THE RELATIONS BETWEEN GLOBAL ENVIRONMENTAL AWARENESS AND TECHNOLOGY

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ABSTRACT
The changes in the society related to the developments in science and technology underline the importance of the need for education. Technological developments broaden and accelerate communication, too. The opinion that rapid and unpreventable developments in technology today lead to many environmental problems and contribute to increases in environmental problems is quite widespread. Within the framework of the study, a three-factored, 15 item Likert type "Global Environmental Awareness Scale" that can measure the attitudes of all individuals and mainly students about global environmental awareness was developed firstly. The aim in preparing such a scale is to measure what the individuals especially in educational ages think about global environment, being able to make suggestions for educational programs in line with the findings obtained, and contribute to programs that will free these solutions from being national and make them global. Following the application of the Global Environmental Awareness Scale and the Attitudes towards Technology Scale (Morgil, 2004) on the students as pretest, a 30-hour computer and internet practice was carried out with the students. The relation between the attitudes towards technology and global environmental awareness and whether computer aided education has an influence on global environmental awareness attitudes and technology-related attitudes was found using the pre- and after implementation data. Regression analysis and paired-sample t-test were carried out in the study in order to find out to what level technology awareness contributes to the creation of global environment awareness and the effects of the computer aided education to attitudes towards global environment awareness and the use of technology. It has been found that the researches of the students on the internet led to a statistically significant increase in their scores in attitudes towards technology, and again, as a consequence of the researches that the students carried out on the internet medium about global environment and the homework and activities they prepared, that there was a statistically significant increase in their scores on attitudes towards global environment.

Keywords: Globalization, Global Environment, Technology, Attitude, Computer Aided Education

ÖZET
Bilim ve teknolojideki gelişmelere bağlı olarak toplumsal hayatta meydana gelen değişmeler, eğitime duyulan ihtiyacın önemini daha da artırmaktadır. Teknolojik gelişmeler iletişimi de yaygınlaştırmakta ve hızlandırmaktadır. Bugün teknolojideki hızlı ve önlenemez gelişmeler pek çok çevre problemini beraberinde getirdiği gibi çevre problemlerinin artmasına da neden olmaktadır görüşü oldukça yaygındır. Çalışma kapsamında öncelikle öğrenciler başta olmak üzere tüm bireylerin global çevre bilinci konusunda tutumlarını ölçebilecek üç faktörlü 15 maddeden oluşan likert tipi "Global Çevre Bilinci Ölçeği" geliştirilmiştir. Böyle bir ölçeğin hazırlanmasındaki amaç özellikle eğitim öğretim çağındaki bireylerin global çevre konusunda ne düşündüklerini ölçmek, elde edilen veriler doğrultusunda eğitim öğretim programlarına öneriler getirebilmek ve bu çözümleri ulusallıktan kurtarıp global hale getirecek çözümlere yardımcı olmaktır. Global Çevre Bilinci Ölçeği ve Teknoloji Tutum Ölçeği (Morgil, 2004) öğrencilere ön test olarak uygulandıktan sonra öğrencilerle bu konuları kapsayan 30 saatlik bilgisayar ve internet uygulaması yapılmıştır. Uygulama öncesi ve sonrası verilerden yararlanarak, teknolojiye yönelik tutumlarla global çevre bilinci arasındaki ilişki belirlenmiş ve bilgisayar destekli eğitimin global çevre bilinci tutumlarına ve teknoloji tutumlarına etkisi olup olmadığı saptanmıştır.

Çalışmada global çevre bilincinin oluşturulmasına teknoloji bilincinin ne derece etkisi olduğunu ve bilgisayar destekli eğitimin global çevre bilincine ve teknoloji kullanımına yönelik tutumlara etkisini belirlemek amacıyla regresyon analizi ve paired-sample t-testi yapılmıştır. Öğrencilerin internet ortamında yaptıkları çalışmalar neticesinde teknolojiye yönelik tutum puanlarında istatistiksel olarak anlamlı bir artış olduğu, ayrıca yine öğrencilerin internet ortamında global çevre konusunda yaptıkları araştırmalar ve internet kullanarak hazırladıkları ödevler ve çalışmalar neticesinde global çevreye yönelik tutum puanlarında istatistiksel olarak anlamlı bir artış olduğu belirlenmiştir.

