "4"ten (çok önemli) "0"a (önemsiz) doğru puanlandırınız.

4= Son Derece Önemli, 3= Çok Önemli, 2= Önemli, 1= Biraz Önemli, 0= Önemsiz

☐ Öğretmen ☐ Ders Kitabı ☐ Teknolojik araçlar ☐ Kütüphane
☐ Okul Binası ☐ Sportif Aktiviteler ☐ Sosyal Aktiviteler

Bir sonraki sayfaya geçiniz

Aşağıdaki verilen eğitim araclarının ilgili derslerdeki kullanım oranlarını "4"ten "0"a doğru puanlandırınız.

4= Neredeyse Her zaman 3= Sıklıkla 2= Ara sıra 1= Nadiren 0= Neredeyse Hiç

		Tv Video	Ses Kasetleri	CD / VCD	Bilgisayar	İnternet	Tepegöz Projektör
15.	Tarih						
16.	Coğrafya						
17.	Türkçe						
18.	Felsefe grubu ve Psikoloji						
19.	Yabancı Dil						

20. Teknolojik araçların hayatınıza etkilerini göz önüne aldığınızda aşağıdaki alanlarda bunların ne derece faydalı olduğunu düşünüyorsunuz? Lütfen "4"ten (çok faydalı) "0"a (en az fadalı) doğru puanlandırınız.

4= Son Derece Faydalı, 3= Çok Faydalı, 2= Faydalı, 1= Biraz Faydalı, 0= En az Faydalı

☐ Kaynak bulma ☐ Konuları daha iyi kavrama ☐ Öğrenmeyi kolaylaştırma

☐ Derslerde öğretilen konuları pekiştirme ☐ Öğrenimi zevkli hale getirme

☐ Öğrenirken öğrenciyi bağımsız kılma

Aşağıdaki sorularda yapılan değerlendirmelere katılıp katılmadığınızı ilgili kutucuğa "X" işareti koyarak belirtiniz.

		Kesinlikle Katılıyorum	Katılıyorum	Olabilir	Katılmıyorum	Kesinlikle Katılmıyorum
21.	Derslerde çeşitli teknolojik eğitim araçlarına yer verilirse daha iyi öğrenebilirim.					
22.	Teknolojik eğitim araçları derslere daha iyi odaklanmamı sağlar.					
23.	Derslerde teknolojik eğitim araçlarına yer verilmesi benim bu derslerdeki başarı seviyemi yükseltir.					
24.	Teknolojik eğitim araçları zaman ve para kaybından başka bir şey değildir.					
25.	Tarihi bir konu hakkında film veya belgesel izlediğimde o konuyu çok daha iyi anlıyorum.					
26.	Tarih dersi kitaptan öğrenilir.					
27.	Tarih derslerini çok seviyorum.					

Anketimize katıldığınız için çok teşekkürler.

APPENDIX E

THE KOLB LEARNING STYLE INVENTORY

E.1 ORIGINAL (ENGLISH VERSION)

LEARNING-STYLE INVENTORY

The Learning-Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. Below are 12 sentences with a choice of endings. Rank the endings for each sentence according to how well ou think each one fits with how you would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job or at school. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn *best*, down to a "1" for the sentence ending that seems least like the way you learn. Be sure to rank all the endings for each sentence unit. Please do not make ties.

Example of completed sentence set:

1. When I learn: 2 I am happy. 1 I am fast. 3 I am logical. 4 I am careful.

Remember: 4 = *most* like you 3 = *second most* like you 2 = *third most* like you 1 = *least* like you

	A		B		C		D	
1. When I learn:	___	I like to deal with my feelings.	___	I like to think about ideas.	___	I like to be doing things.	___	I like to watch and listen.
2. I learn best when:	___	I listen and watch carefully.	___	I rely on logical thinking.	___	I trust my hunches and feelings.	___	I work hard to get things done.
3. When I am learning:	___	I tend to reason things out.	___	I am responsible about things.	___	I am quiet and reserved.	___	I have strong feelings and reactions.
4. I learn by:	___	feeling.	___	doing.	___	watching.	___	thinking.
5. When I learn:	___	I am open to new experiences.	___	I look at all sides of issues.	___	I like to analyze things, break them down into their parts.	___	I like to try things out.
6. When I am learning:	___	I am an observing person.	___	I am an active person.	___	I am an intuitive person.	___	I am a logical person.
7. I learn best from:	___	observation.	___	personal relationships.	___	rational theories.	___	a chance to try out and practice.
8. When I learn:	___	I like to see results from my work.	___	I like ideas and theories.	___	I take my time before acting.	___	I feel personally involved in things.
9. I learn best when:	___	I rely on my observations.	___	I rely on my feelings.	___	I can try things out for myself.	___	I rely on my ideas.
10. When I am learning:	___	I am a reserved person.	___	I am an accepting person.	___	I am a responsible person.	___	I am a rational person.
11. When I learn:	___	I get involved.	___	I like to observe.	___	I evaluate things.	___	I like to be active.
12. I learn best when:	___	I analyze ideas.	___	I am receptive and open-minded.	___	I am careful.	___	I am practical.

E.2 LSI TRANSLATED (TURKISH) VERSION

ÖĞRENME YÖNTEMLERİ TESTİ

Öğrenme Yöntemleri Testi öğrenme s ras nda hangi yöntemi tercih ettiğinizi ve gündelik hayatta karş laşt ğ n z durumlara nas l müdahale ettiğinizi tan mlar. Aşağ da karş lar nda değişik seçenekler bulunan 12 cümle bulacaks n z. Her cümlenin karş s ndaki seçenekleri size uygunluğuna göre numaraland r n z. Bunu yaparken okulda veya günlük yaşant n zda yak n tarihlerde karş laşt ğ n z olaylar göz önüne getiriniz. Her cümlenin karş s ndaki "A, B, C, D" kutucuklar n öğrenme yönteminizi en iyi tan mlayan seçenekten (4'ten), en az tan mlayan seçeneğe (1'e) doğru numaraland r n z. Aşağ daki 12 cümleyi örnekte verildiği gibi doldurduğunuzdan emin olunuz.

Örnek:

1. Öğrenirken	**2**	Mutluyumdur	**1**	H zl y md r	**4**	Mant kl y md r	**3**	Dikkatliyimdir

Dikkat: 4= sizi en iyi tan mlayan, **3**= biraz tan mlayan, **2**= şöyle böyle tan mlayan, **1**= sizi en az tan mlayan

	A		B		C		D	
1. Öğrenirken...		hislerimi göz önünde tutmay severim.		ana fikirler üzerinde düşünmeyi severim.		yaparak öğrenmeyi severim.		izlemeyi ve dinlemeyi severim.
2. En iyi...		dikkatlice dinleyip izlediğimde öğrenirim.		mant kl düşündüğümde öğrenirim.		önsezi ve hislerimi dinlediğimde öğrenirim.		üzerinde iyice çal şt ğ mda öğrenirim.
3. Öğrenirken...		olaylar n nedenlerini anlamaya çal ş r m.		sorumluluk duygusuyla hareket ederim.		sessiz ve çekingenimdir.		güçlü his ve tepkiler geliştiririm.
4. En iyi ...		hissederek öğrenirim.		yaparak öğrenirim.		izleyerek öğrenirim.		düşünerek öğrenirim
5. Öğrenirken...		yeni deneyimlere aç ğ md r.		olaylar bütün yönleriyle ele al r m.		olaylar parçalar na ay rarak tek tek incelerim.		deneyerek öğrenmeyi severim.
6. Öğrenirken...		izleyiciyimdir.		aktifimdir.		önsezilerime kulak veririm.		mant kl y md r.
7. En iyi bilgi kaynağ m...		gözlemlerimdir.		kişisel ilişkilerimdir.		mant kl teorilerdir.		pratik ve denemelerdir.
8. Öğrenirken...		yapt ğ m çal şmalar n sonucunu görmeyi severim.		ana fikir ve teorileri incelemeyi severim.		harekete geçmeden önce beklerim.		kendimi olaylar n içinde hissederim.
9. En iyi...		Gözlemlerime güvendiğimde öğrenirim.		hislerime güvendiğimde öğrenirim.		kendi kendime deneyerek öğrenirim.		kendi fikirlerime güvendiğimde öğrenirim.
10. Öğrenirken...		Pasifimdir		kabulleniciyimdir.		sorumluyumdur.		mant kl y md r.
11. Öğrenirken...		kat l mc y md r.		gözlemlemeyi tercih ederim.		değerlendiririm.		aktif davranmay severim.
12. En iyi...		fikirleri analiz ettiğimde öğrenirim.		aç k fikirli ve yeniliklere aç k olduğumda öğrenirim.		dikkatli olduğumda öğrenirim.		pratik davrand ğimda öğrenirim.

