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Self-compassion and Achievement Goals: A Structural Equation Modeling Approach

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Abstract

Problem Statement: Because research on self-compassion is novel, to examine the relationships between this construct and several psychological and educational variables is a necessity. One of these educational variables is achievement goals.

Purpose of Study: The purpose of this study is to examine the relationships between self-compassion and achievement goal orientations.

Methods: The sample of study consists of 646 university students who were enrolled in different programs at Sakarya University, in Turkey. Of the 646 participants, 319 were female and 327 were male; the mean age was 19.7. The Turkish version of the Self-compassion Scale and the 2X2 Achievement Goal Orientations Scale were used to assess self-compassion and achievement goals. The relationships between dimensions of self-compassion and achievement goals were examined using correlation analysis and the hypothesis model was tested through structural equation modeling. Data were analyzed by LISREL 8.54 and SPSS 11.5.

Findings and Results: In correlation analysis, self-kindness, common humanity, and mindfulness factors of self-compassion were positively related to learning-approach/avoidance goals and were negatively related to performance-approach/avoidance goals. On the other hand, self-judgment, isolation, and over-identification factors of self-compassion were associated positively with learning-avoidance, performance-approach/avoidance goals and were associated negatively with learning-approach goals. According to path analysis results, learning-approach/avoidance goals were predicted positively and performance-approach/avoidance goals were predicted negatively by self-kindness, common humanity, and mindful-

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ness. Further self-judgment, isolation, and over-identification predicted learning-approach goals in a negative way and learning-avoidance, performance/performance-avoidance goals in a positive way. Six factors of self-compassion predicted 72% of learning-approach, 39% of learning-avoidance, 98% of performance-approach, and 97% of performance-avoidance goals.

Conclusions and Recommendations: Participants were limited to Sakarya University students and a replication of this study for targeting other student populations should be made in order to generate a more solid relationship among constructs examined in this study. Also, educational settings should help to foster the self-compassion level of students.

Keywords: Self-compassion, achievement goals, structural equation modeling, path analysis

In recent years, many researchers have criticized self-esteem trainings that encourage individuals to achieve positive attitudes towards himself. They have claimed that this kind of training has excessively emphasized the individual's ego and has imposed self-love on them too intensively, thus leading to narcissistic manners or an unhealthy conception of self (Damon, 1995; Finn, 1990; Hewitt, 1998; McMillan, Singh, & Simonetta, 1994; Seligman, 1995). These arguments have contributed to the structure of self-compassion being put forward, which is based on Buddhist philosophy and has an alternative conception of individual's achieving functional attitudes toward himself. Researches have demonstrated that self-compassion is negatively associated with self-criticism, depression, anxiety, rumination, and thought suppression and is positively associated with social relationship, emotional intelligence, and self-determination. In addition, it has been found that, although self-compassion is significantly related to self-esteem, it is not associated with narcissism (Neff, 2003a).

Self-compassion can be defined as an individual's being discerning and gentle toward himself when faced with suffering caused by his own feelings, unprejudiced against his inadequacy and failure, and accepting that his negative life experiences are an inevitable part of human life (Neff, 2003a). Self-compassion involves three basic elements: self-kindness, awareness of common humanity, and mindfulness. Although these three components of self-compassion are conceptually distinct and are experienced differently at the phenomenological level, they interact to mutually enhance and engender one another.

Self-kindness is being kind and understanding toward oneself rather than being harshly self-critical. Self-compassion entails not being self-critical when one's expectations are not met and not being harmful to an individual's ego in order to make achievements. Instead, self-compassion suggests that the individual should encourage his/her ego gently and patiently to change behaviors (Neff, 2003a). Awareness of common humanity is seeing one's happy or painful experiences as not personal, but similar to all human beings' experiences. Having this kind of awareness, one perceives these experiences to be a part of the larger human experience rather than feeling isolated and alienated from society and harshly criticizing oneself for failure and suffering experiences (Neff, 2003a). This awareness emphasizes one's relatedness to all other humans and to another individual (Kirkpatrick, 2005).

The third component of self-compassion, mindfulness, is a preconceptual awareness that allows an individual to accept life's most stressful and painful emotions without being carried away by them (Gunaratana, 1993; Martin, 1997; Neff, 2003a; Nisker, 1998; Rosenberg, 1999). Mindfulness is a state of balanced awareness that one's feelings and thoughts are observed without avoiding or trying to change them, without exaggeration and prejudice. When individuals accept and tolerate their distress and pain, when they are gentle and kind toward themselves, they avoid suppressing their emotions and thoughts. Thus, when they are aware that distress and pain are something all humans experience, they are not trapped by over-identification. Therefore, self-compassion functions as an adaptive strategy for emotion-organizing through decreasing negative emotions but creating more positive emotions of kindness and relatedness (Neff, Hsieh, & Dejitterat, 2005).

Because research on self-compassion is relatively new, different researches that study the structure of self-compassion and its relation to positive findings in various areas of life are needed. One of these areas is the relationship between self-compassion and achievement goal orientations. Educational psychologists usually distinguish performance-based achievement goal orientations from learning-based goal orientations (Ames & Archer, 1988; Dweck, 1986; Nicholls, 1984). Learning oriented students are motivated to learn in order to achieve their skills and to satisfy their curiosity, to learn new things, and with the aim of the complete understanding the subject matter. They determine the standards for achievement themselves, think that both failure and success are the results of an effort made, and also accept their mistakes as a natural part of the learning process. However, the main factor that motivates performance goal-oriented students to learn is improving and maintaining their self-worth. These types of students attribute success and failure to ability and evaluate their level of skills through social comparison.

Studies show that learning orientation is associated with many different adaptive variables such as academic self-efficacy (Roeser, Midgley, & Urdan, 1996), attributing success to individual effort (Ames & Archer, 1988), active strategies of coping (Cetin, Abaci & Akin, 2006), being persistent in spite of difficulties confronted (Elliott & Dweck, 1988), acting with inner motivation when learning (Meece, Blumenfeld, & Hoyle, 1988), and high academic success (Albaili, 1998; Tanaka & Ysmauchi, 2001). On the other hand, performance goal orientation is associated with many different maladaptive variables such as, avoiding having academic assistance (Newman, 1998; Ryan & Pintrich, 1997), cheating in the exams (Anderman, Griesinger, & Westerfield, 1998), academic self-handicapping (Anderman et al., 1998; Urdan, Midgley, & Anderman, 1998), being unwilling to make efforts in the case of failure (Dweck & Leggett, 1998), experiencing negative feelings after the failure (Turner, Thorpe, & Meyer, 1998), utilizing shallow cognitive strategies (Albaili, 1998; Greene & Miller, 1996), and utilizing passive strategies of coping (Cetin et al., 2006).

The findings above, which describe performance goal orientation as maladaptive, have caused disagreements among researchers and have led some researchers to accept that performance goal orientation is not completely maladaptive, but, in some situations, more adaptive than learning goal orientation. As a result, a new model that suggests that performance goal orientation might be divided into two parts has been developed: performance-approach and performance-avoidance (Elliot & Church, 1997; Middleton & Midgley, 1997). According to this new model, students

with performance-approach goal orientation try to demonstrate more performance and to prove that they are skilled, whereas students with performance-avoidance goal orientation act to avoid being seen as incompetent and a failure. Some researches have indicated that performance-avoidance goal orientation causes maladaptive behaviors, while performance-approach goal orientation does not (Elliot & Church, 1997; Elliot & Harackiewicz, 1996).

Along with performance goal orientation, some researchers (Conroy, Elliot, & Hofer, 2003; Elliot, 1999; Elliot & Church, 1997; Elliot, & Covington, 2001; Elliot, & Trash, 2001; Pintrich, 2000a, 2000b) have recently claimed that learning goal orientation may have two components, approach and avoidance, and have developed the 2X2 Achievement Goal Orientations model. This model includes four achievement goal orientations: Learning Approach Goal Orientation (LPGO), Learning Avoidance Goal Orientation (LVGO), Performance Approach Goal Orientation (PPGO), and Performance Avoidance Goal Orientation (PVGO). According to the 2X2 Achievement Goal Orientations model, students who adopt LVGO focus on avoiding the situations by not completely learning the subject matter, forgetting what they have learned, misunderstanding the subject matter, not being able to take control over learning tasks, and making errors. Empirical proof of this new model was obtained and the model was confirmed through confirmatory factor analysis (Elliot & McGregor, 2001; Finney, Pieper, & Barron, 2004). The 2X2 Achievement Goal Orientations model will be relied on as the theoretical framework of this research.

Because of the fact that emotional and mental processes play an important role in students' adopting achievement goal orientation, the differences in students' self-compassion level are thought to be influential in achievement goal orientations (Linnenbrink & Pintrich, 2002; Turner, Husman, & Schallert, 2002). At the end of the literature review, it has been seen that there was only one research (Neff et al., 2005) on the relationships between students' achievement goal orientations and self-compassion. 222 university students took part in this research where the Self-compassion Scale (Neff, 2003b) and the Achievement Goal Orientations Scale (Midgley et al., 1998) were administrated. The findings of this study indicated that self-compassion related positively to learning goal orientation (r = .28) and negatively to the performance-approach (r = –.13), and the performance-avoidance goal orientations (r = –.29).

The Present Study

Because Neff et al. (2005) based their study on the triple achievement goal orientations model, LVGO was not taken as a variable. Also, the relationships between the subscale of self-compassion and achievement goal orientations were not examined because the self-compassion scale was given a total score in this study. Therefore, the aim of this research is to examine the relationships between six dimensions of self-compassion and achievement goal orientations. I hypothesized that self-kindness, common humanity, and mindfulness would be associated positively with LPGO and LVGO and negatively associated with PPGO and PVGO. I also hypothesized that self-judgment, isolation, and over-identification would be related negatively to LPGO and would be related positively to LVGO, PPGO, and PVGO.

Method

Participants

Participants were 646 university students (327 (50.6%) were male, 319 (49.4%) were female) enrolled in various undergraduate programs at Sakarya University, Turkey. These programs were social science education (*n*=106), elementary school education (*n*=121), preschool education (*n*=147), science education (*n*=118), and psychological counseling and guidance (*n*=154). Their ages ranged from 17 to 26 years and the mean age of the participants was 19.7 years.

Measures

2X2 Achievement Goal Orientations Scale (AGOS). The 2X2 AGOS (Akın, 2006) is a 26-item self-report scale using a 5-point Likert scale (1=*strongly disagree* to 5=*strongly agree*). This instrument has four sub-scales: Learning-approach goal orientation (eight items, e.g., "I like school work that I'll learn from"), learning-avoidance goal orientation (five items, e.g., "I do my best to avoid making mistakes"), performance-approach goal orientation (seven items, e.g., "It is important for me to perform better than others"), and performance-avoidance goal orientation (six items, e.g., "I worry about the possibility of getting bad grades"). Internal consistencies were .92, .97, .97, and .95 and the three-week test-retest reliability estimates were .77, .82, .84, and .86, for LPGO, LVGO, PPGO, and PVGO respectively.

Self-compassion Scale. Self-compassion was measured using the Self-compassion Scale (Neff, 2003b). Turkish adaptation of this scale was done by Akın, Akın, and Abacı (2007). The Self-compassion Scale is a 26-item self-report inventory and consists of six sub-scales: self-kindness, self-judgment, awareness of common humanity, isolation, mindfulness, and over-identification. Each item was rated on a 5-point scale (1=*strongly disagree* to 5=*strongly agree*). Language validity findings indicated that correlations between Turkish and English forms were .94, .94, .87, .89, .92, and .94 for six subscales, respectively. Results of a confirmatory factor analysis indicated that the model was well fit and Chi-Square value (x^2= 779.01, N= 633, sd= 264, p= 0.00), which was calculated for the adaptation of the model, was found to be significant. The goodness of the fit index values of the model were RMSEA= .056, NFI= .95, CFI= .97, IFI= .97, RFI= .94, GFI= .91, and SRMR= .059. The internal consistency coefficients of six subscales were .77, .72, .72, .80, .74, and .74, respectively. The test-retest reliability coefficients were .69, .59, .66, .60 .69, and .56.

Procedure

Permission for participation of students was obtained from related chief departments and students voluntarily participated in research. Completion of the questionnaires was anonymous and there was a guarantee of confidentiality. Measurement items were administered to the students in groups in the classrooms. The measures were counterbalanced in administration. Prior to the administration of measures, all participants were told about the purposes of the study. In this research, Pearson's correlation coefficient and structural equation modeling was utilized to determine the relationships between dimensions of self-compassion and achievement goal orientations. These analyses were carried out via LISREL 8.54 (Jöreskog & Sorbom, 1996) and SPSS 11.5.

It has been observed that, in recent years, structural equation modeling, which is a regression-based technique and is utilized to test the hypotheses related to the relationships between observed and latent variables, has been commonly employed by researchers in developing and testing models. This technique helps researchers to determine direct (effect from one variable to another) and indirect (mediation effect between variables) effects between variables. Path analysis is a structural modeling technique in which observed variables are used and the relationships between these variables are examined. In this research, observed variables were utilized because it was thought that dimensions of self-compassion would directly affect achievement goal orientations. Effects of dimensions of self-compassion on achievement goal orientation were examined using path analysis.

Results

Descriptive Data and Inter-correlations

Table 1 shows the means, standard deviations, inter-correlations, and internal consistency coefficients of the variables used.

Table I

Descriptive Statistics, Alphas, and Inter-correlations of the Variables

Variables	1	2	3	4	5	6	7	8	9	10
1. Self-kindness	1.00									
2.Self-judgment	–.53**	1.00								
3. Aw. Com. Hum	.73**	–.56**	1.00							
4. Isolation	–.44**	.78**	–.50**	1.00						
5. Mindfulness	.66**	–.47**	.67**	–.38**	1.00					
6. Over-identif.	–.43**	.82***	–.50**	.82***	–.43**	1.00				
7. LPGO[a]	.83***	–.50**	.76**	–.42**	.59**	–.42**	1.00			
8. LVGO[b]	.29*	.15*	.43**	.22*	.26*	.22*	.34**	1.00		
9. PPGO[c]	–.36**	.70**	–.40**	.82***	–.31**	.80***	–.39**	–.27*	1.00	
10. PVGO[d]	–.55**	.95***	–.61**	.90***	–.49**	.92***	–.52**	–.10*	.79**	1.00
Mean	17.43	10.38	13.41	8.43	13.64	8.62	27.33	14.59	15.45	12.28
Sd	4.59	3.17	3.98	2.45	3.50	2.51	7.24	3.22	4.50	3.55
Alpha	.82	.89	.80	.87	.74	.81	.89	.88	.93	.96

Note. [a]LPGO = Learning-approach goal orientation, [b]LVGO = Learning-avoidance goal orientation, [c]PPGO = Performance-approach goal orientation, [d]PVGO = Performance-avoidance goal orientation.

p < .05; **p < .01; ***p < .001

When Table 1 is examined, it is observed that there are significant correlations between dimensions of self-compassion and achievement goal orientations. While self-kindness correlated positively with LPGO (r = .83, p<.001) and LVGO (r = .29, p<.05) and negatively with PPGO (r = –.36, p<.01) and PVGO (r = –.55, p<.01), self-judgment has a negative correlation with LPGO (r = –.50, p<.01) and positive correlations with LVGO (r = .15, p<.05), PPGO (r = .70, p<.01), and PVGO (r = .95, p<.001). Awareness of common humanity has positive correlations with LPGO (r = .76, p<.01) and LVGO (r = .43, p<.01), and negative correlations with PPGO (r = –.40, p<.01) and PVGO (r = –.61, p<.01). On the other hand, isolation associated negatively with LPGO (r = –.42, p<.01) and positively with LVGO (r = .22, p<.05), PPGO (r = .82, p<.001), and PVGO (r = .90, p<.001). It is also seen that mindfulness related positively to

LPGO (r = .59, p<.01) and LVGO (r = .26, p<.05) and negatively to PPGO (r = –.31, p<.01) and PVGO (r = –.49, p<.01). Finally, it was found that over-identification has a negative correlation with LPGO (r = –.42, p<.01), but positive correlations with LVGO (r = .22, p<.05), PPGO (r = .80, p<.001), and PVGO (r = .92, p<.001).

