



IMPLICATIONS FOR A GREEN CURRICULUM APPLICATION TOWARD SUSTAINABLE DEVELOPMENT

SÜRDÜRÜLEBİLİR KALKINMAYA YÖNELİK YEŞİL BİR MÜFREDAT UYGULAMASI İÇİN GÖSTERGELER

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ABSTRACT: The aim of present study was two-fold: (1) to determine university students' familiarity and understandings of 'sustainable development', (2) to examine their attitudes toward sustainable development, environmental values, and their behaviors toward sustainable life styles. The data collected by on-line administration of a questionnaire to 958 university students during February-June of 2008 were analyzed by using descriptive statistics. The results reflected that majority of the participants declared themselves familiar with the term of sustainable development, but they could not develop a sound understanding as a holistic concept. It was also found that university students had favorable attitudes toward sustainable development and intrinsic values toward the environment. However, these participants did not readily take some radical actions in order to create a more sustainable future.

Keywords: sustainable development, attitudes, environmental values, behaviors toward sustainability

ÖZET: Bu çalışmanın amacı iki basamaktan oluşmaktadır: (1) üniversite öğrencilerinin sürdürülebilir kalkınma üzerine anlayışlarını belirlemek; (2) sürdürülebilir kalkınmaya yönelik tutumlarını, çevresel değerlerini ve sürdürülebilir yaşam biçimlerini destekleyen davranışlarını incelemektir. Hazırlanan ölçüm aracının Şubat-Haziran 2008 döneminde toplam 958 üniversite öğrencisine uygulanmasıyla toplanan veriler betimsel istatistik kullanılarak analiz edilmiştir. Sonuçlar, katılımcıların çoğunun sürdürülebilir kalkınma terimine aşina olduklarını belirtmelerine rağmen sürdürülebilir kalkınmaya yönelik bütüncül bir kavram olarak güçlü bir anlayış geliştiremediklerini yansıtmaktadır. Sonuçlara göre, üniversite öğrencileri sürdürülebilir kalkınmaya yönelik olumlu tutumlara ve içsel değerlere sahiptir. Ancak, katılımcılar sürdürülebilir bir gelecek için gerekli radikal davranışları yerine getirmemektedirler.

Anahtar sözcükler: sürdürülebilir kalkınma, tutumlar, çevresel değerler, sürdürülebilirliğe yönelik davranışlar

1. INTRODUCTION

Education for sustainable development (ESD) has been viewed as an important agent which will ensure the livability and beauty of nature while increasing the quality of life for all people (Sutton, 2004). With this point of view, the focus on ESD has been mounted up in recent years. A worldwide action plan, Agenda 21 which was accepted in the Earth Summit (United Nations Conference on Environment and Development [UNCED], 1992) proposed that 'education is critical while promoting sustainable development and improving the capacity of human beings to address sustainability issues'. In addition, Agenda 21 (UNCED, 1992) encourages economic and social development while ensuring environmental protection by all levels of formal and non-formal education which integrates related issues into all disciplines. In a later document, namely Johannesburg Declaration, the crucial role of education to achieve sustainability goals was also highlighted at the World Summit on Sustainable Development (WSSD) in 2002 (WSSD, 2002).

In the light of this international consensus on ESD, institutional willingness and commitment to infuse ESD into higher education programs has become a current issue (SQW Ltd, 2006). Since, it was advocated that present educational orientations are more likely to encourage the detrimental characteristics of our recent systems than to meet the needs of the future generations (Berry, 1999; Sterling, 2001). In this aspect, United Nations Decade of Education for Sustainable Development has

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reinforced academicians to make some radical changes which will enable higher education institutions to enact their responsibilities for creating a better and self-sustainable world for the future generations (United Nations, 2003). To be more specific, a higher education institution could be regarded as the major facilitator which enables its graduates to develop the necessary knowledge, values, and skills in order to engage in activities that will improve the quality of life now and without damaging the planet for the future (Haigh, 2005).

One of the European documents which focused on ESD was proposed by COPERNICUS, the Cooperation Programme in Europe for Research on Nature and Industry through Coordinated University Studies. Following the recommendations stated in Agenda 21, 'COPERNICUS Campus' was an education agenda which covered some guidelines for sustainable development in the European Higher Education Area with support of European Commission (COPERNICUS, 2005). COPERNICUS Campus addressed that higher education sector fulfills a central position in ensuring a future society that can cope with the complexities of globalization. There are totally 328 universities from 38 different European countries which have signed 'COPERNICUS Campus' requirements. The developing countries including Turkey are at the primitive stage in fulfillment of these requirements covering the integration of related sustainability issues into all disciplines. At this point, The Copernicus guidelines might also assist higher education institutions by providing some simple steps to meet the challenges of incorporation principles of sustainable development into higher education system. These steps which aimed to get the implementation of strategic goals begins with doing a gap analysis on the elements of sustainability already in the curriculum, campus, community, and culture (COPERNICUS, 2005). In this aspect, it is crucially important to acquire some background information on university students' already existing knowledge on sustainable development, how they feel about sustainable development, and what they actually do to create a sustainable future.

The literature review in the field of education for sustainable development has pointed out that there are limited numbers of research studies on sustainability-related variables. These research studies (Azapagic, Perdan & Shallcross, 2005; Kagawa, 2007; Summers, Corney & Childs, 2004) indicated that university students did not acquire a satisfactory level of knowledge and understanding of sustainable development and there existed significant knowledge gaps with respect to two aspects (social and economic) of sustainable development. However, the survey conducted by Kagawa (2007) showed that the university students had favorable attitudes toward sustainable development. These research studies conducted mostly in developed countries such as United Kingdom have forced these countries to infuse some principles of sustainable development into their curricula. However, the literature review indicated an urgent need to perform a gap analysis in the higher education institutions of developing countries. In this aspect, the present study highlights the potential concerns which could be faced with on the integration process of sustainable development into higher education institutions. In other words, the current study fills an important gap at the primitive stage in creating green curriculums toward sustainable development.

The following research questions guided the present study:

1. How familiar are Middle East Technical University students with the term of 'sustainable development', and what are their understandings of 'sustainable development'?
2. What are Middle East Technical University students' attitudes toward sustainable development, environmental values, and their behaviors toward sustainable life styles?