Anahtar Kelimeler: Globalleşme, Global Çevre, Teknoloji, Tutum, Bilgisayar Destekli Eğitim

INTRODUCTION

A common understanding in the scientific world is the rapid change and development we live today. The unprecedented technological developments, computers, the internet, television, the developments in outreach and communications in short, have reduced the dimensions of the world geography and made the individuals in the society informed about everywhere (Cornoy; Courtivron, 2000). Concepts like globalization, new world order, postmodernism, localization, and neo-liberalism are being used to mean each other recently (Mortimore, 2001). The word "globe", the root of globalization, means a three-dimensional physical shape as well as the earth, the world we live on.

When the histories of all the countries are examined, being able to rule the world and the resources can be seen as the – nearly – only aim. Therefore, the history of globalization can be dated back to the emerging of religions and empires. The objective in global education is to free those people from different nations with different cultures from these differences (Van der Wende, 2003). It is to dispose of different stereotypes by giving a universal history awareness and universal culture, thus achieve the aim of creating a "uniform human type". The biggest hindrance in front of globalization is the nationalistic awareness of people from different cultures. It is inevitable that people educated in different educational institutions have different opinions of life and philosophies of living. The ultimate influence of globalization on education is inevitable (Kell, 1999). Hence, the concept of globalization is a course in graduate and doctorate programs in developed countries. On the other hand, there are serious conflicts of opinions as to how globalization will affect educational systems. The assumption that the differences in educational systems will reduce parallel to the globalization process seems as a natural result of globalization (Lyons, 2000; David, 1999). Educational projects implemented by organizations such as the World Bank and UNICEF can be considered as activities targeted to uniform educational systems.

The duty bestowed on institutions of higher education today is the function of bringing up able staff with suitable professions for the labor market. With globalization in place, students that want to study at universities should find a way in the society of knowledge and technology. The educational problems we encounter are mainly based on the failure to fully understand the reflections of globalization and transforming into the society of knowledge as well as the rapid changes in information technologies on education and environment and therefore, taking the required measures (Beerken, 2003).

For us, globalization is more production than consuming. This can only be achieved by creating a true national awareness and identity. Therefore, educators have important tasks to accomplish, and based on that, a process that can be realized through education is in question. ***Accordingly, the human being is in the centre. There are three professions (sciences) that should place the human being in the centre. The first one is medicine that affords health to people; the second is law that bestows rights and draws the framework of these rights; and the profession of teaching that compasses all of these.***

In his studies on school learning, Bloom (1979) has examined the entry behaviors that cover the past livings and natural and acquired competencies as related to behaviors that the students are desired to acquire in two groups namely cognitive entry behaviors and affective entry characteristics. Affective entry characteristics consist of several convictions related to the attitude that the individual develops against the school and the learning experiences at school, the academic self concept of the individual, that is how competent s/he feels as a result of their comparison of themselves with other individuals carrying out he same activity. The entry behaviors that consist of cognitive and affective entry characteristics are open to change. That is to say that they can be learned, taught, and developed with appropriate methods. The researches indicate that cognitive entry behaviors explain 50 percent of the differences in student success whereas affective entry characteristics explain only 15 percent.

Today, the environment has become a main concern for the world. Pollutions in the seas, rivers, the atmosphere, and wherever we can think of are a global problem (Lisowski, 1993; Trisler, 1993). The polluting of a river springing in our lands is not a local problem anymore, but a global one. The atmospheric pollution or nuclear activities harming environment in the USA or anywhere of the world are not problems of the country where they take place but have turned to be the problems of the whole world. The consequences of the disaster in Chernobyl that happened years ago are suffered not only by the country where the explosion took place but also by the rest of the world. When the fact that people from different cultures act with a nationalistic awareness, which is seen as one of the biggest problems of globalization, is taken into consideration, it will be inevitable for us to face the fact that it would not be easy to find a solution to environmental problems. Since hindering technological developments cannot be a matter to consider, looking for global solutions to environmental issues and creating global environmental awareness has become inevitable (Lisowski and Williams, 1993; Lo Presti and Garafalo,

1994). On the other hand, technology is a requisite of development, advancement, and facilitating living. Therefore, giving up technology and technological advancements cannot be considered as an option.

