

Determination of state-trait anxiety levels of university students during the learning process of global environmental problems*

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Abstract: This descriptive study is to determine anxiety levels of university students during the learning process of global environmental problems. The scope of the research is composed of 39 students. Data were collected via a state-trait anxiety inventory. Trait anxiety inventory was applied both before and after the study whereas, state anxiety inventory was conducted once before the study and after each week when the work on each heading was completed. While their levels of state anxiety increased during the learning process, no change was observed in their trait anxiety levels. It can be concluded that the process of learning about global environmental problems had a significant impact on state anxiety levels of students.

Key words: state-trait anxiety; global learning; environmental education

1. Introduction

The world is facing intense environmental challenges in terms of ozone depletion, genetically modified food, water and air pollution, acid rain, and diminishing biodiversity. As these problems are intertwined with the global pattern of production and consumption, technical solutions are not enough (Ojala, 2007). All of these issues have a major impact on the society that students live in, both now and in the future.

The fact that global environmental problems have a broad range of issues causes some problems in the process of learning as well. Confronting problems and dangers in the world is becoming an extremely difficult experience for people. The lives of today's people, who are affected by this experience, are having a confused, fragmented, emotional, rebellious and stressful characteristic (Giddens, 1998). Studies have indicated that although many young people show an interest in and worry about global issues, this worry is often connected with feelings of pessimism, helplessness, and apathy (Connell, et al., 1999). For many of the subjects, worry was sometimes connected with a feeling of helplessness about the fact that it is very hard to reach concrete results when it comes to global environmental problems because they are so complex and so many diverse actors are involved on a global scale (Ojala, 2007). Recent studies show a decline in general psychological well-being, with increased levels of anxiety and depression, among students (Twenge, 2000). Slaughter (2007) indicated that age-old protective mechanisms of denial, avoidance and repression were in remarkably wide use even—perhaps

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especially—at the highest levels. Anxiety is the perception of reality of vanishing against existing. The anxiety levels of the students, who consider global environmental problems as a danger which forces their existence and values to vanishing, will naturally rise. Recent researches have pointed out that mechanisms of learning and recalling are related to relatively permanent changes in the nervous system. Substances emitted in the brain during high level of concern prevent the protein chain, which is essential for learning, to be built, and therefore, increases the concern level and restricts learning partially causing failure (Baltaş, 2004). Although a certain level of concern is necessary for learning, it is vitally important to adjust its ratio (Ankay, 1990). Studies indicated that academic achievement of students has lessened as a result of increasing the levels of state-trait anxiety (Endler, Kantor & Parker, 1994; Batumlu & Erden, 2007). At this point it is an important question to answer that which kinds of anxiety increase during the learning process.

The purpose of the present study was to explore the state-trait anxiety levels of university students during the learning process of global environmental problems.

2. Method

2.1 Subjects and procedure

The study was conducted in Celal Bayar University, Faculty of Education with the participation of 39 students during 2006-2007 academic years. Sampling was done randomly. Eight headings of issues accepted global environmental problems such as ozone layer, acid rains, nuclear energy, rain forests, desertification, genetically modified organisms, climate change, green house effect, and global warming were discussed. Students were divided into 8 groups. Each week, one heading was handled and three hours were allocated for each discussion session. Issues of global warming and green house effect were taken under one heading and handled for two weeks. The nine-weeks study plan was given to the students prior to the experiment. In the teaching process, which was generally run according to interactive model and group discussion method, other active learning techniques were also benefited from. Each heading was discussed under sub-divisions as: definition of the problem, human factor in the emerging of the problem, effects of the problem on humans and other ecosystems and suggestions for solution respectively. After each heading was discussed in the groups, the groups shared results of their discussions with other groups through short presentations. During discussions, after four stages of sub-divisions, individual opinions of the students were gathered in a final general evaluation session. Group reports were written and attached on the boards, thus, sharing of information was continuous. During the discussions, communication between all groups was allowed. The learning environment was equipped with a board, internet, lap tops, a projection device and other stationary consumables. Prior to each heading started to be discussed, materials prepared by the researcher were handed out to the students.

2.2 Gathering the data

The data of the study were gathered through of state-trait anxiety inventory. Trait anxiety inventory was carried out both before and after the study whereas, state anxiety inventory was conducted once before the study and after each week when the work on each heading was completed.

Trait anxiety inventory requires from the individual to describe how he/she generally feels. For the ranking items expressed feelings and/or behaviors are marked according to their frequency as: (1) never, (2) sometimes, (3) often, (4) almost always. State anxiety inventory requires from the individual to describe student's feelings at a certain moment and under a certain circumstance, in other words, he/she has to describe student's feelings caused

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by the momentary atmosphere he/she is in. State anxiety inventory is a self-evaluation questionnaire which consists of short responds. In respond to ranking items, expressed feelings and behaviors are marked according to their intensity as: (1) never, (2) some, (3) much, (4) completely. In trait-state anxiety inventory, there are two types of expressions: direct expressions express negative feelings and reverse expressions express positive feelings. In state anxiety inventory items, 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20 are reverse expressions. Reverse expressions in trait anxiety inventory are items 21, 26, 27, 30, 33, 36 and 39. After calculating the total intensity of direct and reverse expressions separately, the total intensity value of the reverse expressions is subtracted from the total intensity value of direct expressions. The State-Trait Anxiety Inventory, developed by Spielberg, et al (1970), measures students' trait anxiety levels. The validity and reliability of the inventory in Turkey was made by Öner and Le Compte (1985). The validity of state anxiety inventory is between 0.83 and 0.87, and test-retest reliability is between 0.71 and 0.86. The validity in the other inventory is 0.94-0.96, and test-retest reliability is 0.26-0.68.