Structural Equation Modeling

The hypothesized model was examined via structural equation modeling (SEM). According to this model, achievement goal orientations are predicted by six dimensions of self-compassion. Figure 1 presents the results of SEM analysis, using maximum likelihood estimations. The model demonstrated excellent fit (χ^2 = 18.47, df = 18, p = .42500, GFI = .99, AGFI = .98, CFI = 1.00, NFI = 1.00, RMSEA = .006) and also accounted for 72% of the LPGO, 39% of the LVGO, 98% of the PPGO, and 97% of the PVGO variances.

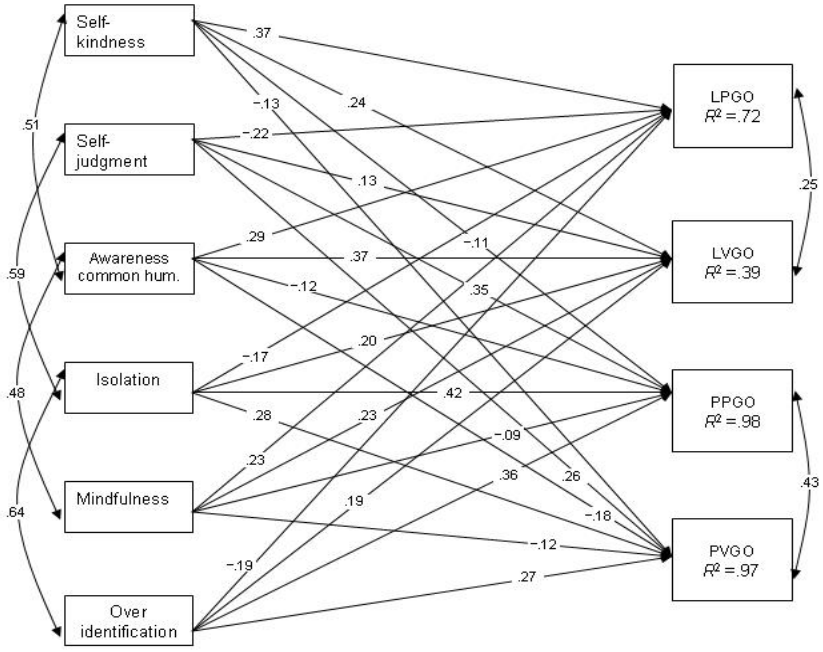

Figure 1 Path analysis between achievement goal orientations and dimensions of self-compassion

The standardized coefficients in Figure 1 clearly show that LPGO was predicted positively by self-kindness, awareness of common humanity, and mindfulness (.37, .29, and .23, respectively) and negatively by self-judgment, isolation, and over-identification (-.22, -.17, and -.19, respectively), whereas LVGO was predicted positively by six dimensions of self-compassion (.24, .13, .37, .20, .23, and .19, respectively). Also self-kindness, awareness of common humanity, and mindfulness predicted PPGO in a negative way (-.11, -.12, and -.09, respectively), self-judgment, isolation, and over-identification predicted PPGO in a positive way. Lastly, PVGO was predicted negatively by self-kindness, awareness of common humanity, and mind-

fulness (-.13, -.18, and -.12, respectively) and positively by self-judgment, isolation, and over-identification (.26, .28, and .27, respectively).

Discussion and Recommendations

The purpose of this research is to investigate the relationships between self-compassion and achievement goal orientations. The findings have demonstrated that there are significant relationships between the dimensions of self-compassion and achievement goal orientations. As expected, path analysis has showed that self-kindness, awareness of common humanity, and mindfulness, positive dimensions of self-compassion, predicted LPGO positively and that self-judgment, isolation, and over-identification, negative dimensions of self-compassion, predicted LPGO negatively. That, in some researches (Albaili, 1998; Ames & Archer, 1988; Cetin et al., 2006; Elliott & Dweck, 1988; Meece et al., 1988; Roeser et al., 1996), LPGO has been found to have relations with adaptive variables in aspects of psychology and education must be taken into consideration when evaluating this result. Besides, when confronted with unsuccessful life experiences, learning-approach oriented individuals tend to examine and eliminate the factors which caused failure, instead of putting the blame on or harshly criticizing themselves (Ironsmith, Marva, Harju, & Eppler, 2001). They experience less harmful feelings and develop more positive attitudes toward themselves (Robins & Pals, 2002). Self-kindness, awareness of common humanity, and mindfulness represents that, in the event of bad life-experiences, the individual's approach toward him/herself is warm, gentle, and kind. Self-judgment, isolation, and over-identification, on the other hand, means that the individual attributes him/herself for making errors and unsuccessful life experiences and intensively identify him/herself with negative feelings when faced failure. When thought in this context, the correlations found in this research seem significantly important.

Secondly, as anticipated, LVGO was predicted positively by all dimensions of self-compassion. Students who adopt LVGO experience worries such as not learning the subject matter exactly or completely forgetting them (Elliot & McGregor, 2001; Finney et al., 2004). Therefore, when compared to a learning approach, it is a less adaptive achievement goal orientation. It is most possible that these students exhibit perfectionist tendencies, avoid being unsuccessful, and feel guilty when they fail (Conroy et al., 2003; Elliot, 1999). When results of this research are examined, it is easily seen that LVGO has much greater relationships with positive dimensions of self-compassion than negative ones. Thus, it can be claimed that LVGO has both negative and positive aspects and that it is related to both positive and negative aspects of self-compassion.

Thirdly, as hypothesized, self-judgment, isolation, and over-identification, which are negative dimensions of self-compassion, predicted PPGO in a positive way. Students with PPGO not only consider social comparisons to be important, but tend to evaluate their performance in relation to those of other individuals as well. And after this comparison, they tend to feel that they are valuable or worthless (Ames & Archer, 1988; Dweck & Leggett, 1988). They may also experience feelings of guilt when they fail. Of negative dimensions of self-compassion, self-judgment, isolation, and over-identification involve individual's self-critical, negative self-assessment, and being seized by emotions when they experience a stressful and painful event. As

a result, it is not surprising that there are high relationships between PPGO and self-judgment, isolation, and over-identification.

Finally, as expected, it is seen that PVGO was predicted positively by self-judgment, isolation, and over-identification. Students with PVGO often tend to avoid being seen as unsuccessful, unskillful, and embarrassed (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). It is highly possible that students who have these characteristics will severely criticize themselves, be reluctant in their social environment, and experience more negative feelings (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). When the results from the research are examined, it is seen that the relationships between PVGO and isolation are at a higher level when compared to the relationships with other dimensions of self-compassion. This relationship is significant when it is thought that students with PVGO are more introverted than the others in the classroom.

It is extremely important to explain the limitations of this research. First of all, because this research intended to build a model rather than test a model that already exists, findings from the research are of explanatory characteristics. Therefore, if it is not tested on another sample, it is wise to avoid taking the findings as definite. Secondly, that the samples presented here are limited to university students restricts the generalizability of the findings. For that reason, it is also important to investigate the variables studied in this research on other sample groups other than university students. Besides, even though structural equation modeling suggests results related to causality, it is difficult to give a full explanation related to causality among the variables examined in the research, because correlational data were used.

References

Albaili, M. A. (1998). Goal orientations, cognitive strategies, and academic achievement of United Arab Emirates college students. *Educational Psychology, 18,* 195–203.

Akın, A. (2006). 2X2 Başarı Yönelimleri Ölçeği: Geçerlik ve güvenirlik çalışması. *Sakarya Üniversitesi Eğitim Fakültesi Dergisi, 12,* 1–13.

Akın, Ü., Akın, A., & Abacı, R. (2007). Öz-duyarlık Ölçeği: Geçerlik ve Güvenirlik Çalışması. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 33,* 1–10.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80,* 260-267.

Anderman, E. M., Griesinger, T., & Westerfield, G. (1998). Motivation and cheating during early adolescence. *Journal of Educational Psychology, 90,* 84–93.

Cetin, B., Abaci, R., & Akin, A. (2006, July). *An investigation of the relationship between achievement goal orientations and the use of stress coping strategies with canonical correlation.* Poster session presented at the 27th International Conference of the Stress and Anxiety Research Society (STAR), Crete, Greece.

Conroy, D. E., Elliot, A. J., & Hofer, S. M. (2003). A 2X2 achievement goals questionnaire for sport: Evidence for factorial invariance, temporal stability, and external validity. *Journal of Sport & Exercise Psychology, 25,* 456–476.

Damon, W. (1995). *Greater expectations: Overcoming the culture of indulgence in America's homes and schools.* New York: Free Press.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*, 1040–1048.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95,* 256–273.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*, 169–189.

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*(1), 218–232.

Elliot, A. J., & Covington, M. V. (2001). Approach and avoidance motivation. *Educational Psychology Review, 13*(2), 73–92.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70,* 461–475.

Elliot, A. J., & Mcgregor, H. (2001). A 2X2 achievement goal framework. *Journal of Personality and Social Psychology, 80,* 501–519.

Elliot, A. J., & Trash, T. M. (2001). Achievement goals and the hierarchical model of achievement motivation. *Educational Psychology Review, 13*(2), 139–156.

Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 53,* 5–12.

Finn, C. E. (1990). Narcissus goes to school. *Commentary, 89,* 40–45.

Finney, S. J., Pieper, S. L., & Barron, K. E. (2004). Examining the psychometric properties of the Achievement Goal Questionnaire in a general academic context. *Educational and Psychological Measurement, 64,* 365–382.

Greene, B. A., & Miller, R. B. (1996). Influences on achievement: Goals, perceived ability, and cognitive engagement. *Contemporary Educational Psychology, 21,* 181–192.

Gunaratana, V. H. (1993). *Sati. In mindfulness in plain English*. Somerville, MA: Wisdom Publications.

Hewitt, J. P. (1998). *The myth of self-esteem: Finding happiness and solving problems in America.* New York: St. Martin's Press.

Ironsmith, M., Marva, J., Harju, B., & Eppler, M. (2001). Motivation and performance in college students enrolled in self-paced versus lecture-format remedial mathematics courses. *Journal of Instructional Psychology, 30*(4), 276–284.

Jöreskog, K. G., & Sorbom, D. (1996). *LISREL 8 reference guide.* Lincolnwood, IL: Scientific Software International.

Kirkpatrick, K. L. (2005). *Enhancing self-compassion using a gestalt two-chair intervention,* Unpublished doctoral dissertation, University of Texas at Austin.

Linnenbrink, E. A., & Pintrich, P. R. (2002). Achievement goal theory and affect: An asymmetrical bidirectional model. *Educational Psychologist, 37,* 69–78.

Martin, J. R. (1997). Mindfulness: A proposed common factor. *Journal of Psychotherapy Integration, 7,* 291–312.

McMillan, J. H., Singh, J., & Simonetta, L. G. (1994). The tyranny of self-oriented self-esteem. *Educational Horizons, Spring,* 141–145.

Meece, J. L., Blumenfeld, P. C., & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology, 80,* 514–523.

Midgley, C., Kaplan, A., Middleton, M., Maehr, M. L., Urdan, T., Anderman, L. H., Anderman, E., & Roeser, R. (1998). The development and validation of scales assessing students' achievement goal orientations. *Contemporary Educational Psychology, 23,* 113–131.

Middleton, M., & Midgley, C. (1997). Avoiding the demonsration of lack ability: An under-explored aspect of goal theory. *Journal of Educational Psychology, 89,* 710–718.

Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2*(2), 85–102.

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity, 2*(3), 223–250.

Neff, K. D., Hsieh, Y., & Dejitterat, K. (2005) Self-compassion, achievement goals, and coping with academic failure. *Self and Identity, 4,* 263–287.

Newman, R. S. (1998). Students' help seeking during problem solving: Influences of personal and achievement goals. *Journal of Educational Psychology, 90,* 644–658.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91,* 328–346.

Nisker, W. (1998). Mindfulness: The opposable thumb of consciousness (Chapter 3). In *Buddha's nature: A practical guide to discovering your place in the cosmos* (pp. 26–30). New York: Bantam Books.

Pintrich, P. R. (2000a). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology, 25,* 92–104.

Pintrich, P. R. (2000b). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*(3), 544–555.

Robins, R. W., & Pals, J. L. (2002). Implicit self-theories in the academic domain: Implications for goal orientation, attributions, affect, and self-esteem change. *Self and Identity, 1,* 313–336.

Roeser, R. W., Midgley, C., & Urdan, T. C. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioral functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology, 88*(3), 408–422.

Rosenberg, L. (1999). Breathing with the body (Chapter 1). In *Breath by breath: The liberating practice of insight meditation* (pp. 10-39). Boston: Shambala.

Ryan, A. M., & Pintrich, P. R. (1997). Should I ask for help? The role of motivation and attitudes in adolescents' help seeking in math class. *Journal of Educational Psychology,* 89, 329–341.

Seligman, M. E. (1995). *The optimistic child.* Boston, MA: Houghton Mifflin.

Tanaka, A., & Ysmauchi, H. (2001). A model for achievement motives, goal orientations, intrinsic interest, and academic achievement. *Psychological Reports, 88,* 123–135.

Turner, J. C., Thorpe, P. K., & Meyer, D. K. (1998). Students' reports of motivation and negative affect: A theoretical and empirical analysis. *Journal of Educational Psychology, 90,* 758–771.

Turner, J. E., Husman, J., & Schallert, D. L. (2002). The importance of students' goals in their emotional experience of academic failure: Investigating the precursors and consequences of shame. *Educational Psychologist, 37,* 79–89.

Urdan, T., Midgley, C., & Anderman, E. M. (1998). The role of classroom goal structure in students' use of self-handicapping strategies. *American Educational Research Journal, 35,* 101–122.

Öz-duyarlık ve Başarı Yönelimleri: Yapısal Eşitlik Modeliyle Bir İnceleme

(Özet)

Problem Durumu: Son zamanlarda birçok araştırmacı, bireyin kendine yönelik pozitif tutumlar geliştirmesi için cesaretlendiren benlik saygısı programlarını eleştirmiş ve bu tür programların bireyin benliğine aşırı düzeyde vurgu yaptığı ve kendisini sevmesini yoğun biçimde empoze ettiği için narsistik tutumlara veya sağlıksız bir benlik algısı gelişimine yol açtığını iddia etmiştir. Bu tartışmalar Budist felsefesini temel alan ve bireyin kendine yönelik işlevsel tutumlar geliştirmesinde alternatif bir bakış açısı sağlayan *öz-duyarlık* yapısının öne sürülmesine yardımcı olmuştur. Öz-duyarlık kavramı, bireyin acı ve sıkıntı çekmesine neden olan duygularına açık olması, kendine özenli ve sevecen tutumlarla yaklaşması, yetersizlik ve başarısızlıklarına karşı anlayışlı ve yargısız olması ve yaşadığı olumsuz deneyimlerin insan yaşamının bir parçası olduğunu kabul etmesi olarak tanımlanabilir. Öz-duyarlık; öz-sevecenlik, paylaşımların bilincinde olma ve bilinçlilik şeklinde üç temel unsur içermektedir. Öz-duyarlığın bu üç unsuru kavramsal anlamda birbirlerinden farklı olmalarına ve fenomonolojik düzeyde farklı yaşanmalarına rağmen birbirleriyle karşılıklı etkileşimde bulunmakta, birbirlerinin meydana gelmesine ve gelişimlerine yardımcı olmaktadır. Araştırmalar öz-duyarlığın, öz-eleştiri, depresyon, anksiyete, derin düşünme ve düşünce baskısı ile negatif; sosyal ilişki, duygusal zekâ ve öz-iradeli olmayla pozitif ilişkili olduğunu kanıtlamıştır. Aynı zamanda öz-duyarlığın benlik saygısı ile anlamlı düzeyde ilişkili olduğu, narsizmle ise ilişkili olmadığı bulunmuştur.