THE PURPOSE OF THE STUDY

Globalization has a direct relation with technological improvements. According to Tozum on this, "globalization is a technology-centered change process; and novelties such as computerization, telecommunication technologies, minimalism, compression technology, and digitalization make technology prevalent on the global scale (Tozum, 2002)". Technological developments also broaden and accelerate communication. The opinion that rapid and unpreventable developments in technology today lead to many environmental problems and contribute to increases in environmental problems is quite widespread.

Within the framework of the study, preparing an attitude scale that can measure the attitudes of all individuals and mainly students about global environmental awareness was planned primarily. The aim in preparing such a scale is to measure what the individuals especially in educational ages think about global environment, being able to make suggestions for educational programs in line with the findings obtained, and contribute to programs that will free these solutions from being national and make them global. The relations between the attitudes towards technology and global environmental awareness and whether computer aided education has an influence on the development of global environmental awareness have been aimed to be identified with the help of the prepared scale. The technological attitudes scale used within the scope of the study was prepared by Yavuz (2004) and analyzed by Morgil and Yucel (2004).

When making suggestions or taking measures related to global environmental awareness utilizing such scales, more lasting and more efficient solutions can be explored by thinking globally instead of locally. Because, with the help of such a scale, human profiles in all levels such as the students at schools, people in the street, laborers at workplaces, housewives at homes, people in general from all professions and all educational and socioeconomic levels can be prepared to produce country profiles to identify how people living in a country look at the issue of global environmental awareness and thus, more efficient solution suggestions can be made worldwide. Support can be taken from sections that consider the issue with a higher awareness level. Because, the environment has no more a problem peculiar only to a single country, a continent or a region, but turned to a problem of the global world (Tognacci, L. H., 1972). The solutions to environmental problems will only be possible with global measures. The place and importance of technology in looking at global environmental problems and solution approaches will also be an important factor of the measures to be taken.

Mathematics teachers and educators believe that whether the students like mathematics or are interested in mathematics lesson or not affect their success (Suydam and Weaver, 1975). Similarly, that the attitudes towards chemistry have an important role in student success has been proven by research studies (Moneim, Hassan, and Shrigley, 1984). Such a study was planned based on the idea that the same effect also applies to the success in bringing about solutions to global environmental problems, which have turned the most important subject of the world, and technology aided education will provide very important contributions in achieving this and whether computer aided education has a contribution in creating global awareness have been examined. One of the objectives of chemistry and science lessons should be that chemistry teachers and chemistry educators would educate individuals that will develop positive attitudes towards the global environment. Whether such an objective has been achieved will be measurable only with the presence of an attitude scale. In many scientific studies, measuring attitudes is necessary. Direct observation of the attitudes of the individuals is impossible. However, the conviction that the behaviors of individuals are based on their intrinsic attitudes is quite widespread (Koklu, 1995). This will play an important role in the assessment of the global environmental awareness attitude levels of students, who in the future will be at managing positions as grown up adults; in the comparison of the obtained data with the technology awareness scale, in the identification of the changes in approaches to the global environment and global environmental problems issue provided by internet based education, and in the identification of problems.

EXPERIMENTAL DETAILS

THE SUBJECT

The sampling of the study is consisted of a total of 247 students studying at Hacettepe University Faculty of Education Chemistry Education Department. 173 of these students have participated in the study on The Development of the Global Environment Awareness Scale and 64 to internet based education applications. Initial and final "global environment awareness" and "technology attitude" scale tests were applied on these students before and after the global environment education in the internet medium.

ATTITUDES SCALE TOWARDS TECHNOLOGY

The technology attitude scale prepared by Yavuz (2004) and analyzed by Morgil and Yucel (2004) was used in the study. A Likert type draft form consisting of 50 attitude statements was used to develop the scale and it was applied on 162 students. Factor analysis was done using the data gathered through this activity and a Likert type technology attitude scale was obtained, which consisted of 19 items in its final form and of which validity and dependability studies were made. The dependability coefficient of the scale is 0.867.

GLOBAL ENVIRONMENTAL AWARENESS SCALE (GEAS)

Within the scope of this study, the following activities were carried out to develop the "Global Environmental Awareness Scale" to measure global environmental awareness.