APPENDIX F

PERMISSION LETTER

Date: Thursday, 03 Jun 200412:38:27 -0400
From: Ginny_Flynn@haygroup.com
Subject: Re: Learning Style Inventory
To: ibt3@pitt.edu

Hi Ibrahim,
Congratulations! Your research request regarding use of the Learning Style Inventory (LSI) has been approved. Attached you will find two documents (.pdf files--Adobe Acrobat 4.05):

- LSItest. pdf - This is a copy of the LSI test. You may print or copy this document as needed for your research.
- LSIprofile.pdf - The profile sheet contains the answer key for the test as well as the profiling graphs for plotting scores. This document may also be reproduced as necessary for your research. The AC-CE score on the Learning Style Type Grid is obtained by subtracting the CE score from the AC score. Similarly, the AE-RO score = AE minus RO.

(See attached file: MCB 200C.PDF)(See attached file: Mcb200d.pdf)

We wish you luck with your project and look forward to hearing about your results. Please mail a copy of your completed research paper or publication to the following address:

LSI Research Contracts
c/o Michelle Curran
HayGroup
116 Huntington Avenue, 4th floor
Boston, MA 02116

If you have any further questions, please let me know.
Regards,
Ginny Flynn
Hay Resources Direct

APPENDIX G

LIST OF SCHOOLS AND TURKEY MAP

Schools Located in Big Cities				
	Province	**Schools (Alias)**	**Initials**	**Code Numbers**
1	Istanbul	Bilim Lisesi	BL	0001-0116
2	Istanbul	Kartal Ilgaz Hanim Lisesi	KIHL	0117-0216
3	Ankara	Tanpinar Lisesi	TL	0443-0548
4	Ankara	Sihhiye Nusret Pasa Lisesi	SNPL	0549-0724
5	Ankara	Tasova Lisesi	TTL	0725-0838
6	Konya	Karapinar Lisesi	KL	1036-1249
7	Konya	Sami Dalaman Lisesi	SDL	1250-1349
Schools Located in Small Towns				
8	Antalya	Avcilar Ataturk Lisesi	AAL	0217-0242
9	Antalya	Akcakoca Lisesi	AL	0243-0301
10	Amasya	Saribey Lisesi	SL	0302-0339
11	Amasya	Saribey Ataturk Lisesi	SAL	0340-0365
12	Amasya	Saribey Fuzuli Lisesi	SFL	0366-0401
13	Samsun	Ahmet Okumus Lisesi	LAOL	0402-0442
14	Hatay	Aksehir Cem Pamir Lisesi	ACPL	0839-0893
15	Hatay	Fatih Cengiz Lisesi	FCL	0894-1035

Turkey map (Provinces included in this study are marked with a star)[1]

[1] Map retrieved from http://www.lib.utexas.edu/maps/turkey.html

APPENDIX H

ISTE NATIONAL EDUCATIONAL TECHNOLOGY STANDARDS FOR STUDENTS (NETS*S)

NETS FOR STUDENTS[2]

"Technology Foundation Standards for Students

1. ***Basic operations and concepts***
   - *Students demonstrate a sound understanding of the nature and operation of technology systems.*
   - *Students are proficient in the use of technology.*

2. ***Social, ethical, and human issues***
   - *Students understand the ethical, cultural, and societal issues related to technology.*
   - *Students practice responsible use of technology systems, information, and software.*
   - *Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.*

3. ***Technology productivity tools***
   - *Students use technology tools to enhance learning, increase productivity, and promote creativity.*
   - *Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.*

4. ***Technology communications tools***
   - *Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.*
   - *Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.*

5. ***Technology research tools***
   - *Students use technology to locate, evaluate, and collect information from a variety of sources.*
   - *Students use technology tools to process data and report results.*
   - *Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.*

6. ***Technology problem-solving and decision-making tools***
   - *Students use technology resources for solving problems and making informed decisions.*
   - *Students employ technology in the development of strategies for solving problems in the real world."*

---

[2] http://cnets.iste.org/students/s_stands.html

GRADES 9 - 12

"Performance Indicators:

All students should have opportunities to demonstrate the following performances.

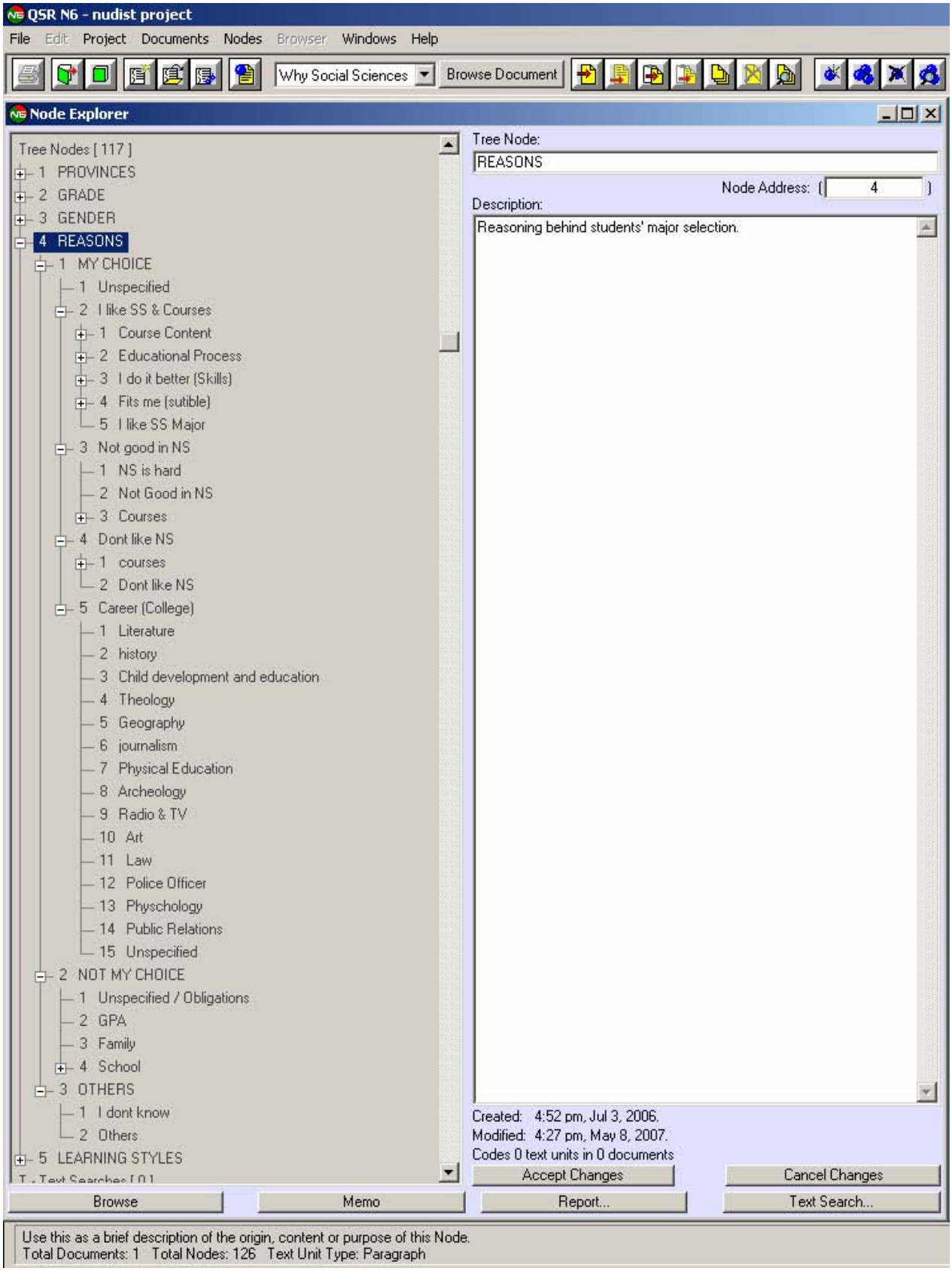
Prior to completion of Grade 12 students will:

1. *Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs. (2)*
2. *Make informed choices among technology systems, resources, and services. (1, 2)*
3. *Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole. (2)*
4. *Demonstrate and advocate for legal and ethical behaviors among peers, family, and community regarding the use of technology and information. (2)*
5. *Use technology tools and resources for managing and communicating personal/professional information (e.g., finances, schedules, addresses, purchases, correspondence). (3, 4)*
6. *Evaluate technology-based options, including distance and distributed education, for lifelong learning. (5)*
7. *Routinely and efficiently use online information resources to meet needs for collaboration, research, publication, communication, and productivity. (4, 5, 6)*
8. *Select and apply technology tools for research, information analysis, problem solving, and decision making in content learning. (4, 5)*
9. *Investigate and apply expert systems, intelligent agents, and simulations in real-world situations. (3, 5, 6)*
10. *Collaborate with peers, experts, and others to contribute to a content-related knowledge base by using technology to compile, synthesize, produce, and disseminate information, models, and other creative works. (4, 5, 6)*[3] *"*

[3] http://cnets.iste.org/students/s_stands.html

APPENDIX I

CODING TREE STRUCTURE ON NUD*IST


QSR N6 - nudist project
File Edit Project Documents Nodes Browser Windows Help
Why Social Sciences
Browse Document
Node Explorer
Tree Nodes [117]
1 PROVINCES
2 GRADE
3 GENDER
4 REASONS
1 MY CHOICE
1 Unspecified
2 I like SS & Courses
1 Course Content
2 Educational Process
3 I do it better (Skills)
4 Fits me (sutible)
5 I like SS Major
3 Not good in NS
1 NS is hard
2 Not Good in NS
3 Courses
4 Dont like NS
1 courses
2 Dont like NS
5 Career (College)
1 Literature
2 history
3 Child development and education
4 Theology
5 Geography
6 journalism
7 Physical Education
8 Archeology
9 Radio & TV
10 Art
11 Law
12 Police Officer
13 Physchology
14 Public Relations
15 Unspecified
2 NOT MY CHOICE
1 Unspecified / Obligations
2 GPA
3 Family
4 School
3 OTHERS
1 I dont know
2 Others
5 LEARNING STYLES
Tree Node:
REASONS
Node Address: (4)
Description:
Reasoning behind students' major selection.
Created: 4:52 pm, Jul 3, 2006.
Modified: 4:27 pm, May 8, 2007.
Codes 0 text units in 0 documents
Accept Changes
Cancel Changes
Browse
Memo
Report...
Text Search...
Use this as a brief description of the origin, content or purpose of this Node.
Total Documents: 1 Total Nodes: 126 Text Unit Type: Paragraph

APPENDIX J

DEMOGRAPHIC INFORMATION

J.1 GRADE, GENDER, RESIDENCY

J.1.1 Participants by Grade and Gender:

		Gender		
		Female	Male	Total
Grade	10th Grade	403	457	860
	11th Grade	217	264	481
Total		620	721	1341

J.1.2 Participants by Grade and Residence:

		Residence		
		Big Cities	Small Towns	Total
Grade	10th Grade	605	260	865
	11th Grade	316	166	482
Total		921	426	1347

J.1.3 Participants by Gender and Residence:

		Residence		
		Big Cities	Small Towns	Total
Gender	Female	462	160	622
	Male	455	266	721
Total		917	426	1343

J.2 REASONS TO CHOOSE SOCIAL SCIENCES AS A MAJOR

J.2.1 Whose Choice By Grade:

Grade	My Choice		Not My Choice		Other	
	N	%	N	%	N	%
10th Grade	606	84	110	15	9	1
11th Grade	370	88	41	10	9	2
Chi-square	7.912					
p	0.025					

J.2.2 Whose Choice By Gender:

Gender	My Choice		Not My Choice		Other	
	N	%	N	%	N	%
Females	472	90	47	9	6	1
Males	504	81	104	17	2	2
Chi-square	16.799					
p	0.001					

J.2.3 Whose Choice for Males by Grade:

Grade	My Choice		Not My Choice		Other	
10th Grade Males	317	80%	72	18%	6	2%
11th Grade Males	187	83%	32	14%	6	3%
Chi-square	2.491					
p	1.					

J.2.4 Whose Choice for Females by Grade:

Grade	My Choice		Not My Choice		Other	
10^{th} Grade Females	289	87%	38	12%	3	1%
11th Grade Females	182	93%	9	5%	3	2%
Chi-square	7.402					
p	0.025					

J.2.5 Whose Choice by Residence:

Residence	My Choice		Not My Choice		Other	
Big Cities	635	84%	109	14%	14	2%
Small Towns	340	88%	42	11%	4	1%
Chi-square	3.998					
p	0.20					

J.2.6 Whose Choice by Learning Style:

Learning Style	My Choice		Not My Choice		Other	
Diverger	99	85%	15	13%	2	2%
Assimilator	120	90%	10	8%	3	2%
Converger	79	87%	11	12%	1	1%
Accommodator	46	88%	6	12%	0	0%
Chi-square	3.566					
p	1.					

J.2.7 Reasons to Choose Social Sciences as a Major:

a) Reasons by Grade:

	Unspecified		I Like Social Sciences		Not Good in Natural Sciences		Don't Like Natural Sciences		Career	
10th Grade	17	3%	346	51%	143	21%	68	10%	99	15%
11th Grade	12	3%	206	49%	69	16%	48	12%	84	20%
Chi-square	8.242									
p	0.10									

b) Reasons by Gender:

	Unspecified		I Like Social Sciences		Not Good in Natural Sciences		Don't Like Natural Sciences		Career	
Females	9	2%	264	48%	105	19%	46	9%	121	22%
Males	20	4%	287	52%	107	20%	70	13%	63	11%
Chi-square	28.395									
p	0.001									

c) Reasons by Learning Style:

	Unspecified	I Like SS	NG in NS*	DL NS**	Career
Diverger	2	53	22	14	19
Assimilator	2	71	24	18	19
Converger	2	39	16	9	19
Accomodator	0	25	10	9	9
Chi-square	5.0566				
p	1.				

d) Reasons by Residence:

	Unspecified		I Like SS		NG in NS*		DL NS**		Career	
Big Cities	21	4%	340	48%	138	19%	81	11%	134	18%
Small Towns	8	2%	211	44%	74	16%	35	7%	49	10%
Chi-square	9.922									
p	0.05									

* NG in NS: Not Good in Natural Sciences

** DL NS: Don't Like Natural Sciences

J.2.8 Why Students Like Social Sciences?

a) Reasons to Like Social Sciences by Grade:

	Content		Process		I do it better		Fits me		I like SS	
10th Grade	92	25%	7	2%	212	57%	13	4%	46	12%
11th Grade	58	26%	5	2%	117	52%	16	7%	29	13%
Chi-square	4.571									
p	1.									

b) Reasons to Like Social Sciences by Gender:

	Content		Process		I do it better		Fits me		I like SS	
Females	80	27%	5	2%	160	55%	11	4%	35	12%
Males	69	23%	7	2%	169	56%	18	6%	40	13%
Chi-square	3.173									
p	1									

c) Reasons to Like Social Sciences by Learning Style:

	Content	Process	I do it better	Fits me	I like SS
Diverger	16	1	32	0	11
Assimilator	19	3	40	2	11
Converger	8	1	18	5	9
Accomodator	11	1	11	1	3
Chi-square	15.846				
p	0.20				

d) Reasons to Like Social Sciences by Residence:

	Content		Process		I do it better		Fits me		I like SS	
Big Cities	81	22%	7	2%	214	59%	17	5%	43	12%
Small Towns	68	29%	5	2%	115	50%	12	5%	32	14%
Chi-square	5.547									
p	1.									