Öz-duyarlık alanında yapılan araştırmalar oldukça yeni olduğu için, yaşamın çeşitli alanlarında bu yapının pozitif çıktılarla ilişkisini inceleyen farklı araştırmalara ihtiyaç vardır. Bu araştırma alanlarından birisi öz-duyarlık ile başarı yönelimleri arasındaki ilişkidir. Eğitim psikologları genellikle öğrenme temelli ve performans temelli başarı yönelimleri arasında ayrım yapmaktadır. Öğrenme yönelimli öğrenciler, öğrenme çalışmalarına merak ve becerilerini geliştirme, yeni şeyler öğrenme ve öğrenecekleri şeyleri tam anlamıyla anlama amacıyla motive olmaktadır. Bu öğrenciler başarıya yönelik standartlarını kendileri belirler, başarı ve başarısızlığı çabaya yükler ve hataları öğrenme sürecinin doğal bir parçası olarak görürler. Performans yönelimli öğrencileri öğrenme çalışmalarına motive eden temel faktör ise öz-değer duygularını koruma ve artırmadır. Bu öğrenciler başarı ve başarısızlığı yeteneğe atfeder ve yetenek düzeylerini sosyal karşılaştırma aracılığıyla değerlendirirler.

Başarı yönelimleri alanında yapılan araştırmaların performans yönelimini uyumsuz olarak tanımlaması, araştırmacılar arasında tartışmalara neden olmuş ve performans yöneliminin tamamen uyumsuz olmadığı yönünde bir görüşün gelişmesini sağlamıştır. Buna bağlı olarak performans yöneliminin ikiye ayrılabileceğini öne süren bir model geliştirilmiş ve bu modelde performans yönelimi yaklaşma ve kaçınma şeklinde ikiye ayrılmıştır. Performans-yaklaşma yönelimli öğrenciler diğerlerinden daha fazla performans sergilemek ve yetenekli olduğunu kanıtlamaya, performans-kaçınma yönelimli öğrenciler ise beceriksiz ve başarısız görünmekten kaçınmaya çalışırlar.

Performans yöneliminin yanı sıra son zamanlarda bazı araştırmacılar, öğrenme yöneliminin yaklaşma ve kaçınma unsurları olabileceğini öne sürmüş ve 2X2 başarı yönelimleri modelini geliştirmişlerdir. Bu model öğrenme-yaklaşma, öğrenme-kaçınma, performans-yaklaşma ve performans-kaçınma şeklinde dört başarı yönelimi içermektedir. 2X2 başarı yönelimleri modeline göre, öğrenme-kaçınma yönelimini benimseyen öğrenciler dersleri tam anlamıyla öğrenememe, öğrendikleri konuları unutma, konuları yanlış anlama, öğrenme görevlerine hakim olamama ve hata yapma gibi durumlardan kaçınmaya odaklanmaktadır. Bu araştırmada da kuramsal çerçeve olarak 2X2 başarı yönelimleri modeli temel alınacaktır. Duygusal ve zihinsel süreçlerin öğrencilerin başarı yönelimlerini benimsemelerinde önemli rol oynamasından dolayı, öğrencilerin öz-duyarlık düzeylerindeki farklılıkların başarı yönelimlerine yansıyacağı düşünülmektedir.

Araştırmanın Amacı: Bu araştırmanın amacı öz-duyarlık ile başarı yönelimleri arasındaki ilişkileri incelemektir.

Araştırmanın Yöntemi: Araştırmanın örneklemini Sakarya Üniversitesi Eğitim Fakültesi'nin çeşitli bölümlerinde öğrenim gören 646 üniversite öğrencisi oluşturmaktadır. 319'u kız, 327'si erkek öğrenciden oluşan örneklemin yaş ortalaması 19,7'dir. Araştırmada ölçme aracı olarak Öz-duyarlık Ölçeği ile 2X2 Başarı Yönelimleri Ölçeği kullanılmıştır. Neff (2003b) tarafından geliştirilen Öz-duyarlık Ölçeği 6 alt boyuttan oluşmaktadır. Bunlar; öz-sevecenlik, öz-yargılama, paylaşımların bilincinde olma, izolasyon, bilinçlilik ve aşırı özdeşleşmedir. 26 maddeden oluşan ve 5'li Likert tipi bir ölçme aracı olan Öz-duyarlık Ölçeği'nin Türkçe uyarlama çalışması ile geçerlik ve güvenirlik analizleri Akın, Akın ve Abacı (2007) tarafından gerçekleştirilmiştir. Doğrulayıcı faktör analizinde, Ki-kare değerinin (x^2 = 779.01, N = 633, sd = 264, p = 0.00) anlamlı ve uyum indeksi değerlerinin RMSEA = 0.056, NFI = .95, CFI = .97, IFI = .97, RFI = .94, GFI = .91, SRMR = 0.05 olduğu bulunmuştur. Ölçeğin iç tutarlık güvenirlik katsayıları .72 ile .80, üç hafta arayla yapılan test-tekrar test güvenirlik katsayıları ise .56 ile .69 arasında değişmektedir. Akın (2006) tarafından geliştirilen bu ölçme aracı 26 maddeden ve öğrenme-yaklaşma yönelimi (ÖYBY), öğrenme-kaçınma yönelimi (ÖKBY), performans-yaklaşma yönelimi (PYBY) ve performans-kaçınma yönelimi (PKBY) şeklinde 4 alt ölçekten oluşmaktadır. 5'li Likert tipi bir ölçme aracı olan 2X2 Başarı Yönelimleri Ölçeği'nin faktör yükleri .41 ile .98 arasında sıralanmaktadır. Ölçeğin iç tutarlılık güvenirlik katsayıları alt boyutlar için .92 ile .97 arasında, test-tekrar test güvenirlik katsayıları ise .77 ile .86 arasında değişmektedir. Öz-duyarlık ile başarı yönelimleri arasındaki ilişkiler korelasyon ve yapısal eşitlik modeliyle incelenmiştir. Elde edilen veriler SPSS 11.5 ve LISREL 8.54 programları kullanılarak analiz edilmiştir.

Bulgular ve Sonuçlar: Öz-duyarlık ile başarı yönelimleri arasındaki ilişkileri incelemek için yapılan korelasyon sonucunda, öz-duyarlığın öz-sevecenlik, paylaşımların bilincinde olma ve bilinçlilik alt boyutlarının öğrenme-yaklaşma ve öğrenme-kaçınma yönelimleriyle pozitif, performans-yaklaşma ve performans-kaçınma yönelimleriyle negatif ilişkili olduğu görülmüştür. Öz-duyarlığın diğer alt boyutları olan öz-yargılama, izolasyon ve aşırı özdeşleşme ise öğrenme-yaklaşma ile negatif, öğrenme-kaçınma, performans-yaklaşma ve performans-kaçınma yönelimleriyle pozitif ilişkili bulunmuştur. Başarı yönelimlerinin öz-duyarlık tarafından açıklanma düzeyini belirlemek amacıyla kurulan yapısal eşitlik modelinden elde edilen uyum indeksleri modelin uyumlu olduğunu göstermektedir (χ^2=18.47, df =18, p=0.42500,

GFI=.99, AGFI = .98, NFI=1.00, CFI=1.00, RMSEA = 0.006). Yapısal eşitlik modelinden elde edilen sonuçlar, öz-sevecenlik, paylaşımların bilincinde olma ve bilinçliliğin öğrenme-yaklaşma ve öğrenme-kaçınma yönelimlerini açıklamada pozitif, performans-yaklaşma ve performans-kaçınma yönelimlerini negatif etkide bulunduğunu göstermiştir. Öz-yargılama, izolasyon ve aşırı özdeşleşme ise öğrenme-yaklaşma yönelimini açıklamada negatif, öğrenme-kaçınma, performans-yaklaşma ve performans-kaçınma yönelimlerini açıklamada pozitif katkı yapmıştır. Öz-duyarlık alt boyutlarının öğrenme-yaklaşma yönelimini açıklama oranı R^2 = .72, öğrenme-kaçınma yönelimini açıklama oranı R^2 = .39, performans-yaklaşma yönelimini açıklama oranı R^2 = .98 ve performans-kaçınma yönelimini açıklama oranı R^2 = .97 olarak bulunmuştur.

Öneriler: Bu araştırmanın sınırlılıklarını belirtmek son derece önemlidir. Birinci olarak araştırma önceden var olan bir modeli test etmekten çok model kurmaya yönelik olduğu için elde edilen sonuçlar açıklayıcı nitelik taşımaktadır. Dolayısıyla farklı bir örneklem üzerinde tekrarlanmadığı takdirde kesin bulgular olarak ele alınması sakıncalı olabilir. İkinci olarak örneklem grubunun üniversite öğrencileriyle sınırlı olması elde edilen bulguların genellenebilirliğini bir derece kısıtlamaktadır. Bu nedenle araştırmada ele alınan değişkenlerin üniversite öğrencileri dışındaki diğer örneklem grupları üzerinde incelenmesi önemlidir. Ayrıca yapısal eşitlik modeli her ne kadar nedenselliğe yönelik sonuçlar ortaya koysa da doğa olarak korelasyonel veriler kullanıldığı için araştırmada ele alınan değişkenler arasındaki nedenselliğe ilişkin kesin açıklamalar yapmak zordur. Ayrıca eğitsel ortamların bireylerin özduyarlık düzeylerinin gelişmesine yardımcı olacak şekilde düzenlenmesi gerekmektedir.

Anahtar Sözcükler: Öz-duyarlık, başarı yönelimleri, yapısal eşitlik modeli, path analizi

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Employability Competences of Vocational Secondary School Students

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Abstract

Problem Statement: The competitiveness of individuals in the labor market depends not only on their vocational competences, but also on whether they have employability competences and whether they can continuously develop them. Employability competences must be such that the individual can find an appropriate job for himself/herself, can advance his/her career and can adapt to social, technological and organizational changes. However, research has indicated that employability competences of individuals are not well-suited to the business market. Hence the need to consider the varying points of view of those concerned in this issue.

Purpose of the study: The primary purpose of this research is to identfy the views of unemployed vocational/technical school graduates, employed vocational/technical school graduates-employees, vocational/technical school principals, vocational/technical school teachers and of employers who employ vocational/technical school graduates concerning employability competences.

Methods: This study is designed as a qualitative one. Participants were selected through maximum variety sampling from purposive sampling methods. The participants in the study were 26 vocational/technical school new graduates who have not yet been employed, 24 current employees who graduated from vocational/technical schools, 20 vocational/technical school principals, 26 vocational/technical school teachers and 20 employers who employ vocational/technical school graduates in their workplaces. In the study, data was collected through an open-ended written questionnaire administered to all groups, and the participants were asked to answer two open-ended questions in writing. The data gathered was evaluated using descriptive analysis and was presented both in written form and in tables as frequencies.

Findings: Based on the views of the participants, this research maintains that vocational/technical school graduates should possess some of the skills and personal attributes in the twenty-two competences clusters in

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order to be employed or to sustain and develop their position in existing jobs; yet the number of competence groups on which all participants agreed was only eight. The highest number of competence expressions belongs to the themes of "communication" and "interpersonal relationships". The lowest number of competence expressions, however, belongs to the themes of "numeracy", "personal presentation", "being energetic" and "being patient. The views of principals and teachers, employees and employers are similar in terms of production of the same competence themes. "communication", "interpersonal relationships", "honesty and reliability", and "foreign language" have been identified as the most important employability competences.

Conclusions and Recommendations: The participants state that besides vocational competences, vocational/technical school graduates should acquire certain employability competences to gain employment and to keep on in their jobs. Nevertheless the variety of competences (themes) expressed by the groups remained limited. Some of the competences dealt with in the relevant literature were not mentioned. Relevant groups need to raise their awareness of employability competences so as to develop a common "employability competences framework".

Keywords: employability, competences, vocational education, key skills

In terms of their effects on both economic productivity and prosperity, the entry of people to the workforce and the levels of their employability competences have been under consideration. Owing to the ever-increasing of the fact of globalization, the competitiveness of individuals, institutions and countries has been placed a high premium. Countries enhance their competitiveness through the qualities of their workforce. They must also devise educational and vocational/professional standards in order to ensure the emergence of competences. However, competences are also regarded as important for individuals to succeed in life-long learning, to be effective citizens in the society they inhabit, to realize their personal development and to establish successful relations with other people. In the past people were mostly looked at simply in relation to a country's economic performance. That is why the concept of "employability competences" is mentioned under the names of "key skills or competences" (OECD, 2000; The Mayer Committee Report, 1992), "transferable skills" (Drummond, Nixon & Wiltshire, 1998), "generic competences or skills" (Robley, Whittle & Murdoch-Eaton, 2005; Clanchy & Ballard, 1995), "core skills or competences" (Confederation of British Industry, 1998), and "necessary skills as workplace (know-how) competences" (21st Century Workforce Commission, 2000).

The Changing Meaning of Employability

The concept of e*mployability* has been studied in various forms in different periods, yet there is still no generally agreed definition of the term. At first, *employability* was described as "having the capability to gain initial employment, maintain employment and obtain new employment if required" (Hillage & Pollard, 1998, p. 1). It was assumed that graduate students would benefit by developing their key (employability) skills, and would thus improve their chances of gaining employment (The Dearing Committee Report, 1997). This perspective emphasized the supply-side of *employment* (McQuaid & Lindsay, 2005), and directed the attention

to the educational process where the competences would be acquired. Emphasis was laid on individual responsibility for development, with educational backing. Educational institutions were responsible for equipping young people with these competences.

The second approach to the concept of *employability* introduced a new approach which took into account both employers and employees (21st Century Workforce Commission, 2000). A supply and demand perspective was taken; the competences of the employee must be consistent with those required by the employer (Brown, Hesketh & Williams, 2003). This approach reflects the efforts of employers to help meet the needs of the economy, after facing serious skills shortages (The Delors Report, 1996; Smith, 2002).

The concept of *employability* today takes a broader perspective; the subject is not only discussed in terms of the competences employers prefer or employees possess. A more holistic approach takes into account labor, education, training and economic conditions. (Conference Board of Canada, 2000). This perspective argues that "the concept of *employability* relates both to the unemployed person who seeks work, and to those already employed who seek better jobs under their current employer, or under a different one, to improve or sustain their position in the labor market, and to those in education" (McQuaid, Green & Danson, 2005, p. 191; McQuaid & Lindsay, 2005, p. 198). This broader perspective explains the concept of *employability* based on various dimensions -*individual factors*, *personal circumstances* and *external factors* including the conditions that determine whether the person can obtain a job or whether he/she can continue in an existing one, and "employability competences" are considered as only one of the sub-dimensions within "individual factors". This approach subsumes the first and second group and adds further factors and complexities.