2. METHOD

2.1. Sample

The sample of this study was constituted from 958 Middle East Technical University (METU) students in Turkey. Looking at the participants' faculties, the rate of participation was highest for Faculty of Engineering students (N=341 (35.6%)), while minimum rate of participation belonged to the students from Faculty of Architecture (N=48 (5.1%)). The rates of participation from the Faculty

of Arts and Sciences, the Faculty of Education, and the Faculty of Economic and Administrative Sciences were 19.1% (N=183), 14.7% (N=141), and 12.0% (N=115), respectively. Concerning the participants' distribution with respect to graduate schools, a total of 26 (2.6%) students from Graduate School of Social Sciences participated in this study. However, there was only 1 (0.1%) student from Graduate School of Applied Mathematics who participated in this study. The rate of participation from Graduate School of Informatics and Graduate School of Natural and Applied Sciences were equal to each other (N=8 (0.8%)). The number of participants who did not state their program was 87 (9.1%). This distribution of participants with respect to faculties and graduate schools indicated the consistency between the population of METU students and the sample participated in this study. Looking at the frequency distribution with respect to participants' grade level and sex, 66 students (6.9%) were from English preparation classes, 593 students (61.9%) were enrolled in an undergraduate program, and 252 students (26.4%) were enrolled in a graduate program at METU. The number of female participants was higher than that of males (479 females (50.0%); 448 males (46.8%)). On the hand, 31 students (3.2%) did not label their grade level and sex.

2.2. Instrument

Regarding the primary purpose of the current study, the researchers prepared 'A Questionnaire on University Students' Views of Sustainable Development' (QUSVSD) that consisted of 4 dimensions on sustainable development, namely, understanding of sustainable development, attitudes toward sustainable development and its different aspects (economic, environmental, social), behaviors toward sustainable life styles, and environmental values. Considering the domain on students' understanding of sustainable development, there were 3 items which were designed to determine university students' familiarity with the term of 'sustainable development' and their current understandings of this term. Two of these items were adopted into Turkish from a questionnaire prepared by Kagawa (2007). The last one in multiple-choice format was originally developed by the researchers in accordance with the different political perspectives for 'sustainable development' which were stated by Dresner (2002). The items in the attitudinal domain were originally developed by Kagawa (2007) and aimed to assess university students' attitudes toward sustainable development from a holistic perspective with one item in multiple choice format, and attitudes toward different aspects of sustainable development (economic, environmental, social) with 13 items in 5-point Likert type. University students' behaviors toward sustainable life styles were evaluated through 14 items in rating scale (always, frequently, sometimes, rarely, never) which were adapted from a questionnaire prepared by Mertig (2003). The domain on environmental values constituted from 9 items in 5-point Likert type which were originally used in World Values Survey (Inglehart et. al, 2002).

The items used in QUSVSD were carefully translated and adapted into Turkish by taking into consideration of Turkey's social, educational, ecological, and cultural context. In addition, wording of the statements in attitudinal items were examined with respect to Edward's criteria (Crocker & Algina, 1986). For content validity concerns, the original and translated items were given to two professors who were experts on education for sustainable development. Each sub-item was evaluated and revised utilizing the responses and reactive comments of these colleagues until 90% agreement was reached among them. This helped to eliminate ambiguities in items and unfamiliar terms. Additionally, two instructors from the Department of Foreign Languages checked the adaptation of the questionnaire into Turkish before the questionnaire was piloted and implemented.

To estimate the internal consistency of the questionnaire, Cronbach's alpha values were calculated for three domains. Cronbach's alpha for items on the domain of 'attitudes toward different aspects of sustainable development' was calculated as 0.71, for the items on 'behaviors toward sustainable life styles' domain as 0.86, and for the items on 'environmental values' domain as 0.77.

2.3. Procedure

After preparation of the measuring tool, due to possible ethical concerns, the items were examined by some experts at Middle East Technical University Human Research Ethics Committee. This online questionnaire was administered to undergraduate and graduate students of this university during February-June of 2008. The participant students were also informed about purpose of the study with the introductory part of the questionnaire.

2.4. Data Analysis

The means and standard deviations of the variables were calculated in order to show participants' attitudes toward different aspects of sustainable development, their values toward the environment and behaviors toward sustainable life styles. In addition, frequencies of participants' responses to some items such as familiarity with the term of 'sustainable development', keywords related to the term of 'sustainable development', and attitudes toward sustainable development were calculated and presented by bar graphs.

3. RESULTS

3.1. University Students' Familiarity and Understandings of Sustainable Development

The students were asked about their familiarity with the term of 'sustainable development'. Figure 1 showed that more than one-third of the students who responded QUSVSD online (36.2%) declared themselves 'very familiar' with the term of 'sustainable development'. Furthermore, more than one-fourth of the participants (28.5%) identified themselves 'quite familiar' with this term. On the other hand, the rate of participants who reported that they were either 'quite unfamiliar' or 'not at all familiar' with this term were 14.4% and 20.9%, respectively.

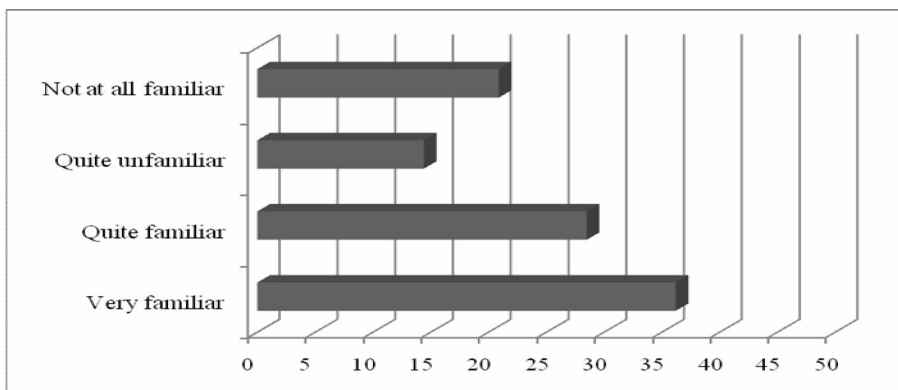


Figure 1: The Percentages on University Students' Familiarity with the Term of 'Sustainable Development'

The participants who identified themselves as familiar with the term of 'sustainable development' were examined about the definition of this term. Most of these participants (76.3%) viewed sustainable development as '*development which meets the needs of the present without comprising the ability of future generations to meet their own needs*'. On the other hand, 10.3% of these participants defined this term as '*development which sustains the provision of goods and services as well enhances of their quality over the long term*'. The rate of participants who identified 'sustainable development' as '*development which aims to protect nature and our natural resources in order to overcome 'ecological crisis' that we face*' was 7.7%. A small percentage of participants defined this term as '*development which meets the needs of society for both long and short term*

without concern for environmental protection' (2.7%) or 'development which allows individuals to live according to their own views of what constitutes a good life' (3.1%).