The "Global Environmental Awareness Scale" related to global environmental awareness was developed by researchers. A total of 173 students were involved in the study while the scale was being developed. In order to develop a valid and dependable measurement tool to be used to measure the attitudes of students according to their knowledge on global environmental awareness, a draft form consisting of 20 statements of awareness was prepared first. The statements in the form are given below.

1. It is not important that chemistry education curricula create global environmental awareness.
2. It is very important to disseminate the environmental awareness developed in chemistry departments to the society in the global scale.
3. Creating the required financial resources for the dissemination of environmental awareness to the public at the global scale is not necessary.
4. Efficient educational methods on the environment at the global scale should be developed through cooperation in chemistry education.
5. Development of global environment awareness through chemistry education is unnecessary.
6. I believe that chemistry departments would make very important contributions to the creation of a clean environment.
7. Since environmental issues are not a local problem, chemistry educators would not make important contributions to global solutions.
8. The pollution's surrounding us are a universal problem and a solution cannot be brought about with measures to be taken at the global scale.
9. Environmental problems at the global scale can be solved with the joint efforts of various environment organizations.
10. Global solutions can only be possible if the solution suggestions in various countries are shared with the whole world.
11. Since most education takes place at schools, environmental education cannot be solved through global environmental education policies.
12. Limitation of environmental pollutants can only be possible through global level joint sanctioning decisions.
13. From now on, the slogan for all years should be "Let's create global environmental awareness".
14. Looking for global solutions to environmental problems cannot be possible through interdisciplinary interaction.
15. More effective and enduring solutions to environmental problems can be found through global environmental investments.
16. Before looking for solutions to environmental problems, awareness should be created among people on what globalization is.
17. Attempts to find global solutions for environmental issues will not create significant benefits in the financial dimension.
18. I don't think that it is sufficient that only a few countries in the world are concerned about environmental problems.
19. Global attempts to find solutions will also mobilize urban and country sides considerably.
20. Since attempts to find global solutions for environmental issues will make nations of the world more close to each other, it will also contribute to the creation of more sensitive individuals.

When this form was being prepared, a group of students were asked to write compositions explaining their feelings and thoughts about global environmental awareness. Upon the examination of these texts, sentences that can be used as statements of awareness were selected and included in the draft form. These statements accepted to indicate behaviors about global environmental awareness were examined by measurement and evaluation experts, they were grammatically checked and the required corrections were made. Whether the students agreed or disagreed with the affirmative and negative statements of awareness was measured with the 5-level grading scale (Anderson, 1981). In order to test the structural validity, in other words to test whether it measures a single

structure (concept), the "fundamental components" analysis, which is a factor analysis technique, was applied. Structural validity is related to what the measured feature is. (Kerlinger, 1973; Tabachnick and Fidel, 1989). Tabachnick and Fidel (2001) state that data from 200 subjects would be enough for factor analysis. However, there are also studies with the number of subjects varying between 100 and 150. Therefore, the number of individuals reached (N=173) have been accepted sufficient for factor analysis.

In this study, the decision to include an item in the scale was based on the principle that the load value in the first factor would be 0.40 and more. The difference between the load value it takes in a factor needed to be 0.10 and more.

On the data collected in the research study, first factor analysis and then item analysis were made in relation with the validity analysis of the scale. When the data for "Total Variance Explained" and "Commonalties" were examined, the differences between the load values of 4 items in 20 were found to be lower than 0.10 and one item had a factor load value below 0.40 and therefore they were taken out of the scale. The remaining items were analyzed a second time.

A new analysis was done and it was observed that of the analyzed K=15 items (variables) were collected under 3 factors with self values greater than 1. The total variance explained by these three factors in relation to the scale is % 52.6. The common variances (communalities) of the three factors defined for the items ranged between 0.336 and 0.709. Accordingly, the three factors that came to the front as important factors in the analysis explain the majority of the total variance in the items as well as the variance of the scale (α=0,851).

The number of important factors in the analysis was defined as three according to the self value measure. This is also apparently seen in Figure 1, which is plotted based on the self values.