Employability Competences

Competences required by any job, often called "employability competences", have been discussed in a broad context and their influences on economic and social processes, and their role in the employment of the individual. Employability competences are defined as "the skills, personal attributes and values which should be acquired by all graduates regardless of their discipline or field of study" (HEC, 1992). *In terms of the individual*; employability competences are those required for that person to gain employment, to get promotion, and to contribute to the developmental goals of the organization (The Conference Board of Canada, 2000). Employability competences are also important in making individuals more productive, compatible, and creative; more able to retain their position in the job; or to move from one job to another for their career progression (McQuaid et al., 2005). Another important aspect of competences for the individual is their relation to self-actualization. Individuals who are aware of and develop their abilities and capacities for growth are assumed to be more satisfied and productive since they perform duties more in keeping with their potential. (Tomlinson, 2007, p. 287).

Human capital is the stock of individual skills, competences and qualifications (Morley, 2001), and therefore *in terms of economy*; employability competences are discussed in relation to their development and use. These might be regarded as a

national asset in production processes that invest in human capital. The competences in this regard are seen as "a product to be traded" (Williams, 2005) or as "marketable commodities" (Jones, 2001, p. 8); and the competences demanded by employers and those acquired by graduates and/or employees must match. Competences must take into consideration the supply-demand balance, with a view to strengthening the link between education and the economy. Educational institutions are viewed as sub-systems supporting the economy (Morley, 2001). It is emphasized that a highly qualified, flexible and constantly updated labor force not only provides fundamental support to the country's economy, but also contributes substantially to the global competitiveness of the country.

In terms of the social; employability competences enhance social inclusion. An education that provides such competences plays a role in preventing the isolation of the individual from social and cultural contexts. It thus becomes a basic instrument of economic and social activity (Williams, 2005). This perspective discusses social involvement both economically and socially. If individuals have the required competences to enter the labor market, they will no longer be excluded from society. They will have a job to sustain their lives (Gray, 2000). Similarly, if they possess the most fundamental instruments to live in a society, i.e. the social competences, then they will not remain outside of the society.

Employability competences are also called "employability skills" (Conference Board of Canada, 1992), "employability competencies" (OECD, 2001; The Mayer Committee Report, 1992) or "key generic skills" (Kearns, 2001). Even if the grouping and naming differ, these studies touch upon similar competences. Some of these groupings on employability competences only include skills (or competences), whereas some include personal attributes (values, attitudes and personality characteristics) as well as skills (ACCI&BCA, 2002). "*Personal attributes*" are listed as loyalty, commitment, honesty and integrity, enthusiasm, reliability, personal presentation, common sense, positive self-esteem, sense of humor, a balanced attitude to work and home life, ability to deal with pressure, motivation and adaptability, and creativity. "*Skills*" are listed in 7 different groups as communication, teamwork, problem-solving, initiative and enterprise, planning and organizing, self-management, learning and technology; and the elements regarded necessary for each skill group are placed in the relevant group as skill expressions. There are 67 skill expressions in this framework developed by ACCI&BCA. "Employability Skills 2000+", which was developed by the Conference Board of Canada (2000), consists of three major domains of competences: *fundamental skills (such as communication, numeric skills etc.)*, *personal management skills (such as continuous learning, work safety, etc.)* and *teamwork skills (such as ability to work with others, to participate in projects and tasks.).* These three major domains include a total of 56 specific skills and attributes. Many countries besides Australia and Canada, such as the United States (21st Century Workforce Commission, 2000), and the United Kingdom (core skills), have done and are doing research on employability competences.

Some research exists on the employability competences that employers require in the employees they will employ. For instance, the study of what employers seek in graduates, Harvey, Moon, Geall, and Bower (1997) maintains that graduates are

expected to be knowledgeable, intelligent, willing to learn, and to acquire self-management, communication, team-working and interpersonal skills. Research conducted in small and medium sized firms (Yorke, 1999) found that the skills which were viewed as valuable by such firms were oral communication, commitment to one's own work, team-work, managing others, ability to analyze the origin of problems in depth, critical thinking, briefing and problem-solving in groups. In the study on competences employers require in employees, Harvey (2000) identified two groups of "attributes": *interactive attributes* (communication, team work, interpersonal skills) and *personal attributes* (intelligence, willingness to learn, learning skills and the ability to sustain learning, research skills, willingness to take risks, initiative, flexibility and adaptability, leadership in making changes and self-skills). As can be observed in the results of the research, "employability competences" are not only limited to skills, but also emphasize personal attributes (Kallioinen, 2007)

Attempts in Turkey

Institutional and academic studies on employability competences in Turkey are fewer and less comprehensive than in other countries. However the "Organizational Structure of the Labor Market and Unemployment in Turkey Report" of TUSIAD (Turkish Industrialists' and Businessmen's Association) (2004) maintains that there is discrepancy between the competences expected by firms and those provided by the educational system. The greater the discrepancy, the longer it takes for graduates to get jobs. The unemployed urgently seek work whilst many positions remain unfilled. The same report states that the rate of unemployed vocational/technical school graduates is almost equal to that of normal high school graduates, and that the problem of inappropriate skills could be overcome by comprehensive and radical educational reform. A similar argument can be observed in the "Labor Market and Unemployment in Turkey Report" of TUSIAD (2002). This asserts that vocational/technical schools do not provide sufficient skills, or the skills provided fail to meet the demands of employers. Coordinated by the MEB (Ministry of National Education) in accordance with the agreement between the Turkish Government and the European Commission, MEGEP (The Project of Strengthening the Vocational Education and Training System in Turkey) project report includes communication, team work, democratic citizenship, reasoning skills, learning and self-management skills as "key skills" in the renewed educational programs (MEGEP Report, 2007). Joint research (2006) by ISKUR (the Turkish Employment Agency) and MEB in 31 provinces and 5651 enterprises (almost all of them employed vocational/technical school graduates) under the auspices of the MEGEP project identified, based on employers' views, the specific requirements that are required for those applying for jobs. According to their findings, employers expect candidates who apply for work to acquire employability competences beyond the technical and vocational - namely social and communication skills, computer skills, entrepreneurship skills, foreign language skills, learning skills, mathematical skills, organizational and personal presentation skills. When, in the same research, the employers were asked to rank (low-normal-high) the capability levels of vocational/technical school graduates, they marked foreign language skills, computer skills and the willingness to work intensively as "low"; whereas they marked the willingness to learn, adaptation to the working environment, and social

and communication skills as "high". A report (2007) prepared by TURKONFED (Turkish Enterprise and Business Confederation) and ERG (Education Reform Initiative) suggests that all secondary school graduates should acquire literacy and numeric skills, problem solving, critical thinking, foreign language, information and communication technology skills, social skills and entrepreneurial skills.

The studies in Turkey show that competences of vocational/technical school graduates mostly come under the concept of "key skills"; the difference between vocational qualifications and employability competences have not yet been sufficiently understood. Turkey is not yet ready to develop a national "employability framework" or "employability competences framework". The Occupational Qualifications Agency was officially established in 2006 to "identify the basics of national qualifications in technical and vocational fields". The institution is expected to conform to national and international vocational standards including employability competences.

Method

The Purpose of the Study

The primary purpose of this research is to identify the views of the unemployed vocational/technical school graduates (students), the employed vocational/technical school graduates (employees), the vocational/technical school principals, the vocational/technical school teachers and the employers who employed vocational/technical school graduates as employees concerning employability competences. Based on this primary purpose, answers to the following questions were sought:

1. According to the views of the above, what are the employability competences that vocational/technical school graduates (students) should acquire in order to gain employment and to maintain employment?

2. Which employability competences do they consider to be more important?

Participants

This study was designed as a qualitative one. Participants were selected through maximum variety sampling from purposive sampling techniques. The objective in maximum variety sampling is to create a relatively small sample but for this sample to reflect, to the maximum possible degree, the variety of individuals who might be a party to the subject in the sample. It was thus found appropriate to conduct research on a group that includes vocational/technical school graduates who are expected to acquire employability competences, employers who employ vocational/technical school graduates as employees, employed vocational/technical school graduates, and vocational/technical school principals and teachers who are responsible, as educational leaders, for the success of their schools, and for the development and execution of the educational program. In this context, the individuals who play a role in the employment of vocational/technical school graduates, and who have a rich knowledge and/or experience of general employability competences, constituted the research sample. This ensured that the findings and results obtained were richer, and that both similar and differing views of group members from different positions could be reflected in the results. Based on the purposive sampling methods, the research

included 26 newly graduated and currently unemployed vocational/technical school graduates, 24 employed vocational/technical school graduates, 20 vocational/technical school principals, 26 vocational/technical school teachers and 20 employers who employed vocational/technical school graduates as employees.

Collection and Analysis of the Data

The data of this research was collected through "open-ended written questionnaire" from all groups. The participants expressed their views on the subject by answering two open-ended questions in writing. The participants were asked to indicate, correctly and impartially, the employability competences that play a role in the employment of vocational/technical school graduates. This was to be based on their knowledge, observations and/or experiences. Firstly an explanation was directed to the participants: "Some of the most important factors that facilitate finding a job in a field are to obtain knowledge of, skills for and attitudes towards occupation at an adequate level. Other than vocational knowledge and skills; some skills, attitudes, capacities and personal attributes will facilitate the employment of vocational/technical school graduates, and will be important for employers in their employment. These skills will help in getting ahead of other candidates for the job. Skills that will be valid regardless vocational disciplines are called employability competences. Following the explanations, all groups were asked "*What are the employability competences that vocational/technical school graduate/students should* acquire *in order to gain employment and to maintain employment?"* and secondly, all participants were then asked "*Which of the above-indicated employability competences do you consider to be more important in employment?*" All groups were asked to list the three competences they found the most important from the "most important" to the "less important". Questions were asked face-to-face and thus any participant queries could be answered, ensuring more reliable answers.

Descriptive analysis techniques were applied to the data resulting from the first question. During the descriptive analysis, first, the expressions of competences which were described in writing in response to the first question were coded; totalling 1096 items (expressions of competences); then these items were grouped under certain categories to form themes of competences. Due care was taken to ensure that the themes distinctly different from each other created a meaningful whole in themselves in terms of competences. The frequency of each competence was stated to give an idea of the ranking order and statements in the "findings" section were supported by actual quotes from the questionnaires. The process of developing themes by grouping the codes under certain categories was repeated twice with a one month of interval in between; and tests were made to ensure that the competences (codes) that were expressed in writing were grouped the same way under the same themes. In the second coding, certain personal attributes were placed under the skills category due to the way they were expressed, and it was agreed that this was a more appropriate grouping.

The analysis of the responses to the second question proceeded thus: At first the competences that were indicated in the first line were identified, then the percentage of being in the first line for each competence was calculated, and the competences indicated in the first line were ranked based on this percentage. The same calculation was repeated for the other two lines. These calculations were repeated for each

participant group. The tables which reflect the views concerning the second question were prepared both for each group, and for all participants.

Findings and Discussion

At the end of the descriptive analysis, the responses to the two questions were assessed and discussed separately.

Views on Employability Competences That Facilitate Employment

The result of the analysis that was conducted based on the expressions of competences indicated by the participants is presented in Table I. At the end of the analysis, 22 themes (groups) were identified and the frequencies of the expressions of competences within each theme are presented in the table. The total frequencies obtained indicated that the groups prioritized the themes of "communication" (176), "interpersonal relationships" (124) and "honesty and reliability" (112). These are followed by "willingness to learn" (92), "adaptation to changes and innovations" (80), "foreign language" (72) and "self-management" (72). All groups reflected their common views on 8 themes of competences by indicating their expressions of competences regarding these themes and the additional theme of "self-confidence" (40). In other words, the 8 competence groups mentioned are the employability competences that vocational/technical school graduates should acquire to be employed or to sustain their position *according to all the groups*. The lowest expressions of competences are found in the themes of "numeracy" (12), "personal presentation" (12), "being energetic" (8) and "being patient" (4). The finding on "personal presentation" is especially interesting. *Only* the principals, the teachers and the employers commented on this competence. Those in the younger age group did not make any remarks on this competence group (theme). The literature also refers to this competence as "aesthetic skills" (Guile, 2002) or "appearance" (Taylor, 1998; Nickson, Warhurst, Witz & Cullen, 1998). Taylor (1998) explains this competence as the management of one's feelings and appearance, whereas Nickson et al. (1998) explain it as exhibiting certain styles of appearance (e.g. hair style, clothing and physical size). This finding can be seen as something that requires attention by young job-seekers or employees who wish to change jobs.

Competences in *communication, interpersonal relations, honesty and reliability, willingness to learn and adaptation to changes/innovations* are those that are most emphasized and expected of graduates by all groups if they are to gain employment. *Principals* attach considerable importance to expressions of competences in communication in the employment of vocational/technical school graduates. They conveyed their views in expressions such as "he/she must express himself/herself well", "he/she must have good diction", "he/she can establish good relations with others in the office" and "he/she must use correct grammar in reports, this is as a requirement of the job". Principals are of the opinion that "honesty and reliability" is a required attribute for vocational/technical school graduates who seek employment. They frequently made such remarks as "should not lie", "should be honest", "should gain the confidence of those he/she works with" as they tried elaborated on the competence.

In a similar vein, *teachers* stressed "communication" in their statements, using such expressions as "should listen carefully to what is spoken", "should express himself/herself clearly", and "should express his/her ideas clearly in writing". Another competence favoured by teachers is the "interpersonal relationships". They often used such expressions as "should be respectful", "should behave nicely to customers", "should get on well with work-mates".

New graduates mostly commented on the competence of "adaptation to changes/innovations". The graduates understood this to mean "should follow up technology well", "should seek innovations", "should be enthusiastic to use new tools" and "should employ new techniques". The graduates, like other groups, also attached considerable importance to competence in communication. This was understood as "can speak briefly and effectively", "can write correctly", and "can listen to other speakers". Another competence that graduates emphasize is the "willingness to learn". Frequent phrases included "should be open to learn", "should obtain new knowledge", "should develop himself/herself by reading", and "should participate in in-service training".

Employees, on the other hand, understood "interpersonal relationships" to mean "should not be aggressive", "should get along with managers", "should be nice in human relations" and so on. Employees do not regard "communication" and "foreign language" as essential competences for employment. They state that "communication" is important to "tell the employer what I know", and that "foreign language" is necessary to "get a job abroad" and to "read the English manuals of certain machines and tools".

Employers mostly commented on the competence of "interpersonal relationships", using such expressions as "should get on well with people", "should respect colleagues", "should not cause conflict" and "should adapt to social environments". This is significant when evaluated alongside the findings of a MEGEP project. The Project Report shows that "social and communication skills" constituted 27% of the overall skill problems. This finding demonstrates that employers face problems regarding this competence. The report also asked employers to do a ranking of the competence levels of vocational/technical school graduates; and the employers rated "social and communication skills" as "high". This finding can be understood to mean that employers employ their current employees by taking this competence into consideration. When the findings of these two research projects are evaluated together, it is easy to understand why employers attach that much importance to this competency. Another competence that employers usually emphasize is "honesty and reliability". Employers often state that honesty and reliability play a considerable role for graduates in gaining employment. Employers used such expressions in their statements as "should be honest", "should gain the confidence of colleagues", "should keep his/her word", and "should not steal anything from the office".