To gain an insight for the university students' understandings of sustainable development, the participants were asked to write up some keywords related to this term. The participants suggested totally 1794 keywords which reflected their personal understandings of sustainable development. Table 1 presented some examples of keywords suggested by these students and the broader categories which these keywords fell into. These categories were also outlined in the Kagawa's work (2007). Observed frequencies of these categories with respect to participants' identifications for sustainable development were presented in Figure 2. The results revealed that 46,2% of these keywords were related to environmental aspect of sustainable development. On the other hand, social (7,8%) and economic (5,4%) aspects were only mentioned by less than one-tenth of the participants. Similarly, observed frequencies of all other categories fall under 10 percent of the suggested keywords by the participant students. The findings of this analysis reflected that the participants could not develop a sound understanding of sustainable development.

Table 1: Categories which the Keywords Suggested by University Students Fell

Categories	Examples
<i>Aspects</i>	
Environmental	Recycle, green, environment, biodiversity
Social	People, quality of life, social
Economic	Economy, production, trade
<i>Temporal</i>	
The future	Future generations, needs of future, future
Long-term	On-going, long-term, continuation
Improvement	Growth, progress, improvement
Stability	Consistent, stable
<i>Approaches toward sustainable development</i>	
Governance, policy, politics	Capitalism, government
Learning and action	Awareness, education
Management	Manage, plan, prevent, control, maintain
Technology, building, and design	Technology, eco-design
Homeostasis	Balance, cycle
Human attitude	Responsibility, selfishness, ethical, well-being
<i>Scale/Level</i>	
Local	Local
Global/international	Worldwide
<i>Perceptions of sustainable development</i>	
Feelings	Positive, necessary, impossible

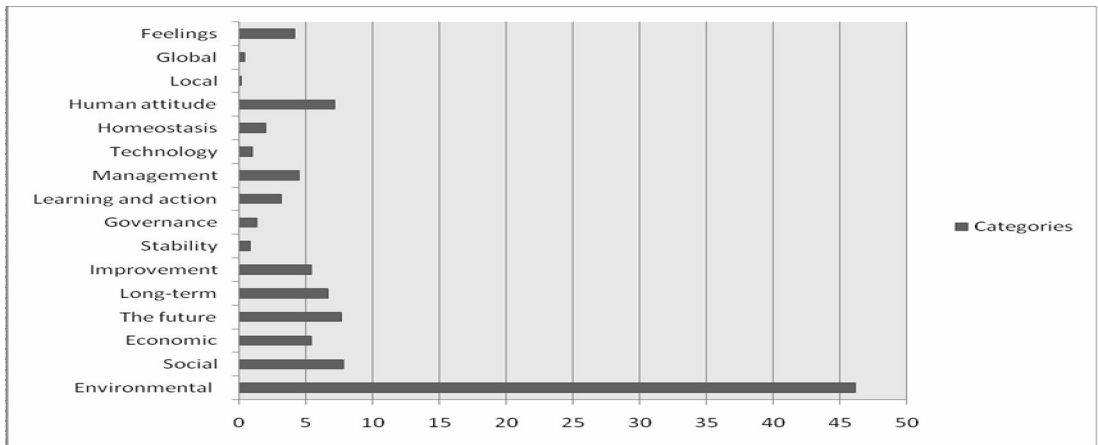


Figure 2: Frequency of Categories with respect to University Students' Identifications

3.2. University Students' Attitudes toward Sustainable Development

The participants who declared themselves as familiar with the terms of 'sustainable development' were also asked about their attitudes toward sustainable development. As presented in Figure 3, majority of these students indicated favorable attitudes toward sustainable development. More than half of these participants (58.4%) reported that it is 'a good thing'. Furthermore, approximately one-third of these participants (34.5%) identified themselves as 'a passionate advocate' of sustainable development. The rate of these participants indicated a neutral statement; 'It is OK if others want to do it' was only 3.6%. Additionally, a small percentage of students (1.3%) reported their non-commitment toward sustainable development with an agreement to the statement of 'I am not really bothered'. The percentage of participants who agreed with the statement of 'I think it is a waste of time and effort' was 2.2%, showing their negative attitudes.

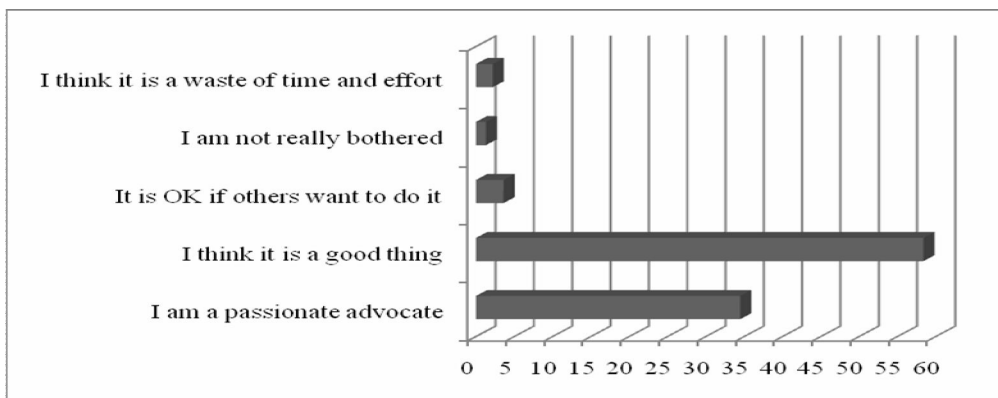


Figure 3: University Students' Attitudes toward Sustainable Development

In order to determine participants' attitudes toward different aspects of sustainable development, the percentages, means, and standard deviations of the university students' responses were calculated through descriptive statistics. The mean score of 4.05 over 5 (S.D=0.41) on total attitudinal domain reflected participants' favorable attitudes toward sustainable development.