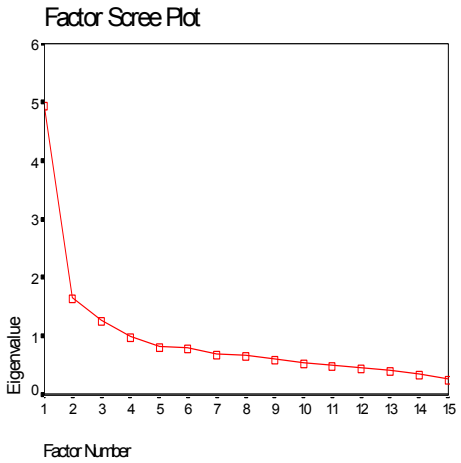

Figure 1. Graphic showing the number of factors versus self values

In the graphic, a high accelerated drop is observed after the first factor. This indicates that the scale may have a general factor. On the other hand, although less, an accelerated drop is also observed in the graphic after the second and third factors, which leads to the idea that the scale can be three-factored. In the forth and consequent factors, the general trend of the graphic is horizontal and an important drop tendency is not observed. This means that the contributions of the third and consequent factors to the variance are close to each other.

When the "Component Matrix" data are examined, it is seen that the first factor load values of all the 15 items are 0.443 and above. This finding indicates that the scale has a general factor. The fact that the variance caused by the first factor before the rotation is 33% is another evidence of the existence of a general factor. However, when the factor rotation results (Rotated Component Matrix), which also enable the defining of the three factors in terms of the items they contain, are examined, it is understood that items 9, 12, 10, 8, 14, and 15 higher results in the first factor, items 1, 2, 3, and 6 in the second factor and items 20, 16, 17, 4, and 7 in the third factor. Of the factor load values, the factor load value of item 18 is lower than 0.45. However, items 5, 11, 13 and 19 have relatively higher load values in all the three factors, but the difference between them is lower than 0.10. Having high load values in both factors, items 5, 11, 13 and 19 were excluded from the scale.

The Global Environmental Awareness Scale is three-factored. of the factors identified important, the first one explains 33% of the total variance related to the scale, the second one 11.1%, and the third one 8.5%. The total variance explained by the three factors is 52.6%.

After factor rotation, it was found that the first factor consisted of six items, the second consisted of four items and the third one consisted of five items. The factor load values of the items in the first factor vary between 0.766 and 0.576. The same values vary between 0.837 and 0.590 for the items in the second factor and between 0.729 and 0.406 for the items in the third factor. The factors were tried to be named after the contents of the items. Considering that all the items in the first factor are related to the **"Solution of the Global Environmental Problems,"** this factor was called the **"Attitude Scale on the Solution of Global Environmental Problems"**. Considering that all the items in the second factor are related to the **"Educational and Training Mediums That can Contribute to the Solution of Environmental Problems,"** this factor was called the **"Attitude Scale on the Contribution of Chemistry Education to the Solution of Global Environmental Problems"**. Considering that all the items in the third factor are related to the **"Importance of Cooperation in the Solution of Environmental Problems,"** this factor was called the **"Attitude Scale on the Solution of the Global Environmental Problems in Cooperation"**.

The scale is one-factored at the same time. In other words, the fact that the first factor load values of the items before the rotation is high as well as that the variance it explains on its own is high show that the scale also has a general factor. Therefore, the **global environmental awareness scale** is suitable to be used as one-factored in addition to being three-factored.

APPLICATIONS IN COMPUTER ASSISTED CHEMICAL EDUCATION

The intensive courses applied 15 hours a week for two weeks on the participating students in the chemistry education internet class can be summarized as follows. The students were first put into teams of four. Then, a working calendar was prepared and the practices that the teams would carry out were explained (Morgil et al., 2004). The students were first shown the PowerPoint Presentation "Green Chemistry" prepared jointly by the "American Chemical Society", "Royal Society of Chemistry", and "Gesellschaft Deutscher Chemiker" (www.acs.org), and then researched how technology affects scientific perception and success and the importance of technology on the web. The students researched modular chemistry education examples related to environment. Here, the NOP-Project on sustainable organic chemistry was discussed with the students and each team was asked to learn the arrangements related to environment protection in the experiments (75 experiments) given within the framework of the project (www.OC.Praktikum.de). In the internet research they conducted, the students have found resources on "Green Chemistry Education" prepared by the IUPAC (Tundo et al., 2001).