Table I

Themes and Frequencies of Codes Defined by All Participants for Each Theme Group

Line No.	Employability Competences (themes)	Principals (n= 20)	Teachers (n=26)	New Graduates (n=26)	Employees (n=24)	Employers (n=20)	Total F
		Frequencies of Codes					
1	Communication	60	48	28	24	16	176
2	Interpersonal relationships	12	32	16	28	36	124
3	Willingness to learn	24	16	28	12	12	92
4	Adaptation to changes/innovations	8	8	32	20	12	80
5	Foreign language	4	12	24	24	8	72
6	Self-management	24	12	12	8	16	72
7	Problem-solving	20	8	8	8	-	44
8	Time management	20	16	4	-	-	40
9	Computer literacy	8	8	-	4	12	32
10	Entrepreneurship	12	16	4	-	-	32
11	Team working	4	8	-	8	4	24
12	Leadership	8	4	4	4	-	20
13	Information	12	-	4	4	-	20
14	Numeracy	-	-	8	4	-	12
15	Honesty and reliability	40	20	8	12	32	112
16	Loyalty and commitment	4	20	8	-	8	40
17	Self-confident	8	16	8	4	4	40
18	Clever	4	4	4	-	8	20
19	Hard worker	-	-	4	4	12	20
20	Personal presentation	4	4	-	-	4	12
21	Being energetic	-	4	-	-	4	8
22	Being patient	-	-	4	-	-	4
Total (Frequencies of Codes)		276	256	208	168	188	1096

Principal and *teacher* groups are closer in regard to competences. These groups seem to agree on all themes except for the skill of "communication" and the personal attribute of "being energetic". This consensus may be because the curriculum of vocational secondary education was changed under the remit of the MEGEP Project, both groups are responsible for the implementation of the new curriculum. In their statements the group of *new graduates* were closer to *employers* and *employees* than to the groups of *principals* and *teachers*. The views of the new graduates differ from those of the groups of principals and teachers on six competences; while they are different from those of the groups of employers and employees on only three (computer literacy, team-working and patient patience).

Priority Ranking of Employability Competencies as to Groups

All groups were asked to write down three of the competences they found the most important based on their answers to the first question. The results of the analysis based on the views of the participants are presented in Table II and Table III, taking into account the occurrence percentage of the competences in ranking order. In Table II, it is observed that the competences of "communication" and "interpersonal relationships" are invariably placed in the first line of each group. This finding shows that all groups agree on the importance of these two competences for vocational/technical school graduates to gain and to sustain employment. Research by Callan (2003) shows that teachers and students rate these two competences as "very important" in terms of gaining employment. 58.1% of the teachers and 68.4% of the students rated "communication" as "very important", while 65.7% of the teachers and 74.6% of the students rated "interpersonal relationships" as "very important". It is interesting to note that the personal attributes of "honesty and reliability" are indicated in the *first* and *second line* only by elder groups (principals, teachers and employers). A similar result was also obtained in the research of Callan (2003). 65.7% of teachers found this competence very important, while only 49.7% of students found it very important. This competence which is referred to in the literature as ethical competence is attached less importance by *new graduates* and *employees*.

Table III presents the ranking order of competences and their percentage order based on the views of all the participants. This table indicates that there is a general consensus on certain competences. Competences in "communication", "interpersonal relationships", "honesty and reliability", "foreign language" and "willingness to learn" are regarded as important by all the participants for vocational/technical school graduates to gain and to sustain employment.

Table II

Priority Ranks of Competences Based on Views of Participants and Their Ranking as to Percentages

	The highest %				The lowest%
	Principal				
First line	honesty and reliability	communication	problem solving	self-management	interpersonal relationships
Second line	willingness to learn	time management	honesty and reliability	communication	problem solving
Third line	communication	willingness to learn	self-management	interpersonal relationships	
	Teachers				
First line	communication	honesty and reliability	interpersonal relationships	willingness to learn	
Second line	communication	interpersonal relationships	time management	willingness to learn	loyalty and commitment
Third line	willingness to learn	loyalty and commitment	entrepreneur ship	foreign language	self-confident
	New Graduates				
First line	communication	interpersonal relationships	foreign language	adaptation to changes and innovations	self-management
Second line	interpersonal relationships	willingness to learn	communication	foreign language	
Third line	foreign language	adaptation to changes and innovations	willingness to learn	interpersonal relationships	self-management
	Employees				
First line	interpersonal relationships	communication	foreign language	adaptation to changes and innovations	
Second line	foreign language	interpersonal relationships	communication	willingness to learn	adaptation to changes and innovations
Third line	interpersonal relationships	communication	honesty and reliability	foreign language	
	Employers				
First line	interpersonal relationships	honesty and reliability	self-management	communication	willingness to learn
Second line	interpersonal relationships	communication	honesty and reliability	computer literacy	
Third line	honesty and reliability	communication	interpersonal relationships	willingness to learn	adaptation to changes and innovations

Another competence which is repeated, despite its relatively lower percentages in each line, is the competence of "adaptation to changes/innovations". Research by Smith and Comyn (2003) is consistent with the findings of this present study. The research was conducted with employers, managers and supervisors of 12 enterprises. "Communication" was rated by the groups as the most commonly valued employability skill, and "reliability" was the most commonly valued attribute.

Table III

Priority Ranks of Competences Based on Views of Participants and Their Ranking as to Percentages

First line		Second line		Third line	
communication	28.5%	interpersonal relationships	25%	communication	20.7%
interpersonal relationships	26.7%	communication	24%	willingness to learn	20.7%
honesty and reliability	18.1%	willingness to learn	18.1%	interpersonal relationships	15.5%
foreign language	9.5%	foreign language	9.5%	foreign language	12.9%
self-management	5.2%	honesty and reliability	7.8%	honesty and reliability	10.4%
willingness to learn	4.3%	time management	7.8%	adaptation to changes/innovations	6.0%
adaptation to changes/innovations	4.3%	computer literacy	3.4%	loyalty and commitment	6.0%
problem solving	3.4%	loyalty and commitment	1.7%	self-management	4.3%
		adaptation to changes/innovations	1.7%	entrepreneurship	2.6%
		problem solving	0.9%	self-confident	0.9%
	100%		100%		100%

The participants found thirteen competences important for vocational/technical school graduates to gain and to sustain employment. The competences that were not addressed by the participants in their rankings (in both Table II and Table III) are skills such as "team-working", "leadership", "information", "numeracy", and personal attributes such as "clever", "hard worker", "personal presentation", "being energetic" and "being patient". "Team-working", "information" and "numeracy" are competence groups most frequently addressed in the literature (Smith & Comyn, 2003). The fact that the competence of "team-working" is not rated by the employers may cause problems for enterprises that are operated collaboratively. Numeracy, on the other hand, is accepted as a basic skill (21st Century Workforce Commission, 2000). This competence which might be described as "understanding and making use of statistics, tables and graphs and using mathematical ideas and techniques" is required in many jobs. "Information" is another competence which is not addressed in the priority rankings. This competence which might be described as the ability "to acquire information using various and appropriate sources; to process and evaluate

it; and to utilize of it" is again important for many enterprises for them to obtain the information necessary to their processes.

Conclusions and Recommendations

It is possible to indicate a few results despite the limitations of the research. It may be argued, based on the findings, that the participant groups expect vocational/technical school graduates to acquire certain competences in order to gain and sustain employment. This can be proved by the fact that each group explained at length what competences vocational/technical school graduates should acquire. However, the low number of competences (themes) addressed by the groups demonstrates that certain competences recently required by labour markets of the developed countries, and frequently emphasized as those that a flexible labor should acquire, have not yet been recognized. Employers who are directly responsible for employment fail to mention certain competences generally regarded as crucial in workplace such as problem solving, time management, team working and information. When all the competences are examined considering all the groups, it is again observed that certain competences such as decision-making, critical thinking and creativity working under stress, often discussed in the literature and in many studies, are not mentioned. Nevertheless, such competences as communication, interpersonal relations, honesty and reliability, and foreign language have been specified as important competences.

It might be suggested that in order to develop a common "employability competences framework" all relevant groups should be made more aware of the importance and necessity of employability competences. The results of qualitative and quantitative studies to be made on the subject after this stage will be more meaningful. Research on the subject with a broader sample, for example in different sectors, might assist relevant groups in assessing the subject in relation to their own specific fields.

References

Australian Chamber of Commerce and Industry and Business Council of Australia (ACCI-BCA). (2002). *Employability skills for the future* (Report Commissioned by Department of Education, Science and Training). Canberra, Australia.

Brown, P., Hesketh, A. & Williams, S. (2003). Employability in a knowledge-driven economy [1]. *Journal of Education and Work,* 16(2), 107-126.

Callan, V. J. (2003). *Generic skills: Understanding vocational education and training teacher and student attitudes*. NCVER, Australia.

Clanchy, J., & Ballard, B. (1995). Generic skills in the context of higher education. *Higher Education Research and Development*, 14(2), 155-166.

The Confederation of British Industry. (1998). *CBI Response to "The Learning Age"*.

Retrieved May 7, 2007, from

http://www.cbi.org.uk/ndbs/positiondoc.nsf/1f08ec61711f29768025672a0055f7a8/29D8011A3B0F898E80256732005888CB/$file/learn1.pdf

The Conference Board of Canada (2000). *Employability Skills 2000+*.

Retrieved April 20, 2007, from

http://www.conferenceboard.ca/education/learning-tools/pdfs/esp2000.pdf

Delors, J. (Chair) (1996). *Learning: The Treasure Within*. Report of the International Commission on Education for the Twenty-first Century (The Delors Report). Paris: UNESCO.

Drummond, I., Nixon, I. & J. Wiltshire, J. (1998). Personal transferable skills in higher education: The problems of implementing good practice. *Quality Assurance in Education*, 6(1): 44-58.

Kallioinen, O. (2007, December 13-14)). *Defining and comparing competences at the university level, national level and European level*. Paper presented at the Developing Joint Programmes and Degrees in Nordic and Baltic Countries, Tampere, Finland.

Gray, J. (2000). Inclusion: A radical critique. In: P. Askonas & S. Steward (Eds.), *Social Inclusion: Possibilities and Tensions* (pp. 19-36). Basingstoke: Macmillan.

Guile, D. (2002). Skill and work experience in the european knowledge economy. *Journal of Education and Work*, 15(3), 251-276.

Harvey, L. (2000). New realities: The relationships between higher education and employment. *Tertiary Education and Management*, 6, 3-17.

Harvey, L., Moon, S., Geall, V. & Bower, R. (1997). *Graduates' work: Organizational change and students' attributes*. Centre for Research into Quality, University of Central England, Birmingham.

HEC (Higher Education Council). (1992). *Achieving Quality*. Canberra, Australia. Australian Government Printing Services.

Hillage, J. & Pollard, E. (1998). *Employability: Developing a framework for policy analysis*. London: Department for Education and Employment.

İŞKUR ve MEB. (2006). *İş piyasası ve beceri ihtiyaçları incelemesi 2005: Türkiye'nin 31 ili için işletme incelemesi*. Ankara: MEGEP İş Piyasası Ekibi ve İŞKUR İşgücü Piyasası Departmanı.

Jones, J. (2001). *Generic Attributes: An agenda for reform or control*?. Retrieved from

http://learning.uow.edu.au/ LAS2001/ Selected/jones_2.pdf

Kearns, P. (2001). Generic skills for the new economy: A review of research relating to generic skills, NCVER, Adelaide.

Mayer E. (1992). *Key Competencies*. Report to the Australian Education Council and the Ministers for Vocational Education, Employment and Training. Canberra, Australia.

Mayer E. (1992). *Putting education to work: The key competencies report*, Report to the Australian Education Council and the Ministers for Vocational Education, Employment and Training, Melbourne.

McQuaid, R. W., & Lindsay, C. (2005). The concept of employability. *Urban Studies*, 42(2), 197-219.

McQuaid, R. W., Green, A. & Danson M. (2005). Introducing employability. *Urban Studies*, 42(2), 191-195.

MEB. (n. d.). MEGEP (Mesleki Eğitimi Geliştirme Projesi). Retrieved August 15, 2007, from http://projeler.meb.gov.tr/indextr.html

Morley, L. (2001). Producing new workers: Quality, equality and employability in higher education. *Quality in Higher Education*, 7(2), 131-138.

Nickson, D., Warhurst, C., Witz, A. & Cullen, A. M. (1998, June). *Aesthetic labour in the service economy: an overlooked development*. Paper presented to the Third International Labour Market Conference, Aberdeen.

OECD. (2001). *Competencies for the knowledge economy: Education policy analysis*. Paris.

OECD. (2000). *Definition and Selection of Competencies (DeSeCo): Theoretical and Conceptual Foundations: Executive Summary*. Retrieved from www.deseco.admin.ch.

Robley, W., Whittle, S. & D. Murdoch-Eaton, D. (2005). Mapping Generic Skills Curricula: Outcomes and Discussion. *Journal of Further and Higher Education*, 29 (4): 321-330.

Smith, A. (2002). Evidence of skill shortages in the engineering trades. NCVER: Leabrook SA.

Smith, E. & Comyn, P. (2003). *The development of employability skills in novice workers*. NCVER, Adelaide.

Taylor, A. (1998). Employability skills: From corporate "wish list" to government policy. *Journal of Curriculum Studies*, 30, 143-164.

The Dearing Report (1997). *Higher education in the learning society*. Reported to the National Committee of Inquiry into Higher Education, HMSO, London.

Tomlinson, M. (2007). Graduate employability and student attidutes and orientations to the labour market. *Journal of Education and Work*, 20(4), 285-304.

TÜRKONFED&ERG (2007, Nisan). *Beceriler, Yeterlikler ve Meslek Eğitimi: Finansman Yapısı ve Politika Önerileri*. TÜRKONFED&ERG Yayınları, İstanbul.

TÜSİAD. (2002, Aralık). *Türkiye'de İşgücü Piyasası ve İşsizlik Raporu* (Yayın no. TÜSİAD-T/2002/12-354). İstanbul.

TÜSİAD. (2004). *Türkiye'de İşgücü Piyasasının Kurumsal Yapısı ve İşsizlik*, (Yayın no. TÜSİAD-T/2004-11/381). İstanbul.

21st Century Workforce Commission (2000). *Building America's 21st century workforce*. National Alliance of Business and US Department of Labour, Washington, DC.

Williams, J. (2005). Skills as metaphor: an analysis of terminology used in *Success For All* and *21st Century Skills*. *Journal of Further and Higher Education*, 29(2), 181-190.

Yorke, M. (1999). The skills of graduates: a small enterprise perspective. In: D. O'Reilly, L. Cunningham & S. Lester (Eds.), *Developing the Capable Practitioner* (pp. 174-183). London: Kogan Page.

Mesleki ve Teknik Lise Mezunlarının İstihdam Edilebilirlik Yeterlikleri

(Özet)

Problem Durumu: Küreselleşme olgusunun ortaya çıkardığı rekabet nedeniyle, bireylerin, kurumların ve ülkelerin rekabet edebilirlik özellikleri mercek altına alınmaktadır. Bu nedenle insanların işle ilgili yeterlikleri, ekonomik refah ve üretkenlik açısından ülkelerin gündemini en çok meşgul eden konulardan biri olagelmiştir. Öte yandan bireylerin işgücü piyasasında herhangi bir işe girebilmek için birbirleriyle rekabet edebilmeleri, mesleki yeterliklerinin yanısıra, istihdam edilebilirlikle ilgili yeterliklere sahip olmalarına ve bunları sürekli olarak geliştirmelerine bağlıdır. İstihdam edilebilirlikle ilgili yeterlikler; bireyin kendine uygun bir iş bulabilmesi, kariyer ilerlemesi yapabilmesi, işini geliştirebilmesi, sosyal, teknolojik ve kurumsal değişimlere uyumlarını sağlayabilmesine uygun nitelikte olmalıdır. Ülkeler iş gücünün nitelikleri yoluyla rekabet edebilme güçlerini arttırmaya çalışmakta ve bu kapsamdaki yeterliklerin oluşmasını güvence altına almak amacıyla eğitim ve meslek standartları geliştirme çabalarını sürdürmektedirler. Amerika Birleşik Devletleri, bir çok Avrupa ülkesi, ve Avustralya 1990'lı yıllardan bu yana insan gücünün niteliklerini yapılan bir çok araştırmayla bu açıdan da analiz etmeye ve bu yeterliklere ilişkin genel bir çerçeve oluşturmaya çabalamaktadır. Ancak araştırmalar bireylerin istihdam edilebilirlikle ilgili yeterliklerinin iş piyasasına uygun olmadığına işaret etmektedir. Bu nedenle ilgili grupların konu hakkındaki görüşlerinin benzer ve farklı yönlerinin saptanması ve üzerinde uzlaşılmış bir çerçevenin ortaya konması gerekmektedir.