Regarding different aspects of sustainable development, the mean score of 4.19 over 5 with a standard deviation of 0.59 showed that participants developed feelings of concern on environmental deterioration and had favorable affects on environmental issues. Figure 4 presented the percentage of university students' responses to examples of attitudinal items on environmental aspect of sustainable development. It was found that most of the participants agreed with the statement related to rights of

plants and non-human animals (90.9%). Similarly, more than 80 percent of the participants agreed that we should change our life styles in order to offset the danger of climate change. The frequency analysis also reflected that most of the participants were aware of the ‘ecological crisis’ that humankind face with (79.2%), and limited natural resources for future generations (71.3%).

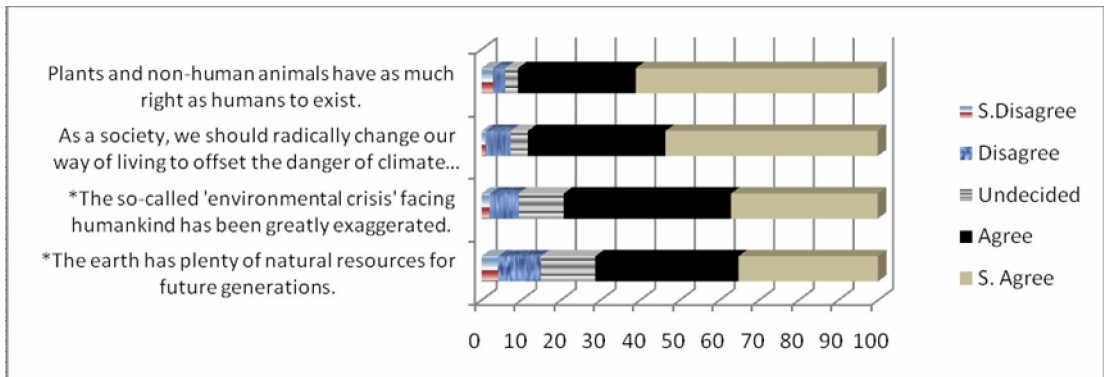


Figure 4: University Students' Attitudes toward Environmental Aspect

**Reversed item*

Looking at the economic aspect of sustainable development, the mean score of 3.65 over 5 (S.D=0.51) reflected that these participants could not develop strong feelings of concern toward economic aspect of sustainability issues. As it was shown in Figure 5, most of the participants (77.9%) believed contribution of environmental protection to economic growth by creating jobs, and with a similar high percentage (69.9%) they agreed with the necessity to care about using home products. However, relatively large percentage of participants (25.8%) was uncertain about using private cars. These students' ideas were also divided when it comes to necessity of economic growth for environmental protection.

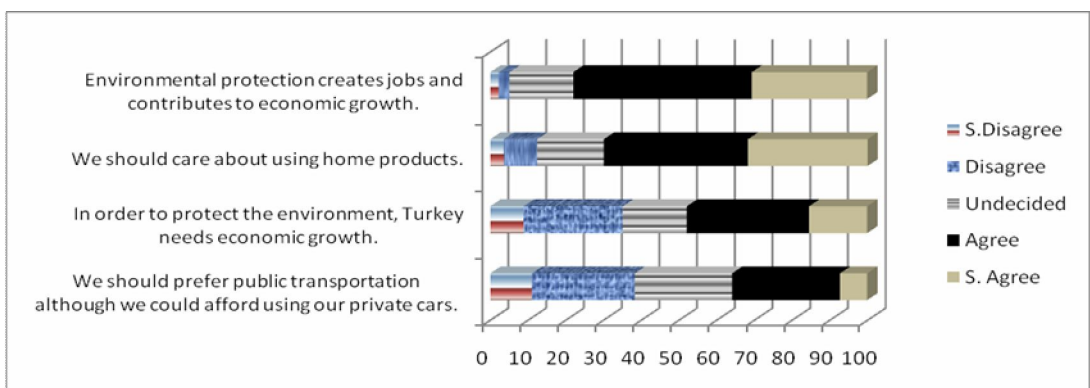


Figure 5: University Students' Attitudes toward Economic Aspect

Concerning the social aspect of sustainable development, the mean score of 4.48 over 5 (S.D=0.54) indicated participants' strong desires and affects toward sustainable social life styles. As Figure 6 presented, more than 90 percent of participants supported the idea that a city should ensure socially inclusive public transportation (98.2%). Similarly, majority of the participants agreed with the statements that cultural diversity should be strongly supported (88.3%) and we should learn from cultures where people live harmoniously with nature (90.6%).

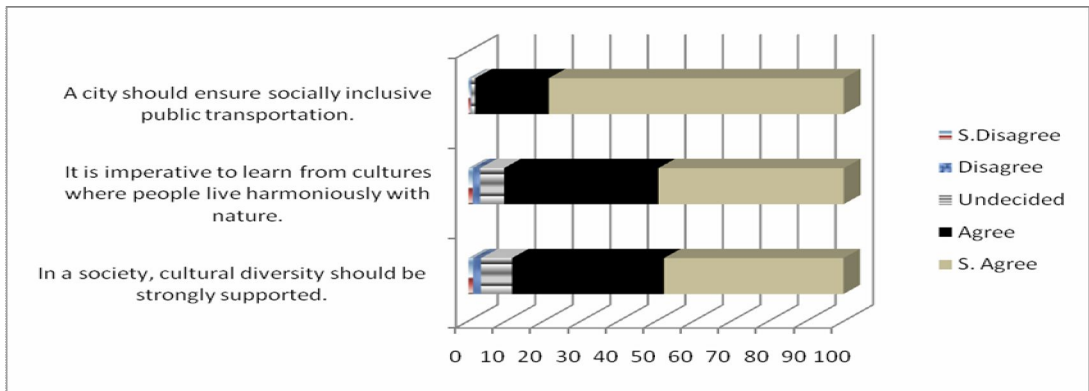


Figure 6: University Students' Attitudes toward Social Aspect

3.3. University Students' Environmental Values

Examining participants' environmental values, the mean score of 4.12 over 5 (S.D=0.55) indicated that the participants' developed favorable intrinsic values toward the nature, and did not support the dominance of human beings on nature. As it was presented in Figure 7, majority of the participants agreed with the statement that humans have moral duties and obligations to other animal species (86.0%) or plants (79.9%). Furthermore, more than half of the participants indicated that humans should adapt to nature rather than modify it to suit them (73.0%). With a similar large percentage (71.0%), participants reported that we do not have the right to alter nature to satisfy wants and desires.