J.2.9 Why Students Think They Can Do Better in Social Sciences?

a) By grade:

Grade	Easy	Talent	Understand Better	Prior Success	All I can do	Memorization	Unspecified
10th Grade	37	22	27	67	2	17	59
11th Grade	20	8	13	48	1	14	18
Chi-square	9.329						
p	0.20						

b) By Gender:

Gender	Easy	Talent	Understand Better	Prior Success	All I can do	Memorization	Unspecified
Female	15	17	21	61	1	18	34
Male	42	13	19	54	2	13	43
Chi-square	15.0615						
p	0.025						

c) By Learning Style:

LS	Easy	Talent	Understand Better	Prior Success	All I can do	Memorization	Unspecified
Diverger	6	1	4	8	0	6	9
Assimilator	5	6	4	15	1	2	13
Converger	3	3	2	4	0	1	8
Accomodator	1	2	1	6	0	0	1
Chi-square	17.201						
p	1.						

d) By Residence:

Residence	Easy	Talent	Understand Better	Prior Success	All I can do	Memorization	Unspecified
Big Cities	36	16	30	69	2	23	51
Small Towns	21	14	10	46	1	8	26
Chi-square	5.980						
p	1.						

J.3 LEARNING STYLE PREFERENCES

J.3.1 Learning Styles by Gender:

Gender	**Diverger**		**Assimilator**		**Converger**		**Accommodator**	
Females	73	29%	84	33%	57	23%	38	15%
Males	67	31%	77	35%	47	22%	26	12%
Chi-square	1.1675							
p	1.							

J.3.2 Learning Styles by Grade:

Grade	Diverger		Assimilator		Converger		Accommodator	
10th Grade	70	27%	90	34%	63	24%	40	15%
11th Grade	70	34%	70	34%	42	20%	24	12%
Chi-square	3.829							
p	1.							

J.3.3 Learning Styles by Residence:

Residence	Diverger		Assimilator		Converger		Accommodator	
Big Cities	93	31%	93	31%	66	22%	46	16%
Small Towns	47	27%	68	40%	39	23%	18	10%
Chi-square	4.751							
p	0.20							

J.3.4 Learning Styles by Province:

Province	Diverger		Assimilator		Converger		Accommodator	
Istanbul	25	28%	31	36%	22	25%	10	11%
Ankara	41	32%	40	31%	29	22%	19	15%
Konya	27	33%	22	27%	15	19%	17	21%
Antalya	8	36%	7	32%	6	27%	1	5%
Amasya	25	31%	32	40%	14	17%	10	12%
Samsun	7	19%	15	41%	13	35%	2	5%
Hatay	7	22%	14	43%	6	19%	5	16%
Chi-square	18.533							
p	1.							

J.3.5 Learning Styles by Schools:

Schools in Big Cities									
Province	**School**	**Diverger**		**Assimilator**		**Converger**		**Accommodator**	
Ankara	**TL**	17	41%	14	33%	8	19%	3	7%
	TTL	14	33%	13	30%	10	23%	6	14%
	SNPL	10	23%	13	29%	11	25%	10	23%
Istanbul	**KIHL**	13	32%	14	33%	8	20%	6	15%
	BL	12	26%	17	35%	14	30%	4	9%
Konya	**KL**	16	32%	12	24%	10	20%	12	24%
	SDL	11	36%	10	32%	5	16%	5	16%
Chi-square		13.972							
p		1.							
Schools in Small Towns									
Amasya	**SAL**	0	0%	18	69%	5	19%	3	12%
	SFL	13	47%	5	18%	4	14%	6	21%
	SL	12	44%	9	33%	5	19%	1	4%
Antalya	**AL**	3	27%	5	46%	2	18%	1	9%
	AAL	5	46%	2	18%	4	36%	0	0%
Hatay	**FCL**	7	29%	8	33%	5	21%	4	17%
	ACPL	0	0%	6	74%	1	13%	1	13%
Samsun	**LAOL**	7	19%	15	41%	13	35%	2	5%
Chi-square		44.346							
p		0.01							

J.4 LEARNING METHOD PREFERENCES

J.4.1 Descriptive Statistics:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Reading	228	16.9	20.1	20.1
	Listening	360	26.7	31.7	51.7
	Watching	152	11.3	13.4	65.1
	Doing	351	26.0	30.9	96.0
	Not Sure	46	3.4	4.0	100.0
	Total	1137	84.2	100.0	
Missing	System	213	15.8		
	Total	1350	100.0		

J.4.2 Learning Methods by Gender:

Learning Methods by Gender N= 1130												
	Reading		Listening		Watching		Doing		Not Sure		Chi-square	p
	n	%	n	%	n	%	n	%	n	%		
Females	121	23.2	164	31.4	63	12	60	30.7	14	2.7	10.938	0.05
Males	104	17.1	194	31.9	87	14.3	91	31.4	32	5.3		

J.4.3 Learning Methods by Grade:

Learning Methods by Grade N= 1134												
	Reading		Listening		Watching		Doing		Not Sure		Chi-square	p
	n	%	n	%	n	%	n	%	n	%		
10th Grade	151	21	229	31.9	94	13	213	29.6	33	4.5	3.487	1.
11th Grade	76	18.4	130	31.4	58	14	137	33.1	13	3.1		

J.4.4 Learning Methods by Residence:

Learning Methods by Residence N= 1137												
	Reading		Listening		Watching		Doing		Not Sure		Chi-square	p
	n	%	n	%	n	%	n	%	n	%		
Big Cities	158	20.2	255	32.6	104	13.3	237	30.3	28	3.6	2.343	1.
Small Towns	70	19.7	105	29.6	48	13.5	114	32.1	18	5.1		

J.5 TECHNOLOGY ACCESS LEVELS

J.5.1 Technology Access Levels:

	TV	Phone	PC	VCD	Internet	Radio	Game Console
Have	1324	1267	442	939	212	158	327
Don't Have	25	81	905	407	1133	188	1018
Missing	1	2	3	4	5	4	5
Total	1350	1350	1350	1350	1350	1350	1350

J.5.2 Technology Access Levels by School in Big Cities:

Schools in Big Cities									
		KIHL	SDL	BL	KL	SNPL	TL	TTL	Total
TV	Don't have	0	0	3	4	3	1	0	11
	Have	100	100	113	210	171	104	113	911
Phone	Don't have	4	6	6	11	9	7	4	47
	Have	96	94	110	203	165	98	108	874
PC	Don't have	65	59	60	138	140	59	50	571
	Have	35	41	56	76	34	45	62	349
VCD	Don’t have	32	26	34	56	51	29	25	253
	Have	68	74	81	158	123	75	87	666
Internet	Don't have	86	86	95	165	161	85	81	759
	Have	14	14	21	48	13	19	31	160
Audio	Don't have	20	8	22	26	17	9	4	106
	Have	80	92	94	188	157	95	108	814
Game Console	Don't have	80	72	91	151	137	79	73	683
	Have	20	27	25	63	37	25	39	236

J.5.3 Technology Access Levels by School in Small Tows:

Schools in Small Towns										
		AAL	ACPL	AL	SAL	FCL	LAOL	SL	SFL	Total
TV	Don't have	0	0	2	1	8	0	3	0	14
	Have	25	55	60	25	134	43	35	36	413
Phone	Don't have	2	1	6	2	17	1	4	1	34
	Have	23	54	56	24	125	42	34	35	393
PC	Don't have	18	46	40	16	128	26	33	27	334
	Have	7	9	22	10	14	17	5	9	93
VCD	Don't have	9	22	14	7	67	7	14	14	154
	Have	16	33	48	19	75	36	24	22	273
Internet	Don't have	22	48	50	21	132	33	36	32	374
	Have	3	6	12	5	10	10	2	4	52
Radio	Don't have	5	9	11	1	46	2	5	3	82
	Have	20	45	51	25	96	41	33	33	344
Game Console	Don't have	20	33	47	21	121	34	33	26	335
	Have	5	22	14	5	21	9	5	10	91

J.6 LEVEL OF TECHNOLOGY USE IN SOCIAL SCIENCES COURSES

J.6.1 The Difference on the Data Before and After Excluded Responses:

History		**TV**		**VCR**		**PC**		**Internet**	
		OR	**NF0**	**OR**	**NF0**	**OR**	**NF0**	**OR**	**NF0**
Valid n		1200	692	1149	640	1143	635	1140	633
Missing		150	659	201	711	207	716	210	718
Mean		.62	1.07	.37	.66	.47	.83	.41	.73
Std. Deviation		1.152	1.344	.935	1.165	1.061	1.304	1.038	1.299
Valid %	**Almost Never**	72.3	52	69.8	64.3	63.6	56.9	70.9	65.5
	Rarely	8.7	15	10	11.8	12	14.2	7.7	9.2
	Sometimes	9.8	16.9	9.2	10.9	9.9	11.8	7.9	9.4
	Frequently	3.8	6.5	6.1	7.2	6.3	7.5	4.7	5.6
	Almost Always	5.6	9.5	4.8	5.7	8.2	9.7	8.7	10.3

*** OR (**Original Responses): All resposes included.

*** NF0** (No full zeros): Respondants who answered all questions in this section with nothing but zero (0) are excluded.