Araştırmanın Amacı: Bu çalışmanın temel amacı; henüz herhangi bir iş yerinde çalışmayan mesleki ve teknik lise mezunlarının, bir iş yerinde çalışan mesleki ve teknik lise mezunlarının, mesleki ve teknik lise müdürlerinin, mesleki ve teknik lise öğretmenlerinin ve mesleki ve teknik lise mezunlarını istihdam eden işyeri sahiplerinin, mesleki ve teknik lise mezunlarının istihdam edilebilirlikle ilgili yeterliklerine ilişkin görüşlerini saptamaktır. Bu temel amaca bağlı kalınarak aşağıdaki sorulara yanıt aranmıştır: a) Herhangi bir iş yerinde çalışmayan mesleki ve teknik lise *mezunlarının*, bir iş yerinde *çalışan* mesleki ve teknik lise *mezunlarının*, mesleki ve teknik lise *müdürlerinin,* mesleki ve teknik lise *öğretmenlerinin* ve mesleki ve teknik lise mezunlarını istihdam eden *işyeri sahiplerinin* görüşlerine göre, a) mesleki ve teknik lise mezunlarının işe alınmalarında ve işi sürdürmelerinde sahip olmaları gereken istihdam edilebilirlikle ilgili yeterlikler nelerdir?; b) meslek lisesi mezunlarının işe alınmalarında ve işi sürdürmelerinde sahip olmaları gereken istihdam edilebilirlikle ilgili yeterliklerden hangileri daha önemlidir?

Araştırmanın Yöntemi: Bu çalışmada nitel araştırma yöntemi kullanılmıştır. Araştırmada nitel araştırmalarda kullanılan amaçlı örnekleme yöntemlerinden maksimum çeşitlilik örneklemesi kullanılmıştır. Burada amaç, göreli olarak küçük bir örneklem oluşturmak ve bu örneklemde çalışılan konuya taraf olabilecek bireylerin çeşitliliğini maksimum derecede örnekleme yansıtmaktır. Çalışmanın katılımcılarını; mesleki ve teknik liseden yeni mezun olmuş ve henüz herhangi bir işte çalışmayan 26 mezun, hali hazırda bir iş yerinde çalışan mesleki ve teknik lise mezunu 24 işgören, 20 mesleki ve teknik lise müdürü, 26 mesleki ve teknik lise öğretmeni ve

işyerlerinde mesleki ve teknik lise mezununu istihdam eden 20 işveren oluşmaktadır. Bu araştırmanın verileri tüm gruplara uygulanan "açık uçlu yazılı anket" yoluyla toplanmıştır. Katılımcılar yazılı olarak iki açık uçlu soruya yanıt vererek konuya ilişkin görüşlerini belirtmişlerdir. Araştırmaya katılanlardan, mesleki ve teknik lise mezunlarının işe girmelerinde rol oynayan istihdam edilebilirlikle ilgili yeterlikleri, bilgi, gözlem ve/veya deneyimlerine dayalı olarak, doğru ve yansız biçimde belirtmeleri istenmiştir. Birinci sorunun verileri üzerinde betimsel analiz tekniği uygulanmıştır. İkinci soruya verilen yanıtların analizinde ise şu yol izlenmiştir: Önce birinci sıraya yazılan yeterlikler belirlenmiş, sonra her bir yeterliğin birinci sırada yer alma yüzdesi bulunmuş ve birinci sıraya yazılan yeterliklerin bu yüzdeye göre sıralamaları yapılmıştır. Aynı işlem diğer iki sıra için de ayrı ayrı tekrar edilmiştir. Bu işlemler her bir katılımcı grubu için tekrarlanmıştır. İkinci soruya ilişkin görüşleri yansıtan tablolar hem her bir grup için hem de tüm katılımcılar için hazırlanmıştır.

Bulgular ve Tartışma: Bu çalışmanın bulguları; katılımcıların görüşlerine göre, mesleki ve teknik lise mezunlarının istihdam edilebilmeleri ve elde ettikleri işi sürdürebilmeleri için yirmi iki yeterlik grubundaki bazı beceri ve kişilik özelliklerine sahip olmaları gerektiğini ortaya koymaktadır; ancak tüm katılımcıların üzerinde uzlaştığı yeterlik grubu sayısı sadece sekizdir. Elde edilen toplam yeterlik ifadeleri, grupların en fazla "iletişim", "kişilerarası ilişkiler" ve "dürüstlük ve güvenirlik" ilgili temalara yer verdiklerine ortaya koymaktadır. Bunu "öğrenmeye gönüllü olma", "değişmelere ve yeniliklere uyum sağlama", "yabancı dil" ve "öz-yönetim" yeterlikleri izlemektedir. Tüm gruplar bu temalara ve ek olarak "özgüven" temasına ilişkin yeterlik ifadeleri yazarak sekiz yeterlik alanındaki ortak görüşlerini yansıtmışlardır. Bir başka deyişle sözü edilen sekiz yeterlik alanı grupların tümüne göre mesleki ve teknik lise mezunlarının işe girmelerinde ve işi sürdürmelerinde sahip olunması gereken istihdamedilebilirlik yeterlikleridir. En az yeterlik ifadeleri ise "sayısal", "kişisel görünüm", "enerjik olma" ve "sabırlı olma" temalarında yer almaktadır. "İletişim" ve "kişilerarası ilişkiler" yeterlik temaları her grubun birinci sırasında mutlaka yer almıştır. Bu bulgu tüm grupların meslek lisesi mezunlarının işe girmelerinde ve işi sürdürmelerinde bu iki yeterliğin önemli olduğu konusunda uzlaşma içinde olduklarına işaret etmektedir. Katılımcıların sıralamalarında hiç yer vermedikleri yeterlikler "takım çalışması", "liderlik", "informasyon", "sayısal" gibi beceriler ile "akıllı", "çalışkan", "enerjik" ve "sabırlı" olma gibi kişilik özellikleri ve "kişisel görünüm"dür.

Sonuç ve Öneriler: Katılımcılar mesleki ve teknik lise mezunlarının işe girmelerinde ve işi sürdürmelerinde mesleki yeterliklerin dışında da bazı yeterliklere, istihdam edilebilirlikle ilgili yeterliklere, sahip olmalarını beklemektedirler. Ancak grupların ifade ettikleri yeterlik temalarının çeşidi sınırlı kalmıştır. Alanyazında ve birçok araştırmada sözü edilen bazı yeterliklere hiç değinilmemiştir. Ortak bir "istihdam edilebilirlikle ilgili yeterlikler çerçevesi" oluşturabilmek için konuya taraf olan ilgili grupların istihdam edilebilirlikle ilgili yeterliklere ilişkin farkındalık düzeylerinin arttırılması ve daha geniş katılımlı nitel ve nicel çalışmaların yapılması gerekmektedir.

Anahtar Sözcükler: İstihdamedilebilirlik, yeterlikler, mesleki eğitim, anahtar beceriler

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TQM Implementation in the Distance Education Institute: A Case of North Cyprus

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Abstract

Problem Statement: Since e-learning business models provide an innovative platform for higher education programmes to compete with one another, there is an intensified need to conduct studies of the organizational practices of the Distance Education Institute within the higher education field, considering that most of the recent studies have paid attention only to the pedagogical aspects of distance education practices. Less attention has been paid to distance education organizational practices; this study, therefore, provides fodder for an academic debate on the role that the organizational structure and practices by Total Quality Management (TQM) play in order to provide continuous quality improvements.

Purpose of the Study: The research aims to investigate the perceptions of Distance Education Institute members on Total Quality Management implementation. These organizational aspects need to be considered alongside the pedagogical practices in the Distance Education Institute.

Methods: This research study encompasses a qualitative research model to collect in-depth data from institute members by in-depth interviews, researcher observation rating scaling, and self-reports. The multiple data were triangulated and analysed thematically.

Findings and Results: Triangulated data reveal that the institute has not efficiently implemented and developed six quality dimensions. In leadership, although the organization has a fair leader, there isn't commitment and team work within the organization. In educational management, there is an intensified need for collaboration among staff on course designs for student-centred education. In respect to human

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resources, facilities are limited in providing professional growth for staff. Managerial instabilities, economical and technological problems created limitations on information management where communication flow among staff is not enough. Students and staff are not satisfied in acquiring their needs and expectations as customer focus and satisfaction. Moreover, partnership is not practicing well, although there are internal collaborations with other departments and also external collaborations with universities in Turkey.

Conclusions and Recommendations: The research findings support that there is an unconscious TQM implementation within the institute. Although the institute has strong practices in leadership, information management, customer focus and satisfaction, it has weak practices on human resources management, educational management, and partnership quality dimension. Furthermore, the research provides an academic debate on quality improvements in the Distance Education Institute. For further studies, an organizational model can be developed based on TQM framework and shared by other higher education institutions. Furthermore, different institutes' performances on the TQM framework can be compared to restructure their organizational structures for continuous quality improvement.

Keywords: Distance education, higher education, quality, total quality management

Total Quality Management (TQM) is a management philosophy that has been practiced in a variety of organizations in the business world. The TQM philosophy refers to a continuous improvement cycle whereby it aims to establish customer requirements, meet these requirements, and measure performance in order to reach quality by further improvement (Sila & Ebrahimpour, 2005). It is necessary to focus on quality management to better understand and better implement quality improvement through management and staff involvement (Helms, Williams, & Nixon, 2001; Lundquist, 1998; Montes, Moreno, & Fernandez, 2004).

According to Zhang (2001), TQM encapsulates customer satisfaction as the driving force of quality practices. In general, TQM organizations are dynamic and constantly strive to improve the quality of their performance. In other words, the prinicple goal for everyone in the organization is to make decisions that can meet or exceed customer expectations.

Although some recent studies emphasize the application of total quality management (TQM) to the business environment, other recent studies have focused on the failure of TQM to work in business organizations due to a lack of organizational readiness for TQM, lack of involvement on the side of top management, lack of structural support for implementation efforts, or lack of employee involvement in TQM implementation (Bugdol, 2005; Curry & Kadasah, 2002). Quality improvement efforts within higher education have mainly been limited to specific tasks, such as course development or curriculum design.

Because TQM is an established framework for organizational change and development that works for a wide range of organizational cultures—from top-down

management cultures to those based on personal accountability, individual empowerment, teamwork or customer focus—it is vital to address the consciousness of the higher education distance education institute with regard to TQM implementation so that they, too, can make use of its framework to assess quality assurance (Love, Li, Irani, & Holt, 2000).

The literature has said much about implementations of TQM in the business world for the purpose of evaluating the performance of organizations through empirical studies (Hoang, Igel & Laosirihongthong, 2005; Jabnoun, 2005; Motwani, 2001; Rad, 2006; Sadıkoğlu, 2005). Although the literature does emphasize that TQM is no longer limited to use in industries, business and higher education in countries such as the US and the UK (Sakthivel, Rajendran, & Raju, 2006; Widrick, Mergen, & Grant, 2006), it has been slow to examine the use of the TQM framework in higher education distance education institutes. A research agenda has been put forward that both addresses perceptions of Distance Education Institute on the TQM framework implementation and sheds light on the adaptations of developing countries' higher education programmes to TQM implementation. The TQM framework has been accepted in the higher education sector as a disciplined management process that focuses on quality. Consequently, there has been a strong push for adopting the TQM framework in educational practices (Borahan & Ziarati, 2002; Mızıkacı, 2003).

Morgan (1997) and the investigation of Venkatraman (2007) have helped to construct a theoretical stance for the research study. Six core quality dimensions of TQM are proposed for adoption by the higher education Distance Education Institute; they are described below:

Table I

TQM Framework by Quality Dimensions

Quality Dimensions	Definitions
Leadership	Leadership dimension should examine personal leadership and involvement in creating and sustaining a customer focus, clear goals, high expectations and a leadership system.
Educational Management	This dimension should examine the key aspects of process management, including learner-focused education design, education delivery, services and business operations.
Human Resources Management	This dimension should examine how staff development and training are aligned with the distance education institute's objectives.
Information Management	The information management dimension should examine the management and effectiveness of the use of data and information to support overall mission-related performance excellence.
Customer Focus and Satisfaction	This dimension should examine how the distance education institute determines the needs and expectations of students and stakeholders.
Partnership Development	This dimension should examine how partnerships at various levels, internal and external could be established.

(Aly & Akpovi, 2001; Venkatraman, 2007).

This research aims to investigate the perceptions of the Distance Education Institute in the North Cyprus higher education system on TQM implementation. In

regards to this, the research sought to find answers to the following research questions:

Q1: How does leadership function within the Distance Education Institute?

Q2: How does the decision-making process work in the Distance Education Institute?

Q3: How does the organization provide a good work environment for personal growth?

Q4: How does communication flow in the information management process?

Q5: To what extent are customers and staff satisfied with the organizational structure and its operation?

Q6: To what extent does the partnership function internally and externally in the organization?

Methodology

Research methodologies based on qualitative research design are typically fundamentally interpretive and emergent. In other words, the research relied on socially-constructed meaning informed by the perceptions and experiences of Distance Education Institute's members (Creswell, 2003; Marshall & Rossman, 1999; Silverman, 2000; Verma & Mallick, 1999). In this paper, a case study approach was used to investigate and report the complex dynamic and unfolding interactions of events, human relationships and experiences for the singular programme involved (Cohen, Morrison, & Manion, 2000; Yin, 1994; Yıldırım & Şimşek, 2005).

The Case

The first Distance Education Institute in North Cyprus to employ distance education was established in 2000. It was created as a small part of an academic affairs initiative, and was the first practicing distance education in the country. It now has seven years' experience with pedagogical and organizational aspects of distance education practices with its members. One director, one technical staff member and thirteen tutors lead the distance education program.

Participants

The Distance Education Institute examined in the study has sixteen members: one vice rector, one director, one technical staff member and thirteen tutors; its administrative and organizational structure can therefore be considered small. This research was carried out with involvement of twelve of the members and relied on purposive sampling as a method to effectively consider the limited number of possible participants and allow for voluntarism in research.

Data Collection Methods and Analysis

In-depth interviews formed the basis for one of the data collection methods used in this study. The interview questions were reviewed by experts and later piloted on Distance Education Institute members. The in-depth interviews ran about sixty minutes to investigate the perceptions of the members in relation to research focus. In addition to this, the theoretical framework of the six quality dimensions (see Table I) was informed through the research booklet in order to evaluate participant perceptions of the institute's members on TQM implementation. A structured observation checklist created by the researcher, based on criteria from the six quality dimensions, was also used for data collection. The observation checklist was reviewed by two experts to check the internal validity of the research process. Finally, self-reports were used to examine the perceptions of participants based on their thoughts about and experiences with TQM implementation. Data were analyzed by thematic analysis, using themes that were selected on the basis of the TQM quality dimensions. Furthermore, multiple data were triangulated based on the TQM framework (see Table I).