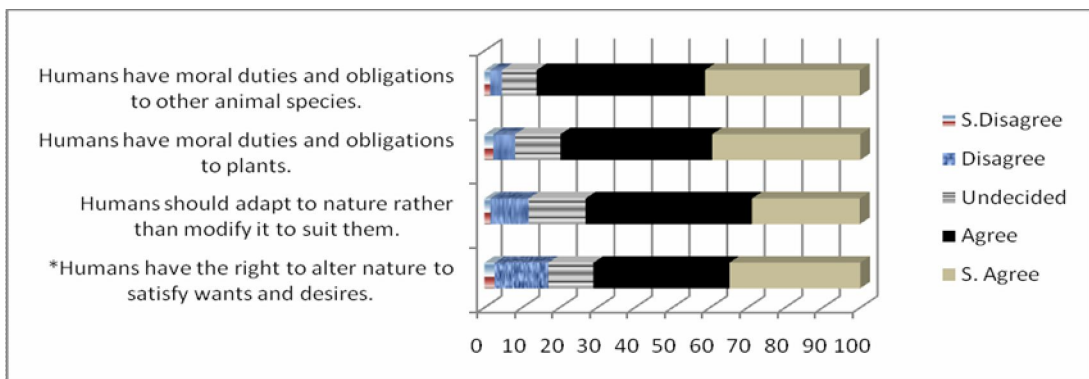


Figure 7. University Students' Responses to Some Items on Environmental Values

*Reversed item

3.4. University Students' Behaviors toward Sustainable Life Styles

Looking at participants' behaviors toward sustainable life styles, the mean score of 3.51 over 5 (S.D=0.60) showed that participants were not readily taking the necessary actions toward a more sustainable life. The results of frequency analysis reflected that the participants did not show the same tendencies while taking some actions toward different sustainability concerns (Figure 8). To be more specific, these students had more favorable behaviors to save energy and water, but they were not prepared to take political actions regarding environmental issues or consider politicians' attitudes toward environmental degradation. For instance, majority of these students' reported that they frequently or always made an effort to use less water when brushing their teeth and bathing (87.6%),

while a small percentage of participants (8.7%) declared that they frequently or always attended a protest march or demonstration for environmental reasons. In addition, only 47.0% of the participants reported that they frequently encourage others involved in a destructive environmental behavior to stop that activity. The results also revealed that more than half of the participants had changed their purchasing habits by choosing locally produced foods rather than imported products (59.1%).

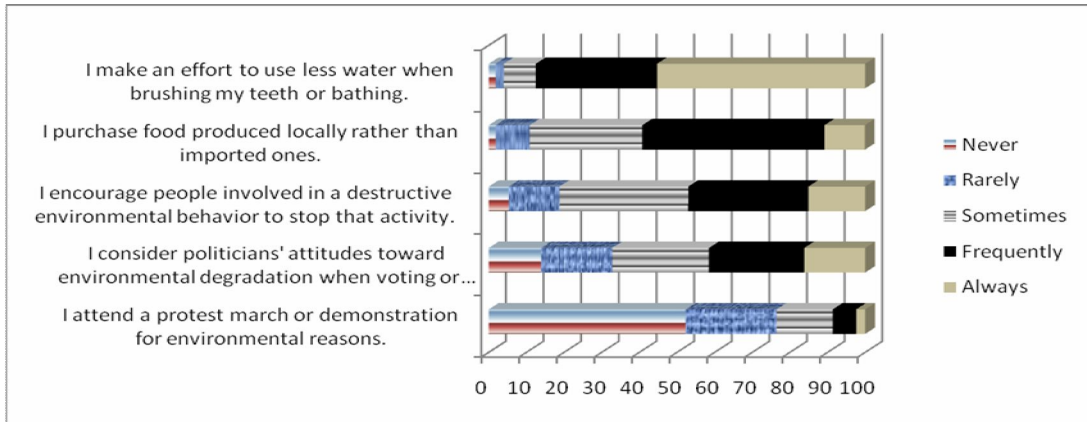


Figure 8: University Students' Behaviors toward Sustainable Life Styles

4. DISCUSSION

The present study aimed to determine university students' familiarity with and understandings of sustainable development in a developing country. Furthermore, attitudes toward sustainable development, environmental values, and behaviors toward sustainable life styles of the university students were examined. The results of the current study showed that university students identified themselves as familiar with the term of 'sustainable development'. Furthermore, these students declared 'sustainable development' as '*development which meets the needs of the present without comprising the ability of future generations to meet their own needs*' which has become a widely known definition after its report in Our Common Future (WCED, 1987). However, participants' awareness for the standard definition of this term may not mean that these students have developed a sound understanding of complex and multi-faced nature of sustainable development.

In fact, the present study revealed that the university students did not hold an adequate understanding of 'sustainable development'. Consistent with the other studies (e.g Alkis & Ozturk, 2007; Azapagic, Perdan & Shallcross, 2005; Kagawa, 2007; Summers, Corney & Childs, 2004), there exist some knowledge gaps in university students' perceptions toward different aspects of sustainable development. The participants declared sustainable development as mostly related to environmental aspect of this term. Since, these students advocated sustainable development in the context of effective usage of natural resources, resolution of environmental problems, and protection of nature. It appeared that most of the university students developed personal awareness dealing with preservation of nature and environmental quality, but not with sustainable development as a holistic concept. Accordingly, it was found that social, political, cultural, and economic aspects of sustainable development were less emphasized by the participants. For instance, none of the participants mentioned some major issues associated with sustainable development such as cultural diversity, political will, human rights, and democracy although these issues are among the major concerns of sustainable development (Dresner, 2002; Sterling, 2001).