J.6.2 Level of Technology-use in Social Sciences Courses by Residence (Descending Means):

Residence		History	Foreign Lang.	Turkish	Geography	Philosophy
Big Cities	Mean	1.0755	1.0272	1.0088	1.0078	.8278
	N	473	452	461	463	455
	Std. Deviation	1.13205	1.18991	1.19371	1.15791	1.13855
		History	**Geography**	**Foreign Lang.**	**Turkish**	**Philosophy**
Small Towns	Mean	.9320	.8838	.8163	.7781	.5510
	N	293	283	277	283	285
	Std. Deviation	1.13307	1.13032	1.10872	1.12007	1.01247

J.6.3 Level of Technology-use in Social Sciences Courses by Schools (Descending Means):

	Schools in Big Cities (Descending Means)						
Technology Usage	KL	SDL	TL	BL	TTL	KIHL	SNPL
	1.72	1.16	1.10	.78	.68	.67	.38
	Schools in Small Towns (Descending Means)						
Technology Usage	AL	FCL	LAOL	SAL	SL	AAL	ACPL	SFL
	1.48	1.23	.86	.57	.46	.29	.26	.15

J.6.4 The Level of Technology-use for Each Educational Technology Devices in Social Sciences Courses:

TV		History	Geography	Turkish Literature	Philo& Psychology	Foreign Language
Valid N		692	659	654	651	644
Missing		659	692	697	700	707
Mean		1.07	1.07	.88	.71	.91
Std. Deviation		1.344	1.376	1.329	1.225	1.364
Valid %	**Almost Never**	52	53.3	62.5	68	61.5
	Rarely	15	14.3	11	11.1	12
	Sometimes	16.9	14.6	10.4	9.4	10.6
	Frequently	6.5	7.9	8	4.6	5.9
	Almost Always	9.5	10	8.1	6.9	10.1

VCR		History	Geography	Turkish Literature	Philo& Psychology	Foreign Language
Valid N		640	633	624	629	610
Missing		711	718	727	722	741
Mean		.66	.70	.57	.52	.75
Std. Deviation		1.165	1.168	1.137	1.112	1.296
Valid %	Almost Never	69.8	67.3	75.2	77.6	70.2
	Rarely	10	11.1	8	7.3	5.9
	Sometimes	9.2	10.3	6.1	5.4	10.5
	Frequently	6.1	7	6.1	4.8	5.6
	Almost Always	4.8	4.4	4.6	4.9	7.9

Audio Tapes		History	Geography	Turkish Literature	Philo& Psychology	Foreign Language
Valid N		620	614	617	619	630
Missing		731	737	734	732	721
Mean		.38	.36	.48	.40	1.10
Std. Deviation		.896	.852	1.069	.942	1.454
Valid %	Almost Never	81.3	80.8	78.8	81.1	54.8
	Rarely	6.9	8.5	7	6.6	13.7
	Sometimes	7.1	6.7	5.7	6.1	10.3
	Frequently	2.3	2.1	4.2	3.6	8.9
	Almost Always	2.4	2	4.4	2.6	12.4

CD / VCD		History	Geography	Turkish Literature	Philo& Psychology	Foreign Language
Valid N		641	629	633	634	624
Missing		710	722	718	717	727
Mean		.79	.81	.67	.58	.90
Std. Deviation		1.181	1.220	1.148	1.120	1.355
Valid %	Almost Never	60.2	61.5	68.1	73	61.7
	Rarely	17.2	14	11.5	10.3	11.2
	Sometimes	12.2	12.7	9.3	6.9	12.3
	Frequently	4.5	5.6	7	5	4.5
	Almost Always	5.9	6.2	4.1	4.7	10.3

PC		History	Geography	Turkish Literature	Philo& Psychology	Foreign Language
Valid N		635	628	623	633	628
Missing		716	723	728	718	723
Mean		.83	.80	.81	.59	.80
Std. Deviation		1.304	1.306	1.352	1.177	1.352
Valid %	Almost Never	63.6	66.7	67.4	75	68.5
	Rarely	12	9.4	9	8.1	7.6
	Sometimes	9.9	9.7	8.5	5.8	8.4
	Frequently	6.3	5.9	5.1	5.1	54.9
	Almost Always	8.2	8.3	10	6	9.6

Internet		History	Geography	Turkish Literature	Philo& Psychology	Foreign Language
Valid N		633	623	621	615	615
Missing		718	728	730	736	736
Mean		.73	.70	.70	.55	.73
Std. Deviation		1.299	1.262	1.292	1.146	1.336
Valid %	Almost Never	70.9	71.4	72.8	76.4	72.5
	Rarely	7.7	8	6.6	8.3	7
	Sometimes	7.9	7.7	7.6	5.9	5.5
	Frequently	4.7	5.3	4.3	3.1	5.4
	Almost Always	8.7	7.5	8.7	6.3	9.6

OH Projector		History	Geography	Turkish Literature	Philo & Psychology	Foreign Language
Valid N		633	619	611	611	596
Missing		718	732	740	740	755
Mean		1.09	.69	.61	.36	.33
Std. Deviation		1.522	1.279	1.212	.912	.925
Valid %	Almost Never	59.6	71.9	74.8	82.2	85.4
	Rarely	8.4	8.4	8.2	7.7	6.4
	Sometimes	11.8	6.6	5.9	4.9	2.5
	Frequently	4.3	4.7	3.8	2.1	1.7
	Almost Always	16	8.4	7.4	3.1	4

J.6.5 The level of Technology-use for Each Educational Technology Devices in Each Social Sciences Courses (Descending Means):

History		OH Projector	TV	PC	CD / VCD	Internet	VCR	Audio Tapes
Valid N		633	692	635	641	633	640	620
Missing		718	659	716	710	718	711	731
Mean		1.09	1.07	.83	.79	.73	.66	.38
Std. Deviation		1.522	1.344	1.304	1.181	1.299	1.165	.896
Valid %	Almost Never	59.6	52	63.6	60.2	70.9	69.8	81.3
	Rarely	8.4	15	12	17.2	7.7	10	6.9
	Sometimes	11.8	16.9	9.9	12.2	7.9	9.2	7.1
	Frequently	4.3	6.5	6.3	4.5	4.7	6.1	2.3
	Almost Always	16	9.5	8.2	5.9	8.7	4.8	2.4

Geography		TV	CD / VCD	PC	VCR	Internet	OH Projector	Audio Tapes
Valid N		659	629	628	633	623	619	614
Missing		692	722	723	718	728	732	737
Mean		1.07	.81	.80	.70	.70	.69	.36
Std. Deviation		1.376	1.220	1.306	1.168	1.262	1.279	.852
Valid %	Almost Never	53.3	61.5	66.7	67.3	71.4	71.9	80.8
	Rarely	14.3	14	9.4	11.1	8	8.4	8.5
	Sometimes	14.6	12.7	9.7	10.3	7.7	6.6	6.7
	Frequently	7.9	5.6	5.9	7	5.3	4.7	2.1
	Almost Always	10	6.2	8.3	4.4	7.5	8.4	2