Again through their internet research, the students have learned that The Interuniversity Consortium "Chemistry for the Environment" (INCA) was established in 1993 (Tundo et al. 2002). Being an organization supported by the OECD and IUPAC, INCA makes contributions to the protection of the environment. Internet studies on globalization and global environment-related issues were also carried out with the students using various resources.

(http://iied.edfac.usyd.edu.au/iied/teaching/global.html,http://webtools.cityu.edu.hk/news/newslett/globalization.htm, http://ssn.flinders.edu.au, Cornoy M., Higher Education in a Global Innovation Economy, www.chet.org.za/debates/310798c.html, Courtivron I., (2000). Within the scope of this study, when the knowledge levels of economy department students, in whose curriculum the subject of globalization exists, is compared to the chemistry education department students, who has received technology supported education on globalization and the global environment, although these topics are not within their curriculum, it has been found that using technology affects the accumulation of knowledge. Using technology in research affects the global environment awareness of students (Morgil, O., 2004).

TEST PROCEDURE

The Global Environmental Awareness Scale and the Attitudes towards Technology Attitude Scale were applied to a total of 64 students as a pretest. The students were given 45 minutes for this process. After the students have completed the above mentioned intensive course practice in the chemistry education internet class for two weeks as 15 hours they chose for a week, the same Global Environmental Awareness Scale and the Attitudes towards Technology Scale were given to the students for them to answer as a post test. The objective here is to investigate how and to what degree the use of technology affects Global Environment Analysis.

RESULTS

Regression analysis and paired-sample t-test were carried out within the scope of this study in order to find out to what level technology use contributes to the development of global environment awareness and identify that computer aided education is related to the formation of global environmental awareness and attitudes towards the use of technology. The results obtained through these analyses are discussed below. The results of the t-test carried out to find the significance of the difference in the mean scores from the pretest and post test of the Global Environmental Awareness Scale are given in Table 1.

Table 1. The Comparison of pretest and post test mean scores of the Global Environmental Awareness Scale

Measurement	N	Mean	Standard Deviation	df	t	sig.
Pre Test	64	61.94	3.29	63	-14.623	0.000
Post Test	64	67.97				

Following the researches of the students about global environment awareness on the internet, it has been found that the use of technology provides a significant increase on attitudes towards global environmental awareness. As a consequence of the researches of the students on the internet about the issue of global environment and the homework they prepared, a significant increase in their scores in attitudes towards global environment has been identified [$t_{(63)}$= -14.623; p<0.01]. While the average global environment-scale scores of the students were 61.94 before the activity, this figure increased to 67.97 after the internet practice. This finding revealed that internet practices increase global environment awareness and that this increase is statistically significant.

The results of the t-test carried out to find the significance of the difference in the scores of the pretest and posttest of the Technology Attitudes Scale are given in Table 2.

Table 2. The Comparison of the Technology Attitudes Scale Pretest and Posttest Average Scores

Measurement	N	Mean	Standard Deviation	df	T	sig.
Pre Test	64	74.62	5.30	63	-10.571	0.000
Post Test	64	81.63				

As a consequence of the researches of the students on the internet, a significant increase in their scores in attitudes towards technology has been identified [$t_{(63)}$ = -10.571; p<0.01]. While the average of the technology attitude scores of the students was 74.62 before the activity, this figure increased to 81.63 after the internet practice. In fact, when it is considered that the maximum score that should be obtained from this scale is 95, it cannot be asserted that the students had negative attitudes towards the use of technology even in the beginning. However, it has been observed that the implemented practices have improved these positive attitudes even more. This finding revealed that internet practices increase attitudes towards technology and that this increase is statistically significant.

The pretest regression analysis results on to what level the attitudes of the students towards technology predict their attitudes towards the issue of global environment are shown in Table 3.

Table 3. The pretest regression analysis results on to what level the attitudes of the students towards technology predict their attitudes towards the issue of global environment.