Participant consent forms were used in order to protect the privacy and confidentiality of the volunteer participants. The research booklet included a presentation of the introduction, purpose, potential significance, design, techniques, research questions and a consent form, which was intended to create consciousness of the significance of the research context for the participants. Although the target organization was small, the use of multiple data collection methods enhanced the richness of the data, allowing for the collection of in-depth perceptions and experiences of Distance Education Institute members.

Findings and Results

This research study reveals that the Distance Education Institute tends to stay in the infant stage of its organizational structure and that there is an unconscious implementation of TQM dimensions with regard to managerial, technological, political, and economical problems.

Leadership

The in-depth interview findings demonstrate that the leadership style of the management in the Distance Education Institute is flexible, open and fair. The director stated that the leadership style of the higher education system requires more financial and moral support to solve the problems of distance education practices by focusing on the challenges of changing the managerial system within the university; the system is supported by one technical staff member, who described the leadership style as "fair, open-minded and tolerant." One of the online tutors emphasised, "leadership style of the organization reflects that of a flexible management, for example, the director is trying to be flexible and share communicative practices. But the authority structure of the system, being a government university, limits flexible management." The other online tutors indicated that the director is a good leader who tries to make fair decisions.

Observed researcher findings related to the leadership quality dimensions are shown in Table II. These findings indicate that the leaders negotiate with all stakeholders on vision, mission and values decisions. The leaders, furthermore, inform all stakeholders by direct communication, share their experiences and thoughts with all personnel, encourage the production of creative and new thoughts and define the problems of today and of the future. Additionally, the leaders call for major changes, are open-minded, and collaborate with higher education and Distance education institutes. All of these practices function within both the university and Distance Education Institute; however, each organization's functional units have their own values and ethics. In addition, management is participative, shows an appreciation for teamwork, and takes pride in the application of new approaches to contemporary changes.

Table II

Leadership Quality Dimension

	Statements	Degree of Practice in the Distance Education Institute				
		Completely	Much	Moderately	A few	None
01	Leaders negotiate with all stakeholders on vision, mission and values decisions.		X			
02	Leaders inform all stakeholders by direct communication.		X			
03	Leaders share experiences with all personnel.		X			
04	Leaders encourage creative and new thoughts.		X			
05	Leaders define the problems of today and the future.		X			
06	The leaders call for major change.		X			
07	Leaders are open-minded, collaborative.		X			
08	Each organization functional unit has its own values and ethics.			X		
09	Management is participative.			X		
10	Management appreciates teamwork.			X		
11	Management takes pride in the application of new approaches to contemporary changes.			X		

The self-report results enhance the validity of the observation and interview findings in relation to the leadership quality dimension. However, the vice rector of Academic Affairs reported that the leaders only "moderately" negotiate with all stakeholders on vision, mission and values decisions, inform stakeholders by direct communication, and share experiences and thoughts with all personnel, the director, and technical staff. Online tutors reported that the leaders negotiate with stakeholders,

inform stakeholders, and frequently share experiences and thoughts. On the other hand, most of the participants reported that the leaders encourage "much" production of creative and new thoughts. One of the tutors, however, commented that the leaders encourage "few" creative and new thoughts. In addition to this, participants agreed on their reports that the leaders define the problems of today and the future, call for major change, and are open-minded and collaborative; and that management is participative, appreciates teamwork, and moderately takes pride in the application of a new approach to contemporary changes. Also, participants all reported that each organization's functional unit needs to have its own values and ethics, although the Distance Education Institute has little experience with having its own values and ethics.

Educational Management

Regarding participation in management, directors and tutors agree that being a small organization, the Distance Education Institute enables the staff to participate in the decision-making process, although not much in practice. Although the members are involved in decisions in some cases, such as for technical problems and during meetings, apart from this, the opportunity is limited. The director indicated "the weakest aspect of the system is that most of the people involved are from computer engineering, since we didn't have an instructional designer in the beginning."

In addition to this, some of the tutors pointed out, "usually, members of the Distance Education Institute participate in the decision-making process." Furthermore, online tutors responded that there are limitations in their participation in management and involvement in the decision-making process due to centralization of the educational system. Even technical staff described management as participative in decision-making. Tutors argue that, while the size of the organization may provide for the possibility of participative management, the organization is not structured around this reality. Rather, everyone is responsible for their own courses and there is not enough opportunity to be involved in the decision-making process regarding course and curriculum design. While the director explained that education, curriculum, and course design are structured by online tutors, tutors argue that learner-focused education is possibly considered by institute members, but is not practiced well. For example, one of the tutors supported, although the institute promotes learner focused education within its distance education practices, learner focused education is not functioning well regarding to the impact of traditional learning and teaching practices. Furthermore, our findings with regards to educational management, as shown in Table III, reveal that although there was moderate encouragement for teamwork and collaboration, commitment to change, and improvements in curriculum design and delivery, there is little evidence that this is being practiced within the Distance Education Institute.

Table III

Educational Management Quality Dimension

	Statements	Degree of Practice in the Distance Education Institute				
		Completely	Much	Moderately	A few	None
01	There is improvement in the design and delivery of education practices.				X	
02	There is encouragement for teamwork and commitment to curriculum design.			X		
03	There are changes in education design and delivery in necessary fields.				X	
04	There is commitment among tutors in the decision-making process to applying the new approach.				X	
05	There is appreciation and support for a constructivist approach for a learner-focused philosophy in on-line education.				X	
06	Curriculum and courses are designed by tutors' collaborative contributions.				X	

Self-report results indicate that there is an intensified need to increase the commitment among tutors in the decision-making process to apply the new approach, as well as to gain appreciation and support for the constructivist approach as a means of implementing a learner-focused philosophy in online education. In addition to this, participants reported that there were moderate improvements in the design and delivery of education practices, encouragement for teamwork, and commitment to curriculum design, and collaborative contributions from the tutors on course designs. Although participants reported that this happened moderately in practice, researchers observed little evidence of improvement in the design and delivery of distance education practices, encouragement for teamwork, commitment to curriculum design, and collaborative contributions of the tutors on course designs. Thus, there are slight contradictions between the observations of the researcher and self-reports; the interview results, therefore, provide a means to determine how to accurately interpret the educational management dimension. In this regard, it should be noted that it is necessary to improve all aspects of the educational management quality dimension.

Human Resources Management

Based on the in-depth interview findings, although the vice rector of academic affairs and the director of the organization stated that there are opportunities for personal growth of the members, such as through conferences and seminars

provided by the university, tutors argue that these opportunities are not sufficient for professional development and personal growth. However, in terms of professional growth opportunities, the online tutors pointed out that taking online courses, experiencing virtual learning and teaching itself are valid ways to stimulate personal and professional growth. Technical staff indicated that the university-provided seminars and conferences are enough to help them grow professionally. On the other hand, one of the tutors made the following criticism:

"There are not enough opportunities; we are trying to attend conferences, we are doing research on an individual basis, and there is no collaborative, organised faculty development activity."

In terms of performance appraisal, all members agree that it is necessary to have a performance appraisal, that is, an evaluation criteria with which to evaluate the Distance Education Institute and its functions so that its members may attempt to develop quality standards. Tutors mentioned that the whole university does participate in SWOT analysis, but this is not especially true for the Distance Education Institute. They argued that it is vital to set strategies to plan for continuous quality improvements in distance education and to reveal the criteria of the performance appraisal to expose the areas where the Distance Education Institute falls short in its strategic planning and performance. Although there are problems with the performance and strategic plan of the organization, the vice rector of academic affairs pointed out that the management system is aware of the problems and subsequently summarized the issue as follows:

"The university is very sensitive to academic and distance education issues; we conduct regular questioning to test the outcome of positive and negative changes by SWOT analysis. The university is preparing an action plan for improvement."

Table IV below shows the human resources management quality dimension; the observer's findings show that training for developing technology is provided to all staff. The results reveal that the performance evaluation is reliable and unbiased; a system of rewards is based on performance; work distribution is executed based on the capabilities, knowledge and skills of each person; the work load distribution is balanced; the occupation of the staff is based on experience and knowledge; and competencies are moderately practiced within the Distance Education Institute. Additionally, sharing the vision of the organization among the staff, taking into account the suggestions and views of staff or staff representatives on decisions regarding job descriptions, having job descriptions for all staff, having criteria to evaluate the performance, providing training and seminars for personal and professional growth, and supporting learning and success for personal growth are other practices implemented by the Distance Education Institute.

Table IV

Human Resources Management Quality Dimension

	Statements	Degree of Practice in the Distance Education Institute				
		Completely	Much	Moderately	A few	None
01	Staff shares the vision of the organization.				X	
02	The suggestions and views of staff or staff representatives are taken into account on decisions about job descriptions.				X	
03	There are job descriptions for all staff.				X	
04	There are criteria to evaluate the performance.				X	
05	Performance evaluation is reliable and unbiased.			X		
06	Rewarding is done based on the performance.			X		
07	Work distribution is done based on the capabilities, knowledge, and skills of the each person.			X		
08	Work load is distributed in balance.			X		
09	Occupation of the staff is based on experience, knowledge, and competencies.			X		
10	Training and seminars are done for personal growth.				X	
11	Training for developing technology is provided to all staff.		X			
12	There are opportunities of learning and success in personal growth.				X	

In terms of the human resources management quality dimension, participants reported that there are limitations on sharing the vision of the organization, and on taking into account decisions about job descriptions and evaluating performance. Also, participants reported that the work load distribution is balanced and that it is done based on capabilities and skills of the members, the occupations of the staff are based on experience and knowledge, and that training for personal growth and technology skills are moderately practiced. In addition to this, there is a need to increase support for learning and success.

Information Management

Technical staff and tutors agree that the Distance Education Institute promises to meet the needs and expectations of the students and members, but that the Distance Education Institute does encounter problems with maintaining assurance to the

academic staff and students, due to the managerial changes, political instabilities, and financial and infrastructure problems.

Tutors, directors, and technical staff highlight that there is no efficient flow of communication among members for completing any specific task or situation within collaborative activity related to managerial changes, financial and infrastructure problems. Because the communication flow among the staff and tutors follows the administrative hierarchy, one of the tutors emphasized the following:

"Communication flows moderately, because if you want to do something, you should do it yourself. There is no opportunity to have simultaneous communication. But I believe that the director and technical staff are helpful in finding a solution. But there are limited resources (financial and legal, limited rights to make decisions due to authority) to solve the problem."

Table V shows our data related to the information management quality dimension. The results reveal that the Distance Education Institute has a very appropriate work environment and that an appropriate level of technical and physical structure was provided to academic staff in light of the organization's location in a developing country. Additionally, materials and technology are provided for the courses; material and technology distribution among staff is performed based on an equality principle. Information and working technology are also readily available. Staff, however, marked "few" with regard to their degree of confidence in sharing knowledge with colleagues.

Table V

Information Management Quality Dimension

	Statements	Degree of Practice in the Distance Education Institute				
		Completely	Much	Moderately	A few	None
01	An appropriate work environment is provided to staff.		X			
02	Staff has confidence to share knowledge among colleagues.				X	
03	Technical and physical structure of the Distance education institute is appropriate.		X			
04	Materials and technology are provided for the course environment.		X			
05	Material and technology distribution is equitable.		X			
06	All working information and technology is accessible.		X			

The results of the self-reports show that there is a high degree of practical application with regard to developing an appropriate work environment for staff, good technical and physical infrastructure, and equitable distribution of materials and technology. Although these practices show strong evidence of an informed manage-

ment, there are limitations in the availability of information and technology; staff members have little confidence in sharing knowledge with colleagues.

Customer Focus and Satisfaction

The in-depth interview findings reveal that, since learner-focused education is a requirement of online education, tutors agree that the system has implemented learner focused education, but they are not quite sure about the effectiveness of the learner-focused education practices in the distance education context. Tutors stated that although education design, delivery and services try to promote constructivist collaborative learning tools, the outcome is not sufficient in practice. Moreover, online tutors agree that, with regard to implementations of course design and delivery, each tutor is responsible for his or her own course and to ensure that these courses address students' needs and expectations, even if tutors are not aware of the effectiveness of the practices.

Table VI shows the findings on customer focus and satisfaction. The findings show that staff and students have many personal rights; the staff feels that they are valuable to the organization and that students show moderate confidence in the education standards. In addition to this, the wages and salary are not sufficient for the staff, considering the country's political and economical instabilities. Moreover, the following results scored "moderately," the creative ideas of students for change are supported, staff and students receive immediate feedback about their needs and expectations, and the needs and expectations of the staff and students are determined by questionnaire, interview techniques, etc. There are a few social and cultural activities for the staff, as well as required programs to prevent demoralization.

Table VI

Customer Focus and Satisfaction Quality Dimension

	Statements	Degree of Practice in the Distance Education Institute				
		Completely	Much	Moderately	A few	None
01	Staff feels that they are valuable to the organization.			X		
02	There are social and cultural activities for staff.				X	
03	Students feel confident about the education standard.			X		
04	There are required preventions for demoralized conditions.				X	
05	Wages, salary are sufficient for staff.				X	
06	The creative ideas of students for change are supported.			X		
07	Staff and students have personal rights.		X			
08	Staff and students get immediate feedback on their needs and expectations.			X		
09	Needs and expectations of staff and students are determined by questionnaire, interview techniques etc.			X		

The self-report results support the interview data, which reveal the need to evaluate the effectiveness of the learner-focused education practice. Participants reported that learner-focused education exists, but it is not being practiced well within the system. Moreover, participants reported that salary and preventions against demoralization do not sufficiently take into account the needs and expectations of the staff.

Partnership Development

Based on the in-depth interview findings, both the vice rector of academic affairs and the director emphasized that the organization was still in the initial stages and adaptations were in progress; however, tutors agreed that collaborative activities among the staff were not sufficient for change and improvement. The technical staff stated that meetings and orientation days are evidence of the partnership among members. The director stated "yes, a good example, of our commitment to collaboration, is that we develop our own management system." On the other hand, one of the tutors emphasized that collaboration is being done on an individual basis when problems arise, but that this is not sufficient.

In terms of internal and external collaboration, tutors agree that the Distance Education Institute collaborates with other departments and faculties within the university for online courses, and has external collaboration with other higher education programs in Turkey, where collaboration within and outside of the institute is not sufficient. One of the tutors stated, "with regard to external collaboration, tutors teach within the online program. Moreover, they utilize assistance from other institutions. With regard to internal collaboration, online teaching follows a blended style of learning." One of the tutors added, "at the moment, I think collaboration is limited."

Table VII shows that the Distance Education Institute moderately practices patience, respects relationships among staff, allocates resources for long-term plans, and provides an opportunity for research. In addition to this, the organization receives some support from external distance education institutes for internal service trainings and has few external relations with other higher education programs regarding distance education.

Table VII

Partnership Development Quality Dimension

	Statements	Degree of Practice in the Distance Education Institute				
		Completely	Much	Moderately	A few	None
01	There is patience and a respect-based relationship among staff.			X		
02	Organization gets support from external institutes for inner service training.				X	
03	There is allocation of resources for long-term plans.			X		
04	There is an opportunity for research.			X		
05	Internal collaboration with other departments and faculties.			X		
06	External relations with other higher education programs regarding online education.				X	

For the partnership development and management quality dimension, participants reported that they are not satisfied with the level of internal collaboration with other departments and faculties. In addition to this, participants reported that there are patience, respect, allocation of resources, and opportunity for research; however the external relations of the Distance Education Institute need to be improved by overcoming problems with managerial changes, finance, infrastructure, and politics.