Turkish Literature		TV	PC	Internet	CD / VCD	OH Projector	VCR	Audio Tapes
Valid N		654	623	621	633	611	624	617
Missing		697	728	730	718	740	727	734
Mean		.88	.81	.70	.67	.61	.57	.48
Std. Deviation		1.329	1.352	1.292	1.148	1.212	1.137	1.069
Valid %	Almost Never	62.5	67.4	72.8	68.1	74.8	75.2	78.8
	Rarely	11	9	6.6	11.5	8.2	8	7
	Sometimes	10.4	8.5	7.6	9.3	5.9	6.1	5.7
	Frequently	8	5.1	4.3	7	3.8	6.1	4.2
	Almost Always	8.1	10	8.7	4.1	7.4	4.6	4.4

Philosophy and Psychology		TV	PC	CD / VCD	Internet	VCR	Audio Tapes	OH Projector
Valid N		651	633	634	615	629	619	611
Missing		700	718	717	736	722	732	740
Mean		.71	.59	.58	.55	.52	.40	.36
Std. Deviation		1.225	1.177	1.120	1.146	1.112	.942	.912
Valid %	Almost Never	68	75	73	76.4	77.6	81.1	82.2
	Rarely	11.1	8.1	10.3	8.3	7.3	6.6	7.7
	Sometimes	9.4	5.8	6.9	5.9	5.4	6.1	4.9
	Frequently	4.6	5.1	5	3.1	4.8	3.6	2.1
	Almost Always	6.9	6	4.7	6.3	4.9	2.6	3.1

Foreign Language		Audio Tapes	TV	CD / VCD	PC	VCR	Internet	OH Projector
Valid N		630	644	624	628	610	615	596
Missing		721	707	727	723	741	736	755
Mean		1.10	.91	.90	.80	.75	.73	.33
Std. Deviation		1.454	1.364	1.355	1.352	1.296	1.336	.925
Valid %	Almost Never	54.8	61.5	61.7	68.5	70.2	72.5	85.4
	Rarely	13.7	12	11.2	7.6	5.9	7	6.4
	Sometimes	10.3	10.6	12.3	8.4	10.5	5.5	2.5
	Frequently	8.9	5.9	4.5	54.9	5.6	5.4	1.7
	Almost Always	12.4	10.1	10.3	9.6	7.9	9.6	4

APPENDIX K

COMPUTER AND THE INTERNET KNOWLEDGE

K.1.1 Computer and the Internet Knowledge (Descending Means):

	N	Mean	Std. Deviation
MS Word	1291	2.71	1.048
E-mail & Chat	1279	2.59	1.254
Internet Search	1287	2.57	1.168
MS Windows	1295	2.53	1.057
MS Word 2	1287	2.45	1.113
MS Excel	1276	2.23	1.083
MS Powerpoint	1272	2.02	1.059
Webpage	1283	2.01	1.138
Valid N (listwise)	1188		

K.1.2 Computer and the Internet Knowledge by Gender:

		Experience Level (%)					
	Gender	Never Tried	Beginner	Intermediate	Expert	Chi-square	p
MS Windows	Female	30.8	17.5	39.8	11.9		
	Male	18.8	17.7	38.5	25	47.769	0.001
MS Word	Female	23.7	13.4	40.4	22.4		
	Male	15.4	18.1	38.5	28	20.290	0.001
MS Word 2	Female	33.9	17.4	31.3	17.4		
	Male	24.7	18.9	32.9	23.5	15.594	0.01
MS PowerPoint	Female	49.5	18.1	25.3	7.1		
	Male	40	22.2	23.9	13.9	22.570	0.001
MS Excel	Female	40.5	21.7	29.4	8.4		
	Male	31.5	19.2	30.1	19.2	34.404	0.001
Internet Search	Female	38.8	16.6	26.7	17.9		
	Male	18.5	14.6	30.1	36.8	89.126	0.001
E-mail & Chat	Female	46	14.7	17.1	22.2		
	Male	19.6	11.6	23.2	45.6	127.118	0.001
Webpage	Female	57	15	17.1	10.9		
	Male	41.6	18.8	20.5	19.1	33.815	0.001

K.1.3 Computer and the Internet Knowledge by Learning Style:

		Diverger	Assimilator	Converger	Accomodator	Chi-square	p
MS Windows	Never tried	27	26	21	17		
	Beginner	25	25	20	14		
	Intermediate	58	71	37	17	8.443	1.
	Expert	26	36	22	14		
MS Word	Never tried	21	21	14	13		
	Beginner	23	17	19	12		
	Intermediate	63	74	43	17	12.454	0.20
	Expert	29	43	23	20		
MS Word 2	Never tried	28	32	25	18		
	Beginner	31	28	18	12		
	Intermediate	53	60	33	13	11.802	1.
	Expert	21	35	22	18		
MS Powerpoint	Never tried	55	49	34	24		
	Beginner	23	31	22	16		
	Intermediate	36	58	32	10	11.108	1.
	Expert	16	18	11	6		
MS Excel	Never tried	47	41	31	20		
	Beginner	31	33	28	8		
	Intermediate	40	62	27	23	10.181	1.
	Expert	15	18	14	8		
Internet Search	Never tried	34	33	24	18		
	Beginner	19	29	14	11		
	Intermediate	38	49	30	16	4.433	1.
	Expert	44	44	32	15		
E-mail Chat	Never tried	36	48	31	20		
	Beginner	16	23	13	10		
	Intermediate	31	37	18	14	3.943	1.
	Expert	49	47	35	17		
Webpage	Never tried	67	80	48	32		
	Beginner	25	28	16	10		
	Intermediate	19	30	17	11	4.595	1.
	Expert	22	17	18	7		

K.1.4 Computer and the Internet Knowledge by Residence:

		Big Cities		Small Towns		Chi-square	p
		n	%	n	%		
MS Windows	Never tried	209	23.1	105	26.9	2.542	1.
	Beginner	158	17.5	70	17.9		
	Intermediate	363	40.2	143	36.6		
	Expert	174	19.2	73	18.7		
MS Word	Never tried	172	19.1	75	19.2	0.720	1.
	Beginner	142	15.8	65	16.7		
	Intermediate	361	40.1	147	37.7		
	Expert	226	25.1	103	26.4		
MS Word 2	Never tried	250	27.8	120	30.8	2.423	1.
	Beginner	161	17.5	76	19.5		
	Intermediate	294	31.9	119	30.6		
	Expert	193	20.9	74	19		
MS Powerpoint	Never tried	387	43.7	175	45.2	2.276	1.
	Beginner	183	20.7	77	19.9		
	Intermediate	212	24	100	25.8		
	Expert	103	11.6	35	9		
MS Excel	Never tried	324	36.2	129	33.9	0.995	1.
	Beginner	183	20.4	78	20.5		
	Intermediate	260	19	120	31.6		
	Expert	129	14.4	53	13.9		
Internet Search	Never tried	257	28.5	100	26	7.569	0.10
	Beginner	124	13.7	76	19.8		
	Intermediate	262	29	105	27.3		
	Expert	260	28.8	103	26.8		
E-mail Chat	Never tried	285	31.8	119	31.1	10.435	0.025
	Beginner	106	11.8	61	15.9		
	Intermediate	172	19.2	90	23.5		
	Expert	333	37.2	113	29.5		
Webpage	Never tried	422	46.6	202	53.4	8.831	0.05
	Beginner	165	18.2	53	14		
	Intermediate	167	18.5	76	20.1		
	Expert	151	16.7	47	12.4		

APPENDIX L

ATTITUDES TOWARD USE OF EDUCATIONAL TECHNOLOGY

L.1 ELEMENTS OF EDUCATION

L.1.1 Elements of Education Ranks (Descending Means):

	N	Minimum	Maximum	Mean	Std. Deviation
Teacher	1280	0	4	3.55	.932
Textbooks	1267	0	4	2.93	1.037
Educational Tech. Materials	1254	0	4	2.85	1.172
School Building	1235	0	4	2.74	1.290
Library	1246	0	4	2.66	1.193
Social Activities	1227	0	4	2.51	1.213
Sports	1243	0	4	2.45	1.303
Valid N (listwise)	1151				

L.1.2 Elements of Education Ranks by Gender:

Gender		Teacher	Textbooks	Educational Materials	Library	School Building	Sports	Social Activities
Female	Mean	3.66	3.05	2.82	2.86	2.76	2.19	2.56
	N	592	591	576	583	568	572	562
	Std. Deviation	.764	.944	1.136	1.102	1.268	1.297	1.174
Male	Mean	3.46	2.82	2.88	2.47	2.72	2.67	2.47
	N	683	672	672	657	662	665	660
	Std. Deviation	1.041	1.106	1.204	1.238	1.312	1.267	1.245
Chi-square		20.785	17.956	7.892	36.769	3.385	43.990	7.553
p		0.001	0.01	0.10	0.001	1.	0.001	0.20

L.1.3 Elements of Education Ranks by Grade:

Grade		Teacher	Textbooks	Educational Materials	Library	School Building	Sports	Social Activities
10th Grade	Mean	3.50	2.96	2.86	2.62	2.81	2.45	2.48
	N	823	809	804	800	789	799	783
	Std. Deviation	.979	1.049	1.197	1.227	1.303	1.330	1.206
11th Grade	Mean	3.63	2.87	2.85	2.72	2.61	2.45	2.56
	N	455	456	448	444	444	442	442
	Std. Deviation	.837	1.016	1.128	1.128	1.258	1.250	1.226
Chi-square		8.723	9.906	5.223	7.927	18.055	8.268	2.735
p		0.10	0.05	1.	0.10	0.001	0.10	1.

L.1.4 Elements of Education Ranks by Residence:

Residence		Teacher	Textbooks	Educational Materials	Library	School Building	Sports	Social Activities
Big Cities	Mean	3.50	2.94	2.88	2.67	2.75	2.55	2.62
	N	886	880	871	869	865	867	860
	Std. Deviation	.985	1.028	1.170	1.206	1.313	1.286	1.220
Small Towns	Mean	3.65	2.91	2.80	2.64	2.72	2.21	2.26
	N	394	387	383	377	370	376	367
	Std. Deviation	.791	1.059	1.176	1.166	1.234	1.310	1.158
Chi-square		10.691	1.224	4.660	2.301	14.159	20.368	32.210
p		0.05	1.	1.	1.	0.01	0.001	0.001

L.1.5 Elements of Education Ranks by Learning Style:

Learning Styles		Teacher	Textbooks	Educational Materials	Library	School Building	Sports	Social Activities
Diverger	Mean	3.50	2.79	2.76	2.58	2.70	2.45	2.44
	N	136	134	129	132	132	129	127
	Std. Deviation	1.011	1.027	1.286	1.160	1.364	1.317	1.264
Assimilator	Mean	3.71	2.78	2.78	2.43	2.52	2.04	2.48
	N	153	154	150	148	149	148	146
	Std. Deviation	.758	1.056	1.061	1.138	1.378	1.365	1.205
Converger	Mean	3.61	2.87	2.90	2.80	2.57	2.14	2.58
	N	102	99	99	93	88	99	95
	Std. Deviation	.822	.976	1.174	1.185	1.294	1.348	1.208
Accomodator	Mean	3.51	2.85	2.84	2.44	2.48	2.36	2.42
	N	63	60	58	59	60	59	59
	Std. Deviation	1.045	1.147	1.121	1.236	1.347	1.349	1.276
Chi-square		10.531	6.646	20.086	12.897	5.862	17.348	9.328
p		1.	1.	0.10	1.	1.	0.20	1.

L.1.6 Elements of Education Ranks by Learning Methods:

Learning Methods		Teacher	Textbooks	Educational Materials	Library	School Building	Sports	Social Activities
Reading	Mean	3.54	3.17	2.75	2.78	2.69	2.48	2.39
	N	214	215	208	211	202	209	204
	Std. Deviation	.996	.944	1.179	1.200	1.392	1.309	1.217
Listening	Mean	3.65	3.02	2.72	2.70	2.76	2.42	2.51
	N	334	331	331	323	327	325	319
	Std. Deviation	.747	.991	1.153	1.197	1.240	1.256	1.205
Watching	Mean	3.29	2.63	3.14	2.48	2.70	2.67	2.56
	N	148	148	145	146	144	144	146
	Std. Deviation	1.230	1.052	1.093	1.244	1.246	1.301	1.226
Doing	Mean	3.57	2.78	2.93	2.66	2.73	2.33	2.58
	N	338	328	330	323	318	325	322
	Std. Deviation	.873	1.103	1.169	1.172	1.279	1.358	1.246
Chi-square		29.114	44.643	25.678	13.951	12.492	22.325	16.419
p		0.01	0.001	0.025	1.	1.	0.05	0.20

L.2 ATTITUDES

L.2.1 Item # 21 - If various technological materials are used in the classroom students can learn better.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	743	55.0	56.1	56.1
	Agree	275	20.4	20.8	76.9
	I am not Sure	257	19.0	19.4	96.3
	Disagree	25	1.9	1.9	98.2
	Strongly Disagree	24	1.8	1.8	100.0
	Total	1324	98.1	100.0	
Missing	System	26	1.9		
Total		1350	100.0		

L.2.2 Item # 22 - Use of educational technology in classroom helps students focus their attention.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	489	36.2	37.0	37.0
	Agree	378	28.0	28.6	65.6
	I am not Sure	363	26.9	27.5	93.0
	Disagree	74	5.5	5.6	98.6
	Strongly Disagree	18	1.3	1.4	100.0
	Total	1322	97.9	100.0	
Missing	System	28	2.1		
Total		1350	100.0		

L.2.3 Item # 23 - The use of educational technology helps students to improve their academic achievements.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	493	36.5	37.7	37.7
	Agree	356	26.4	27.2	64.9
	I am not Sure	359	26.6	27.4	92.3
	Disagree	67	5.0	5.1	97.4
	Strongly Disagree	34	2.5	2.6	100.0
	Total	1309	97.0	100.0	
Missing	System	41	3.0		
Total		1350	100.0		

L.2.4 Item # 24 - The use of technology is nothing but wasting time.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	66	4.9	5.1	5.1
	Agree	80	5.9	6.2	11.3
	I am not Sure	131	9.7	10.1	21.4
	Disagree	462	34.2	35.6	57.0
	Strongly Disagree	558	41.3	43.0	100.0
	Total	1297	96.1	100.0	
Missing	System	53	3.9		
Total		1350	100.0		

L.2.5 Item # 25 - I understand history better with documentaries or movies.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	744	55.1	57.0	57.0
	Agree	321	23.8	24.6	81.5
	I am not Sure	161	11.9	12.3	93.9
	Disagree	45	3.3	3.4	97.3
	Strongly Disagree	35	2.6	2.7	100.0
	Total	1306	96.7	100.0	
Missing	System	44	3.3		
Total		1350	100.0		

L.2.6 Item # 26 - History can only be learned from books.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	137	10.1	10.4	10.4
	Agree	221	16.4	16.8	27.3
	I am not Sure	388	28.7	29.6	56.8
	Disagree	363	26.9	27.6	84.5
	Strongly Disagree	204	15.1	15.5	100.0
	Total	1313	97.3	100.0	
Missing	System	37	2.7		
Total		1350	100.0		

L.2.7 Attitudes by Grade:

Grade		Learn Better	Focus	Achievement	Not Waste	Movies and Documentaries	Not Books
10th Grade	Mean	4.25	3.96	3.94	4.08	4.29	3.15
	N	848	851	841	827	837	839
	Std. Deviation	.992	1.009	1.035	1.109	.993	1.173
11th Grade	Mean	4.31	3.92	3.89	4.00	4.31	3.32
	N	473	468	465	468	466	471
	Std. Deviation	.897	.958	1.045	1.114	.988	1.241
Chi-square		4.653	4.749	3.682	2.933	1.575	14.147
p		1.	1.	1.	1.	1.	0.01

L.2.8 Attitudes by Gender:

Gender		Learn Better	Focus	Achievement	Not Waste	Movies and Documentaries	Not Books
Female	Mean	4.30	3.93	3.89	4.14	4.34	3.23
	N	612	612	605	600	604	606
	Std. Deviation	.865	.929	1.000	1.019	.928	1.232
Male	Mean	4.26	3.96	3.96	3.98	4.26	3.19
	N	705	703	697	690	695	700
	Std. Deviation	1.031	1.041	1.069	1.178	1.045	1.165
Chi-square		22.150	16.816	9.198	15.192	6.280	9.554
p		0.001	0.01	0.1	0.01	0.20	0.05

L.2.9 Attitudes by Residence:

Residence		Learn Better	Focus	Achievement	Not Waste	Movies and Documentaries	Not Books
Big Cities	Mean	4.25	3.90	3.91	4.05	4.28	3.18
	N	907	906	902	890	896	900
	Std. Deviation	.964	.996	1.031	1.114	1.003	1.201
Small Towns	Mean	4.33	4.03	3.95	4.07	4.32	3.28
	N	417	416	407	407	410	413
	Std. Deviation	.946	.986	1.063	1.105	.969	1.196
Chi-square		6.669	27.128	2.626	.938	1.918	2.808
p		0.2	0.001	1.	1.	1.	1.