Variables	B	Std. Error	β	T	p
Constant Technology	68.512	7.318		9.363	0.000
	-8.8E-02	0.098	-0.114	-0.904	0.370
R= 0.114	R^2= 0.013				
$F_{(1, 62)}$= 0.816	p=0.370				

When the results of the analysis is examined, it is seen that the pretest scores for attitudes towards technology are not a significant predictor of the pretest scores for global environment awareness [R=0.114; R^2=0.013; F=0.816; p>0.01]. There is not a meaningful relation between the pre-attitudes of the students towards technology and their pre-attitudes towards global environment awareness. Table 4 shows the results of the post test regression analysis on to what level the attitudes of the students towards technology predict their attitudes towards the issue of global environment.

Table 4. The results of the post test regression analysis on to what level the attitudes of the students towards technology predict their attitudes towards the issue of global environment

Variables	B	Std. Error	β	T	P
Constant	87.407	9.700		9.011	0.000
Technology	-0.238	0.118	-0.247	-2.011	0.049
R= 0.247		R^2= 0.061			
$F_{(1, 62)}$= 4.043		p=0.000			

The results of the analysis show that attitudes towards technology are a meaningful predictor of attitudes towards global environment awareness [R=0.247; R^2=0.061; F=4.043; p<0.01]. There is a highly significant relation between the attitudes of the students towards technology and their attitudes towards the global environment.

DISCUSSION AND SUGGESTIONS

The changes in the society related to the developments in science and technology underline the importance of the need for education. Concepts that have been common in the recent years such as the new world order, globalization, opening to the world and the technology, reconstruction are among the popular definitions used to describe the post industrialization information societies. When the roots of these definitions are examined, it is seen that the concept of knowledge and the use of technology in educational and training environments have an important decisive role. Information's gaining such a significance forces the structure, functioning, management, programs, and in short, all organization of the educational institutions, which are among the important centers where information is produced and distributed and ones that use various technological opportunities to make this distribution as effective as possible, to change.

In order to be able to adapt to the rapid developments in our country and in the world, there is a need to improve the educational system in Turkey to the contemporary level and make it in conformity with the requisites of the time. Awareness should be created among individuals on the educational technologies that are to be used to reach the present-day level and they should be informed about their environment friendly utilization. To do this, how individuals look at the issue of global environment and the use of technology as well as their related feelings and thoughts, and the issue of how the use of technology in educational and training environments will change global environment awareness should be known. The affective properties listed above can only be measured through attitude scales.

In the study, the relation between the newly developed global environment scale and the technology attitude scale developed by Yavuz (2004) have been examined to investigate if there is a difference between the pretest and posttest results of the global environment awareness scale and the pretest and posttest results of the technology attitude scale. The activities that the students carried out on the internet medium revealed a statistically significant increase in their scores for attitudes towards technology [$t_{(63)}$ = -10.571, p<0.01]. Computer aided training realized during the pretest/posttest practices of the Global Environment Awareness Scale has made a significant contribution to the enhancement of the global environmental awareness. A statistically significant increase in the students' scores in attitudes towards global environment awareness was observed at the end of the researches that the students carried out on the internet medium about global environment and the homework and activities they prepared [$t_{(63)}$= -14.623, p<0.01].

In their study to measure the knowledge on and attitudes towards global environment of the students of chemistry education and the students in administrative and economic sciences, Morgil O. et al. (2004) found that chemistry education department students responded with higher success levels about the subject of globalization than the students in economy department, where the subject of globalization is within the curriculum. The students with higher average responses are those who carry out various research activities about the subject of environment on the internet medium, although globalization is not included in their educational programs as a subject.

Attitudes lead to the success or failure of the educational process. Attitudes towards global environment and technology have a role in providing the active participation or pacification of the students in relation to these issues. The achievement of significant increases in the averages of both attitudes show the motivating effect of computer aided education on student attitudes. Because, the students thus obtained information about the global environment, environmental problems, possible measures, and how and in what ways technological improvements can harm the environment and benefited from the ease of access to this information in the computer medium as well as the efficient and effective use of time.