These students also seemed to be lack of an understanding that associates social development in particular with productive sectors, equity, wealth, equal opportunity and poverty. In fact, sustainable development is advocated to be a way to achieve for all humankind a rich quality of life by bridging developmental issues with environmental concerns (National Research Council, Policy Division, Board on Sustainable Development, 1999). In line with these international agreements, it is obvious that sustainability transition is not possible just with a social revolution or a technological miracle.

But, sustainability transition depends on changing life styles, values, or economic systems and this should be supported by political will and governmental commitment. In this aspect, university students' conceptualizations of sustainable development which were lack of changing life styles, political initiations, and economic prosperity points out an urgent need to create some education programs on sustainable development.

This survey revealed that these students had favorable attitudes toward sustainable development, and advocated this process as a good thing. Regarding their attitudes toward environmental aspect of sustainable development, the participants held favorable feelings of concern toward environmental deterioration which was consistent with the research findings reported by Tuncer, Tekkaya & Sungur (2006). To be more specific, these participants, as the citizens of a developing country, showed the general tendency that was reported in some worldwide surveys on environmental concern. Interestingly, participants from developing countries had higher feelings of concern and attitudes toward the environment than from developed countries (Dunlap, Gallup & Gallup, 1993). Furthermore, consistent with the results reported by Kagawa (2007) it appears that the participants had strong desires for social justice by showing agreements for cultural diversity and living harmoniously with the nature. However, when it comes to participants' concerns with respect to interaction of environmental and economic aspects of sustainable development, some contradictions appeared in the responses of these university students. For instance, these university students advocated strong need for collective and radical changes in order to offset the danger of climate change, but they also preferred private cars to public transportation. One possible explanation for this finding might be that university students were not ready to make some individual sacrifices from their own comforts to protect the environment. Another possible explanation might be that the city and the campus in which the participants were living did not provide the necessary opportunities for public transportation.

As well as the university students' attitudes toward sustainable development, their values toward the environment were examined in the current study. Consistent with the responses of Turkish sample who had participated in the 2000 World Values Survey (Inglehart, Basanez, Diez-Medrano, Halman & Luijkx, 2002), the university students reported that human beings should coexist with nature. Furthermore, similar to developed societies like Europeans, North Americans, and Japanese participating in national surveys (Inglehart, Basanez, Diez-Medrano, Halman & Luijkx, 2002) the participants of the present study rejected the idea that human beings have the right to master nature. The participants' agreements indicated the importance given to nature and rejection of domination over nature at least at an abstract level. Regarding the continuum of human-nature relationship in which ecocentrism at the one end and anthropocentrism on the other, the results indicated that the university students were obviously not closer to anthropocentric end of the continuum.

Looking at the personal behavioral changes toward more sustainable life styles, their preferred individual ways of living were not necessarily coherent with their critical agreements and statements. The actions most frequently taken by the participants were reported as saving energy, and recycling aluminum cans, glass bottles and paper. These actions, reflecting their responsibilities as consumers, displayed their placement in 'light green' end on a 'light to dark green' spectrum (Porritt & Winner, 1988). 'Dark green' actions representing "*a radical, visionary and fundamentalist challenge to the prevailing economic and political world order*" (Porritt and Winner, 1988, p.11) were less likely taken by the university students. For instance, consistent with the research results by Inglehart, Basanez, Diez-Medrano, Halman & Luijkx, (2002), attending a protest march or a demonstration for environmental reasons and examining politicians' attitudes toward environmental degradation were addressed as 'never' or 'rarely' by most of the participants. As supported by some researchers (Leiserowitz, Kates & Parris, 2005), light green actions could make significant changes toward a more sustainable world. However, we should take some extra responsibilities in order to provide an opportunity for the future generations to meet their own needs.

5. CONCLUSIONS AND IMPLICATIONS

The present study highlighted some complexities which a public university in a developing country could face with at the primitive stage of reorientation toward a Copernicus Campus. In this aspect, some conclusions and suggestions could be offered for educators, curriculum developers, administrators, and the researchers who deal with the education for sustainable development in developing countries. Firstly, in reorientation of formal curriculum to address sustainable development, the reformists should work to embed needs of sustainable development by stating the interconnectedness of different aspects of this process more explicitly. At this point, environmental aspect of sustainable development should be linked with economic, social, cultural and political aspects of sustainable development in order to facilitate students' comprehension of multi-faceted and complex nature of sustainable development. Secondly, university students' favorable attitudes toward sustainable development should be regarded as an auxiliary agent while creating a curricula and implementing teaching materials. Furthermore, ecocentric worldviews about environmental degradation and feelings of concern on a healthy environment should be placed as strong motivators in this process. In general, learning has been viewed as a cognitive process, but affective considerations should not be neglected in education for sustainable development. Appropriate pedagogies should be developed to help students transform their feelings into actions in order to create their own sustainable futures. The present study also pointed out that the university students most frequently preferred to take some actions showing responsibility as consumers such as using less energy and water, recycling, and changing purchasing habits. In this aspect, the university campus should ensure the necessary infrastructures to facilitate these light green actions. At this point, it is worth examining the suggestions and expectations of university students and staff while creating a sustainable campus life. Although their active engagement with the light green actions plays significant roles toward a more sustainable world, more radical changes have been suggested to promote sustainable development (Leiserowitz, Kates and Parris, 2005). Rich learning opportunities to stimulate dark green actions should be discussed in reorientation of ESD curricula.