L.2.10 Attitudes by Learning Style:

LS		Learn Better	Focus	Achievement	Not Waste	Movies and Documentaries	Not Books
Diverger	Mean	4.44	4.00	4.01	3.95	4.36	3.21
	N	136	135	135	132	130	134
	Std. Deviation	.777	.922	.970	1.203	.956	1.251
Assimilator	Mean	4.19	3.94	3.89	4.28	4.47	3.54
	N	160	160	160	158	157	158
	Std. Deviation	.912	.973	1.022	.978	.903	1.092
Converger	Mean	4.33	4.02	3.90	4.19	4.36	3.49
	N	104	103	101	101	103	103
	Std. Deviation	.886	.929	1.005	.946	.906	1.275
Accomodator	Mean	4.38	3.98	4.00	3.97	4.33	3.24
	N	63	62	62	63	64	63
	Std. Deviation	.869	1.000	1.101	1.295	.856	1.292
Chi-square		15.132	6.739	11.787	16.278	10.503	12.338
p		1.	1.	1.	1.	1.	1.

L.2.11 Attitudes by Learning Method:

Learning Method		Learn Better	Focus	Achievement	Not Waste	Movies and Documentaries	Not Books
Reading	Mean	4.13	3.84	3.80	3.96	4.22	2.95
	N	220	220	219	216	223	222
	Std. Deviation	1.018	1.016	1.089	1.112	1.060	1.187
Listening	Mean	4.18	3.85	3.88	4.01	4.23	3.11
	N	352	355	353	345	346	348
	Std. Deviation	1.011	.986	1.042	1.085	.965	1.186
Watching	Mean	4.53	4.34	4.23	4.29	4.53	3.49
	N	152	151	150	147	150	151
	Std. Deviation	.829	.902	.956	1.048	.880	1.160
Doing	Mean	4.33	3.92	3.94	4.04	4.30	3.32
	N	345	345	341	338	335	341
	Std. Deviation	.909	1.006	1.017	1.137	1.027	1.208
Chi-square		31.679	56.164	24.723	22.545	22.942	32.423
p		0.001	0.001	0.025	0.05	0.05	0.01

L.2.12 Technology Access Level and Attitude Correlation:

		Tech_Access	Attitude
Tech_Access	Pearson Correlation	1	.064(*)
	Sig. (2-tailed)		.020
	N	1349	1338
Attitude	Pearson Correlation	.064(*)	1
	Sig. (2-tailed)	.020	
	N	1338	1339

* Correlation is significant at the 0.05 level (2-tailed).

L.2.13 Computer & the Internet Knowledge and Attitude Correlations

		Computer and the Internet Knowledge	Attitude
Computer and the Internet Knowledge	Pearson Correlation	1	-.135(**)
	Sig. (2-tailed)		.000
	N	1315	1305
Attitude	Pearson Correlation	-.135(**)	1
	Sig. (2-tailed)	.000	
	N	1305	1338

** Correlation is significant at the 0.01 level (2-tailed).

L.3 CONTRIBUTIONS OF EDUCATIONAL TECHNOLOGY IN STUDENTS' LIVES

L.3.1 Contributions by Grade:

Grade		Resources	Content	Easy	Fun	Reinforcing	Independent
10th Grade	Mean	3.18	2.99	2.97	3.00	3.32	2.51
	N	822	813	824	810	827	804
	Std. Deviation	1.029	1.011	1.139	1.077	1.072	1.273
11th Grade	Mean	3.30	2.95	2.95	2.98	3.31	2.49
	N	461	459	463	463	466	457
	Std. Deviation	.992	1.034	1.051	1.071	.963	1.288
Chi-square		8.004	0.497	11.828	1.019	13.203	0.455
p		0.10	1.	0.025	1.	0.025	1.

L.3.2 Contributions by Gender:

Gender		Resources	Content	Easy	Fun	Reinforcing	Independent
Female	Mean	3.30	3.15	3.12	3.21	3.44	2.48
	N	598	594	593	590	599	582
	Std. Deviation	.980	.933	1.037	.998	.943	1.270
Male	Mean	3.17	2.82	2.83	2.81	3.21	2.51
	N	681	675	690	679	689	675
	Std. Deviation	1.048	1.066	1.146	1.107	1.092	1.289
Chi-square		5.639	34.868	22.909	58.140	16.515	4.488
p		1.	0.001	0.001	0.001	0.01	1.

L.3.3 Contributions by Residence:

Residence		Resources	Content	Easy	Fun	Reinforcing	Independent
Big Cities	Mean	3.18	2.98	3.01	3.03	3.33	2.50
	N	875	878	885	875	891	868
	Std. Deviation	1.054	1.036	1.089	1.090	1.055	1.293
Small Towns	Mean	3.33	2.96	2.88	2.91	3.29	2.48
	N	410	396	404	400	404	394
	Std. Deviation	.927	.981	1.142	1.034	.987	1.250
Chi-square		7.460	5.202	4.591	28.513	8.812	5.917
p		.10	.20	.20	.001	.10	.20

L.3.4 Contributions by Learning Methods:

Learning Methods		Resources	Content	Easy	Fun	Reinforcing	Independent
Reading	Mean	3.34	2.97	2.97	3.04	3.31	2.54
	N	212	211	212	211	214	206
	Std. Deviation	.939	1.004	1.166	1.027	1.053	1.327
Listening	Mean	3.22	2.96	2.89	2.99	3.31	2.35
	N	340	339	339	338	341	334
	Std. Deviation	1.059	1.028	1.115	1.119	.941	1.191
Watching	Mean	3.00	2.92	2.93	2.82	3.45	2.55
	N	147	146	149	147	150	146
	Std. Deviation	1.147	1.041	1.027	1.096	1.007	1.254
Doing	Mean	3.20	2.97	2.92	3.01	3.26	2.58
	N	340	336	338	333	339	328
	Std. Deviation	.987	1.041	1.135	1.061	1.100	1.308
Chi-square		22.399	9.331	20.349	21.730	32.905	26.728
p		.10	1.	.20	.20	.01	.05

APPENDIX M

ATTITUDES TOWARD HISTORY

M.1.1 Descriptive Statistics:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	398	29.5	30.4	30.4
	Agree	380	28.1	29.0	59.4
	I am not Sure	293	21.7	22.4	81.8
	Disagree	104	7.7	7.9	89.8
	Strongly Disagree	134	9.9	10.2	100.0
	Total	1309	97.0	100.0	
Missing	System	41	3.0		
Total		1350	100.0		

M.1.2 Attitudes toward history by Grade:

		I Like History					
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Total
Grade	10th Grade	241	251	192	69	87	840
	11th Grade	155	129	101	35	46	466
Total		396	380	293	104	133	1306

M.1.3 Attitudes toward history by Gender:

		I Like History					
		Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	Total
Gender	Female	177	166	147	55	60	605
	Male	217	213	146	49	72	697
Total		394	379	293	104	132	1302

M.1.4 Attitudes toward history by Learning Style:

Learning Style	I Like History					Total
	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree	
Diverger	39	45	25	9	17	135
Assimilator	51	51	29	16	12	159
Converger	35	29	22	11	6	103
Accomodator	19	13	14	7	8	61
Total	144	138	90	43	43	458

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