Another significant result of the study is that despite the widespread understanding that the utilization of technology harms the environment, as a result of the activities carried out on the internet medium, the students have seen that the conscious use of technology according to rules will not lead to any harm to the environment. Because, as a result of the computer aided activities, the students became more sensitive about the environment, learned more about the topic, and consequently, an increase was obtained in their attitudes towards the global environment. Similarly, as a result of computer aided researches and investigations carried out about technology, on its application areas, application types, interactions with the environment and harms it can give to the environment when wrongly used, the benefits that can be obtained when it is used with conscious, a significant increase have also been achieved in the students' attitudes towards technology. In fact, the examination of the data show that the average attitude scores of the students towards technology and the use of technology are not low ($X_{ort.}$= 74.62). The significant increase contributed to this upon the application is an indication of the fact that the activity carried out was in line with the objective. Thirdly, the answer to the question to what level the attitudes towards the use of technology predict global environment awareness was looked for in the study and it has been found that technology attitudes significantly predict the attitudes towards global environment awareness. Attitudes towards the use of technology explain the 6% of the total variance about the global environmental attitudes. The remaining 84% portion is predicted by other factors. The regression equation for the prediction of the global environment attitudes by the technology attitudes as per the results of the regression analysis is given below.

Attitudes towards Global Environment = 87,407 – 0.238 technology attitudes

From now on, countries have to think more global when they are establishing their educational systems and implementing new policies and raise qualified people that can compete in the global market. The internet technology that emerged parallel to the rapid developments in information technologies has deeply affected economy, education, environment, environment-related consumer behaviors, and our lives. With the dissemination of internet use, people have experienced the opportunity to share their accumulation of knowledge, thoughts, and what they wonder in the virtual environment as well as the comfort of being able to access the right information easily and fast. Thus, in this information age the human being has found the opportunity to learn things and to develop himself/herself to be useful continuously throughout life and to benefit from his/her surrounding. In the information society, the educational opportunities that countries present to their citizens are directly related to the resources and investments in this field.

The following suggestions can be made in light of the data obtained through this study:

- Obtaining correct and current information must be attached importance to,
- Globalization in the fields of education, environment, and technology fields must be attached importance to, as in all other fields,
- The developments in the informatics sector should be adapted to and the related developments should be closely monitored,
- The awareness of environment protection should be improved via computer aided education,
- Since environment and technology are both vital elements of life, these should not be the problem of only those working in the fields of environment and technology and technology workers should support environment and environment protection and environment workers should support technology, the conscious use of technology, and its benefits as well,
- Correct and healthy awareness should be created among individuals about environmental and technological issues and the related attitudes of the individuals should be measured to look for ways to change negative attitudes to positive ones,
- In a world where learning of correct and current information throughout life is inevitable, computers should be made usable in all fields of education,
- Conscious use of technology should be taught to individuals starting from the primary education level and if it is possible that a technology can harm the environment, the students should be made aware of it and be enlightened. Awareness should be created among students by including technology and environment relations in the curricula topics, and the internet should be utilised to obtain information on environment and environment protection,

When we consider the fundamental properties of the information society, we see that technology, globalization, and environmental awareness are an undividable trio. When this is considered, the results of the study are striking. Chemistry educators have more important duties in this. The first is that the profession of teaching, which has the human in its center and is among the most important professions in relation to globalization, will play a very important role. The second is that since globalization and global environment awareness is of question in relation to the environment, and since chemistry is one of the most important environment-related sciences, this issue should be of special concern to chemistry educators. Globalization cannot be achieved

without having the conscious use of technology implemented and the technological opportunities brought up to a certain level developed. Therefore, when considering globalization as a concept intermingled with technology, the importance of educational services comes to the surface in making them in conformity with the system, as it does in all fields. All sciences have a share within this requirement. When looked at from the angle of the science of chemistry, the consideration and development of environmental awareness within the process of globalization, and acknowledge of the fact that this development can be even further enhanced by computer aided education is a reality that should be accepted by all now. When the creation of some concepts is realized in school environments, the development of related knowledge levels and their implementation become much easier. Because, the school environments' high possibility of realizing planned, programmed, and required behaviors is accepted by all experts. The ways to utilize computers in all stages of education and training should be found out and educators should be equipped enough to provide computer based education. To put it in a nutshell, the education system in our country should be enhanced to the contemporary level and be implemented as required by the age in order to adapt to the rapid change being experienced in our country and in the world. This study supports this aspiration in that works on the mediums of computer and the internet significantly increase attitudes related to the global environment and attitudes towards the use of technology that supports it.

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