REFERENCES

- Alkis, S. & Ozturk, M. (2007). Sustainable development in opinions of primary student teachers and pre-service teacher education in Turkey. *Paper presented at 2007 Symposium of the International Geographical Union - Commission on Geographical Education (IGU - CGE)*, Lucerne, Switzerland.
- Azapagic, A., Perdan, S. & Shallcross D. (2005). How much do engineering students know about sustainable development? The findings of an international survey and possible implications for the engineering curriculum. *European Journal of Engineering Education*, 30(1), 1-19.
- Berry, T. (1999). *The Great Work, Our Way into the Future*, New York: Belltower.
- COPERNICUS (2005). *Copernicus-Guidelines for Sustainable Development in the European Higher Education Area*, Copernicus-Campus. Retrieved March 23, 2008, from <http://www.unece.org/env/esd/information/COPERNICUS%20Guidelines.pdf>
- Crocker, L. & Algina, J. (1986). *Introduction to Classical and Modern Test Theory*, Holt, Rinehart and Winston Inc.
- Dresner, S. (2002). *The Principles of Sustainability*, Earthscan Publications Ltd, London.
- Dunlap, R. E., Gallup, G. H. & Gallup, A. M. (1993). Of global concern: Results of the Health of the Planet Survey. *Environment*, 7(15), 33-39.
- Haigh, M. (2005). Greening the university curriculum: appraising an international movement. *Journal of Geography in Higher Education*, 29(1), 31-48.
- Inglehart, R., Basanez, M., Diez-Medrano, J., Halman, L. & Luijkx, R. (2002). *World values surveys and European values surveys, 1981-1984, 1990-1993, and 1995-1997*. Inter-university Consortium for Political and Social Research, Ann Arbor, MI: Institute for Social Research.
- Kagawa, F. (2007). Dissonance in students' perceptions of sustainable development and sustainability: Implications for curriculum change. *International Journal of Sustainability in Higher Education*, 8(3), 317-338.
- Leiserowitz, A. A., Kates R. W. & Parris T. M. (2005). Do global attitudes and behaviors support sustainable development?. *Environment*, 47(9), 22-38.
- Mertig, A. (2003). *Michigan State University Environmental Survey of Freshman – Fall 2000 and Spring 2003*. Retrieved October 24, 2007, from <http://www.ecofoot.msu.edu/documents/frosh.environmental.survey.pdf>

- National Research Council, Policy Division, Board on Sustainable Development (1999). *Our common journey: A transition toward sustainability*. National Academy Press, Washington, DC.
- Porritt, J. & Winner, D. (1988). *The coming of the greens*, Fontana, London.
- Sutton, P. (2004). *A Perspective on environmental sustainability? A paper for the Victorian Commissioner for Environmental Sustainability*. Retrieved April 12, 2007, from [http://www.ces.vic.gov.au/CA256F310024B628/0/FE9C3A0DE353A819CA2571E6001BFA30/\\$File/A+Perspective+on+Environmental+Sustainability.pdf](http://www.ces.vic.gov.au/CA256F310024B628/0/FE9C3A0DE353A819CA2571E6001BFA30/$File/A+Perspective+on+Environmental+Sustainability.pdf)
- SQW Ltd (2006). *Specialist review and evaluation of the higher education partnership for sustainability (HEPS) programme: final report to the UK higher education funding bodies (HEFCE, SFC, HEFCW and DEL) from SQW Ltd*. Retrieved on 10-March-2009, at URL: www.hefce.ac.uk/Pubs/rdreports/2006/rd08_06/rd08_06.pdf
- Sterling, S. (2001). *Sustainable education: re-visioning learning and change*. Totnes, Greenbooks.
- Summers, M., Corney, G. & Childs, A. (2004). Student teachers' conceptions of sustainable development: the starting-points of geographers and scientists. *Educational Research*, 46(2), 163-182.
- Tuncer, G., Tekkaya, C. & Sungur, S. (2006). Pre-service teachers' beliefs about sustainable development: Effect of gender and enrollment to an environmental course. *Hacettepe University Journal of Education*, 31, 179-187.
- United Nations (2003). Resolution 57/254. United Nations Decade of Education for Sustainable Development; Resolution adopted by the General Assembly. United Nations General Assembly, 57th Session, 21 February 2003, Agenda item 87 (a) 02 55612; Document: A/RES/57/254 (New York: United Nations). Retrieved on 21-March-2008 at URL: <http://www.unesco.ch/pdf/UNDecade.pdf>.
- United Nations Conference on Environment and Development (UNCED) (1992). *Agenda 21: Action plan for the next century*, Rio de Janeiro.
- World Commission on Environment and Development (1987). *Our common future*, Oxford, Oxford University Press
- WSSD, Key Outcomes of the Summit (2002). World Summit on Sustainable Development. Retrieved December 19, 2006, from <http://www.johannesburgsummit.org/html/documents/summit-docs/2009-keyoutcomes-commitments.doc>

GENİŞLETİLMİŞ ÖZET

Yüksek öğretim kurumları, gelecek nesillere güzel bir dünya bırakmak ve onlara kaliteli yaşam koşulları sağlamak için gerekli bilgi, değer, beceri ve davranışlara sahip bireyler yetiştirmede en temel etken olarak görülmüştür (Haigh, 2005). Bu görüş doğrultusunda, sürdürülebilir yaşam ile ilgili her konunun yüksek öğretim programlarına entegrasyonu üzerine çalışmalar son yıllarda hız kazanmıştır. Bu nedenle, bu çalışma yüksek öğretim programlarına sürdürülebilir kalkınma için eğitim prensiplerinin entegrasyonu sürecinde ihtiyaç duyulabilecek bir takım bilgileri elde etmeyi amaçlamıştır. Gelişmekte olan bir ülkede 'COPERNICUS Campus' antlaşmasına taraf olan bir üniversitede gerçekleştirilen bu çalışma elde ettiği sonuçlar ile benzer konumdaki üniversitelere de bu süreçte destek olmayı hedeflemiştir. Daha açık bir ifadeyle, bu çalışmanın amacı üniversite öğrencilerinin 'sürdürülebilir kalkınma' terimine ne ölçüde aşına olduklarını ve bu terim ile ilgili anlayışlarını belirlemektir. Aynı zamanda bu öğrencilerin sürdürülebilir kalkınmaya yönelik tutumlarının, çevreye yönelik değerlerinin ve sürdürülebilir yaşam biçimlerine yönelik davranışlarının tespit edilmesi hedeflenmiştir. Güvenirlik ve geçerlik çalışmaları ile son haline getirilen ölçüm aracı 4 farklı boyutu içermektedir; 'sürdürülebilir kalkınmaya yönelik anlayış' boyutu çoktan-seçmeli ve açık uçlu toplam 3 sorudan, 'sürdürülebilir kalkınmaya yönelik tutum' boyutu çoktan-seçmeli ve Likert-tipi toplam 14 maddeden, 'çevresel değerler' boyutu 9 Likert-tipi maddeden ve 'sürdürülebilir yaşam biçimlerine yönelik davranışlar' boyutu ise 14 maddeden oluşmuştur. Bu ölçek Şubat-Haziran 2008 tarihleri arasında Orta Doğu Teknik Üniversitesi'nin lisans ve lisansüstü eğitim programlarına kayıtlı öğrencilerine internet ortamında uygulanmıştır. Belirtilen amaçlar doğrultusunda, ortalama, standart sapma ve frekanslar betimsel istatistik kullanılarak hesaplanmıştır. Bu çalışmanın sonuçlarına göre üniversite öğrencilerinin bir çoğu 'sürdürülebilir kalkınma' terimine aşına olduklarını belirtmelerine rağmen gerçekte 'sürdürülebilir kalkınma' üzerine güçlü bir anlayış geliştirememişlerdir. Katılımcılar 'sürdürülebilir kalkınma' terimini, bu terimin daha çok çevre boyutu ile ilişkilendirmiştir. Sonuçlar, sürdürülebilir kalkınmanın sosyal, politik, kültürel ve ekonomik boyutlarının katılımcılar tarafından kısmen daha az vurgulandığını göstermiştir. Bütüncül bir kavram olarak sürdürülebilir kalkınmaya yönelik tutumları değerlendirildiğinde ise katılımcıların yarısından fazlası (%58.4) sürdürülebilir kalkınmayı olumlu karşıladıklarını ve yaklaşık üçte-biri de (%34.5) sürdürülebilir kalkınmayı sonuna kadar desteklediklerini belirtmiştir. Aynı zamanda, bu çalışmanın sonuçlarına göre üniversite öğrencileri sürdürülebilir kalkınmanın çevresel ve sosyal boyutuna yönelik olumlu tutumlara sahiptir. Gelişmekte olan bir ülkenin bireyleri olarak bu öğrenciler, çevresel tutumlar üzerine gerçekleştirilmiş