2.3 Data analysis

Results of state anxiety inventory were analyzed with t-test and those of trait anxiety inventory were analyzed using Wilcoxon Signed Ranks and Friedman test. The software SPSS 15.0 was used in analysis.

3. Result

Descriptive statistical results of the data obtained from state anxiety inventory are given in Table 1.

Table 1 Descriptive statistical results

	Pretest	G1p	G2p	G3p	G4p	G5p	G6p	G7p	G8p
N	39	38	37	36	39	39	38	37	37
Mean	35.7	65.2	58.5	62.2	60.6	59.8	58.3	59.0	62.6
Std. Deviation	5.0	15.2	13.0	15.2	11.3	11.4	8.1	10.2	13.8
Minimum	25.00	42.00	31.00	25.00	40.00	41.00	31.00	39.00	27.00
Maximum	46.00	96.00	96.00	100.00	88.00	92.00	75.00	81.00	100.00

Notes: G: Global problem; G1: Ozone depletion; G2: Acid rains; G3: Nuclear power; G4: Desertification; G5: Rain forest; G6: Genetically modified organism; G7: Green house and global warming; G8: Climate change; p. Post-test.

Students received state anxiety points between arithmetic averages of 58-68 in terms of the type of global environmental problems. They also had points between 25 and 43 of minimum values, between 46 and 100 of maximum values, between 42 and 75 of the values that represent the gap between maximum and minimum values (Table 1). Considering the maximum (80) and minimum (20) points which can be received from state anxiety inventory, it can be stated that students generally had higher anxiety levels than the average during the learning process of global environmental problems. State anxiety is defined as an unpleasant emotional arousal in face of threatening demands or dangers (Spielberger, 1970). It could be said that learning about global issues affects the state anxiety levels of students.

To investigate the significance of the difference of the scores between the pre-test and post-test carried out following each week of the study, Wilcoxon Signed Ranks test was applied to the results. The results are given in Table 2.

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Table 2 Results of Wilcoxon Signed Ranks test

	G1p-Pr	G2p-Pr	G3p-Pr	G4p-Pr	G5p-Pr	G6p-Pr	G7p-Pr	G8p-Pr
Z	-5.3	-5.0	-5.1	-5.4	-5.4	-5.2	-5.3	-5.2
p	.000	.000	.000	.000	.000	.000	.000	.000

Note: Pr: Pretest.

According to Table 2, the difference between the preliminary state anxiety scores and the state anxiety scores obtained after each week of the study is meaningful. These findings show that state anxiety levels of the students raise during the learning process. Studies supported these results. Rogers and Tough (1996) indicate that Learning about global issues also involves an emotional response. Furthermore, some students experienced a range of conflicting emotions, such as elation/depression, hopefulness/hopelessness, fear/courage and sadness/happiness. Hicks (2002), Hicks and Bord (2001) stated that some students might get confused, some might have optimistic and some others might have pessimistic feelings, while confronting global environmental problems. Besides these, some students who were introduced with the scales of the future disasters which might occur because of global environmental problems drew a dark future scenario and stated that they wouldn't be able to do anything for the solution of the problems in that particular scenario (Oluk & Sakacı, 2007).

Freidman test was applied to see whether state anxiety scores differ depending on the type of global environmental problems. The results of Freidman test are given in Table 3.

Table 3 Result of Friedman test

	Mean rank		Mean rank		Mean rank
Gp8	5.07	Gp4	4.61	Gp6	4.06
Gp3	5.03	Gp5	4.39	Gp7	3.85
Gp1	4.92	Gp2	4.08		

Notes: N=36, Chi-square=9.654, $df=7$, $p=0.20$.

Results of Freidman analysis show that the difference of the student's scores between state anxiety scores according to the type of global environmental problem is insignificant ($X^2=9.654$, $p>0.05$). These results indicate that all global environmental problems have a similar effect on levels of state anxiety.

The t test was applied in order to investigate the significance of the difference between the preliminary trait anxiety scores and post-trait anxiety scores. The results are given in Table 4.

Table 4 T-test results of scores trait anxiety

	N	Mean	sd	df	t	p
Pre test	36	55.1	9.4	35	0.932	0.338
Post test	36	56.1				

T-test results show no significant difference between the students' pre-labour and post-labour levels of trait anxiety ($t_{(35)}=0.932$, $p>0.05$). This result shows that the learning process of global environmental problems doesn't change the level of trait anxiety. These results also show students' perceptions of global environmental problems.

4. Conclusion

The study examined the state-trait anxiety levels of university students during the learning process of global

environmental problems. These findings indicate that the learning process of global environmental problems does not affect the trait anxiety of the students but affects their state anxiety levels. It is clear that the process of learning about global environmental problems has a significant impact on this group of students. Issues of environmental damage are uncomfortable to deal with and it is this that adds an extra pedagogical dimension to learning about global issues.

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