uluslararası düzeydeki araştırmalarda tespit edilen genel eğilimi göstermişlerdir. Bu uluslararası araştırmalara göre (Dunlap, Gallup & Gallup, 1993), gelişmekte olan ülkelerin katılımcıları gelişmiş ülkelerin katılımcılarına göre çevreye yönelik daha olumlu tutum ve daha fazla ilgiye sahiptirler. Sosyal kalkınmaya yönelik tutumlar incelendiğinde ise bu çalışmanın sonuçları, üniversite öğrencilerinin doğayla harmoni içinde yaşamayı ve kültürel çeşitliliği destekleyerek sosyal kalkınma yönünde istekli olduklarını göstermiştir. Ancak, sürdürülebilir kalkınma sürecinde çevre ve ekonominin etkileşimi üzerine tutumları incelendiğinde katılımcıların yanıtlarında bir takım çelişkilerin bulunduğu tespit edilmiştir. Çevresel değerler boyutunda ise sonuçlara göre, katılımcılar doğaya yönelik olumlu içsel değerlere sahiptir ve insanoğlunun doğaya hükmetmeye hakkı olmadığını savunmaktadırlar. Bu sonuçlar, üniversite öğrencilerinin doğaya verdiği önemi ve en azından soyut düzeyde de olsa insanoğlunun doğadaki diğer varlıklardan daha üstün olmadığı yönünde farkındalık geliştirdiklerini işaret etmiştir. Sürdürülebilir yaşam biçimlerine yönelik davranışları incelendiğinde, bu çalışmaya katılan öğrenciler sürdürülebilirlik yönünde enerji ve su tasarrufu gibi araştırmacılar (Porritt and Winner, 1988) tarafından ‘açık yeşil’ olarak nitelendirilen bazı davranışları gerçekleştirdiklerini belirtmişlerdir. Verilen yanıtlara göre, katılımcıların yarısından fazlası dişlerini fırçalarken ya da banyo yaparken daha az su kullanmaya özen göstermektedir. Aynı zamanda, bu öğrenciler özellikle yerel yiyecekleri tüketmeye dikkat etmektedirler. Ancak, üniversite öğrencilerinin yarısından fazlası sürdürülebilir bir gelecek için gerekli olan bazı radikal davranışları nadiren gerçekleştirmektedir ya da gerçekleştirmemektedir. Bu davranışların arasında çevre sorunlarına duyarlı politikacıları desteklemek veya oy vermek, çevre sorunları ile ilgili protesto yürüyüşü veya gösterilere katılmak yer almaktadır. Bu noktada özellikle dikkat çekmemiz gereken konu, gelecek nesillerin kendi ihtiyaçlarını karşılayabilmeleri için toplum olarak daha fazla sorumluluk almamız ve radikal davranışları yerine getirmemiz gerektiğidir. Sonuç olarak, bu araştırmanın bulgularına göre müfredat geliştirme uzmanları ve eğitimciler, yüksek öğretim programlarının sürdürülebilir kalkınma için eğitim yönünde yeniden düzenlenmesi sırasında bu kavramın farklı boyutlarının (çevresel, ekonomik, sosyal) birbirleri ile olan etkileşimini en açık şekilde ifade etmelidirler. Aynı zamanda, bu süreçte öğrencilerin sürdürülebilir kalkınmaya yönelik olumlu tutumları ve içsel değerleri yardımcı bir unsur olarak değerlendirilmelidir. Üniversite öğrencilerin bu konudaki olumlu duygu ve düşüncelerini sürdürülebilir bir gelecek için uygun davranışlara dönüştürmelerine yardımcı pedagojiler izlenmelidir. Üniversite yerleşkelerinde, öğrencilerin ‘açık yeşil’ olarak nitelendirilen davranışları pekiştirmeleri ve radikal davranışları da yerine getirmeleri için uygun altyapılar ile ideal yaşam koşulları sağlanmalıdır. Bu noktada, üniversite öğrencilerinin ve personelinin sürdürülebilir yaşam koşulları için önerileri ve beklentileri değerlendirilmelidir ve gerekli yenilikler yapılmalıdır. Sürdürülebilir bir gelecek için üniversite öğrencilerin şu an gösterdikleri davranışlar önemli katkı sağlasa bile sürdürülebilir kalkınma hedeflerine ulaşmak için daha radikal değişikliklerin yapılması gerekmektedir. Bu sebeple, yüksek öğretim programlarının sürdürülebilir kalkınma için eğitim yönünde yeniden düzenlenmesi sürecinde üniversite öğrencilerine radikal kararlar alıp gerçekleştirmeleri için uygun öğrenme ortamları hazırlanmalıdır.