Conclusions and Recommendations

The rapid and enormous growth of distance education practices provides a competitive advantage for higher education institutions in order to reach a higher standard of quality in distance education. In the meantime, the quality of online education is becoming a crucial issue that should be a subject of investigation in the academic world. Although online education seems to provide a new model for higher education in developing countries, it is important to discuss ways to implement quality programs in light of the specific cultures and contexts where this will be used. In this competitive world, online education can be a global tool to provide access to education for the whole world (Meyer, 2002).

It is clear from the research agenda of quality in distance education by both its pedagogical and organizational aspects, that there lacks a standard of definition of quality, and that the current practices for implementing quality programs have a limited effect. Fortunately, several approaches and frameworks have been developed for use in higher education and distance education. In this work, total quality management is proposed as philosophy and framework are appropriate for implementing continuous quality improvements in the higher education sector (Chang, 2005; Montano, Hunt, & Boudreaux, 2005).

Interview, observation and self-report results confirmed that the Distance Education Institute is still in its initial developing process, seeking to discover moral and financial support in order to improve staff recruitment and infrastructure. According to the TQM framework analysis, leadership as reflected through small organization practices, the provision of technological infrastructure for information management, and the emphasis on customer focus and satisfaction through consideration of the expectations and needs of students and staff are present strengths of the Distance Education Institute studied here. On the other hand, human resources management, partnerships, and educational management were not efficiently implemented according to the criteria in our TQM analysis. Furthermore, it is important to emphasize that the Distance Education Institute needs to improve in the areas of leadership management, educational management, human resources management, information management, customer focus and satisfaction management, and partnership development, that is—the six quality dimension criteria of the TQM framework, by establishing a model for continuous quality improvements based on its own organizational culture.

Figure 1 summarizes the current status of TQM implementation within the structure of the organization based on the perceptions and experiences of its members. The TQM framework for implementation in higher education Distance Education Institute given below provides a debatable standard for quality improvements within these organizations.

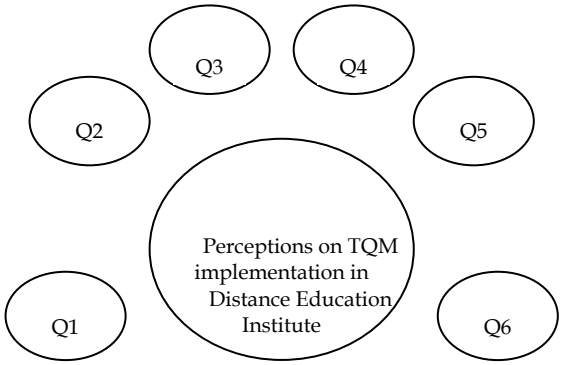

Figure1. Current TQM framework in distance education institute

This study on the TQM implementation of Distance Education Institute, based on the perceptions and experiences of active members, provided the current status of Distance Education Institute in the North Cyprus higher education system, and identified an intensified need to integrate and correlate the six quality dimensions using a conscious action plan as indicated in Figure 2.

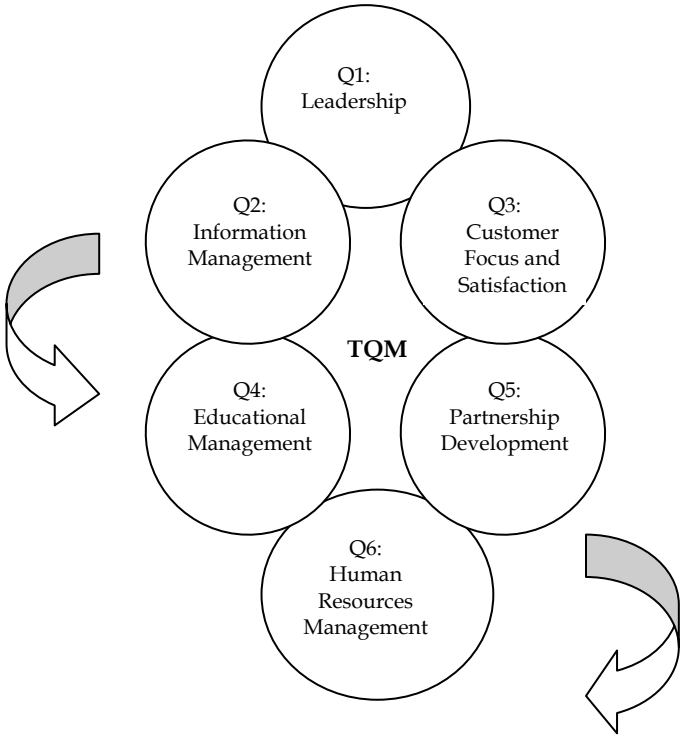

Figure 2. TQM model for distance education institute

The above framework operates differently for each of the specific contexts of implementation. Figure 2, above, can be adapted to distance education institutes in higher education for continuous quality improvements. This highlights the need to implement the framework for a particular context and to refine the continuous quality improvements using an action plan specific to one's own organizational culture.

This research suggests that further research studies on quality improvements in distance education institutes in higher education are needed. Specifically, this study raises questions about the effectiveness of the creation of one's own model versus use of the TQM framework for future studies and academic debate. Additionally, each quality dimension could be compared in a comparative study among multiple higher education distance education institutes in order to shed light on different distance education practices for quality improvements, given the various organizational structures of higher education institutions.

References

Aly, N., & Akpovi, J. (2001). Total quality management in California public higher education. *Quality Assurance in Education, 9*(3), 127-131.

Borahan, G. N., & Ziarati, R. (2002). Developing quality criteria for application in the higher education sector in Turkey. *Total Quality Management & Business Excellence, 13*(7), 913-926.

Bugdol, M. (2005). The implementation of the TQM philosophy in Poland. *TQM Magazine, 17*(2), 113-120.

Chang, H. H. (2005). The influence of continuous improvement and performance factors in total quality organization. *Total Quality Management, 16*(3), 413-437.

Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education*. London: Routledge Falmer.

Creswell, J. W. (2003). *Research design: qualitative & quantitative approaches*. United Kingdom: SAGE.

Curry, A., & Kadasah, N. (2002). Focusing on elements of TQM- evaluation for sustainability. *TQM Magazine, 14*(4), 207-216.

Helms, M. M., Williams, A. B., & Nixon, J. C. (2001). TQM principles and their relevance to higher education: the question of tenure and post-tenure review. *International Journal of Educational Management, 15*(7), 322-331.

Hoang, D. T., Igel, B., & Laosirihongthong, T. (2006). The impact of total quality management on innovation. *International Journal of Quality & Reliability Management, 23*(9), 1092-1117.

Jabnoun, N. (2005). Organizational structure for customer-oriented TQM: an empirical investigation. *TQM Magazine, 17*(3), 226-236.

Love, P., Li, H., Irani, Z., & Holt, G. D. (2000). Re-thinking TQM: toward a framework for facilitating learning and change in construction organizations. *The TQM Magazine, 12*(2), 107-116.

Lundquist, R. (1998). Quality improvements of teaching and learning in higher education: a comparison with developments in industrial settings. *Teaching in Higher Education, 3*(1), 51-62.

Marshall, C., & Rossman, G. B. (1999). *Designing qualitative research*. Thousand Oaks: SAGE.

Meyer, K. (2002). *Quality in distance education*. San Francisco: Wiley Periodicals.

Mızıkacı, F. (2003). Quality systems and accredition in higher education: an overview of Turkish higher education. *Quality in Higher Education, 9*(1), 95-106.

Montano, C., Hunt, M., & Boudreaux, L. (2005). Improving the quality of student advising in higher education – a case study. Total *Quality Management & Business Excellence,16*(10), 1103-1125.

Montes, F. J. L, Moreno, A. R., & Fernandez, L. M. M. (2004). Assessing the organizational climate and contractual relationship for perceptions of support for innovation. *International Journal of Manpower, 25*(2), 167-180.

Morgan, G. (1997). *Images of organization*. USA: SAGE.

Motwani, J. (2001). Critical factors and performance measures of TQM. *The TQM Magazine 13*(4), 292-300.

Rad, M. A. (2006). The impact of organizational culture on the successful implementation of total quality management. *The TQM Magazine 18*(6), 606-625.

Sadıkoğlu, E. (2005). Integration of work measurement and total quality management. *Total Quality Management & Business Excellence, 16*(5), 597-605.

Sakthivel, P.B., Rajendran, G., & Raju, R. (2005). TQM implementation and students' satisfaction of academic performance. *The TQM Magazine, 17*(6), 573-589.

Sila, I., & Ebrahimpour, M. (2005). Critical linkages among TQM factors and business results. *International Journal of Operations & Production Management, 25*(11), 1123-1155.

Silverman, D. (2000). *Doing qualitative research.* London: SAGE.

Venkatraman, S. (2007). A framework for implementing TQM in higher education program. *Quality Assurance in Education, 15*(1), 92-112.

Verma, G. K., & Mallick, K. (1999). *Researching education: perspectives and techniques.* London: Falmer Press.

Widrick, S., Mergen, E., & Grant, D. (2002). Measuring the dimensions of quality in higher education. *Total Quality Management & Business Excellence, 13*(1), 123 -131.

Yıldırım, A., & Şimşek, H. (2005). *Sosyal bilimlerde nitel araştırma yöntemleri*. Ankara: Seçkin Yayıncılık.

Yin, R. K. (1994). *Case study research design and methods*. London: SAGE.

Zhang, Q. (2001). Quality dimensions, perspectives and practices- A mapping analysis. *International Journal of Quality & Reliability Management, 18*(7), 708-721.

KKTC Yüksek Öğretim Uzaktan Eğitim Kurumunda Toplam Kalite Yönetimi Uygulaması

(Özet)

Problem Durumu: Yüksek öğretim kurumlarında uzaktan eğitim; çağdaş eğitim yöntemleri bakımından üniversitelerin hem kaliteye ulaşmasında hem de rekabet avantajı sağlamada bir strateji olarak kullanılmalıdır. Bu nedenle, uzaktan eğitimde yönetim ve kalite araştırma konuları olarak önem kazanmaktadır. Toplam kalite yönetimi, kurumların performansının değerlendirilmesi ve iyileştirilmesi amacıyla kullanılan yönetim tekniklerinden biridir. Performans değerlendirilmesinde ve iyileştirilmesinde kullanılan toplam kalite yönetimi anlayışı, araştırmaların işletme alanıyla sınırlı kalmış ve sayısal verilere bağlı bulgular sunulmuştur. Bazı araştırmalarda görülmüştür ki; toplam kalite yönetimi eğitim kurumlarındaki eksiklikleri tespit etmek amacıyla kullanılmaktadır. Özellikle, yüksek öğretim kurumlarında, uzaktan eğitimin stratejik bir kurum olarak ele alınması ve uzaktan eğitim kurumunun yönetim boyutunun incelenmesi konularında yapılan araştırmalar sınırlıdır. Bu nedenle bu araştırmada; hem yüksek öğretim kurumlarında toplam kalite yönetimi anlayışı ele

alınmakta hem de uzaktan eğitimin, kaliteyi artırmada stratejik bir unsur olduğu vurgulanmaktadır. Aynı zamanda katılımcıların bakış açısını ve tecrübelerini, nitel bulgu olarak yansıttığı için özgün bir değere sahiptir.

Araştırmanın Amacı: Bu araştırma, uzaktan eğitim kurumunda başta yöneticiler olmak üzere etkin role sahip olan teknik eleman ve öğretmenlerin, kurumun performansını iyileştirmeye yönelik olan "toplam kalite yönetimi" anlayışına ilişkin bakış açılarını ve sistemdeki tecrübelerini belirlemeye yöneliktir.

Araştırmanın Yöntemi: Araştırma, nitel araştırma özelliği taşımaktadır. Araştırmada, uzaktan eğitim kurumunun, küçük bir yönetim yapısı olarak toplam kalite yönetiminde yer alan altı kalite boyutunu ne kadar yansıttığı ele alınmaktadır. Araştırmada, veri toplama yöntemleri olarak; kişisel görüş raporları, araştırmacı gözlem raporu ve görüşmelere yer verilmiştir. Veri toplama sürecinde, görüşme soruları, gözlem formu ve kişisel görüş raporu soruları, ABD ve Türkiye'den seçilmiş iki uzman tarafından kontrol edilmiş ve pilot çalışma gerçekleştirilmiştir. Araştırmanın kuramsal temelini oluşturan altı kalite boyutuna ve araştırma sorularına bağlı olarak, ondört görüşme sorusu oluşturulmuş, üyelerin bakış açıları ve tecrübeleri hakkında detaylı bilgi edinilmeye çalışılmıştır. Aynı zamanda, literatür taramasına bağlı olarak geliştirilen, ölçeğe dayandırılmış gözlem formu, araştırmacı tarafından araştırma sürecinde kullanılmıştır. Katılımcıların kişisel görüş raporları da araştırmacının gözlem formunda yer alan başlıca altı kalite boyutu hakkındaki görüş ve bakış açılarını belirtebilmeleri amacıyla tasarlanmıştır. Katılımcılara bir araştırma paketi sunulmuş, bu pakette; araştırmanın önemi, araştırma soruları ve veri toplama süreci hakkında bilgi verilerek gönüllülük ve katılımcılık arttırılmaya çalışılmıştır. Araştırmaya katılım ve izin formunun da yer aldığı bu pakette, etik konusu ve katılımcıların araştırma sürecinde kimliğinin korunması da vurgulanmıştır. Çeşitlemeye bağlı ortaya çıkan veriler birbiriyle karşılaştırılmış ve zengin veri yorumu yapılmıştır. Toplam kalite yönetimi, kalite boyutlarının ifadeleri ışığında elde edilen verilerden temalar seçilerek veri değerlendirilmesinde betimsel analizden yararlanılmıştır.

Araştırmanın Bulguları: Liderlik kalite boyutu; yöneticilerin kararlara ne kadar katılımcılık imkanı sağladığını ve stratejik planlar üzerinde ne kadar çalıştığını ifade etmektedir. Eğitim yönetimi boyutu; öğrenci-merkezli eğitim ve ders tasarımlarını kapsamaktadır. İnsan kaynakları ise çalışanların gelişimi için sağlanan eğitim faliyetlerini ifade etmektedir. Bunlara ek olarak bilgi yönetimi boyutuyla; bilginin ve teknolojinin kullanımı ve altyapısı ele alınmaktadır. Müşteri memnuniyeti boyutunda ise öğrenci ve çalışanların beklentilerinin karşılanması, işbirliği boyutunda ise kurumun üniversite içinde ve dışında sahip olduğu işbirliği faaliyetleri vurgulanmaktadır. Araştırmada, veriler her kalite boyutuna göre ayrı ayrı yorumlanmış ve kurumun yansıttığı duruma bağlı çözüm önerileri sunulmuştur. Liderlik kalite boyutuna göre, kurumda liderliğin esnek, açık ve adil olduğu görülmektedir. Ancak otoriter bir yüksek öğretim anlayışından ötürü, esnek bir yönetimin yine de sınırlı olabileceği vurgulanmıştır. Eğitim yönetimine ait kalite boyutu ele alındığı zaman, kurumun küçük bir örgüt yapısı olmasına rağmen ders tasarımı konusunda karar verme sürecinde, işbirliği ve katılımcılığın zayıf olduğu ortaya çıkmaktadır. Katılımcılar, karar verme sürecine sadece teknik konular için katıldıklarını vurgulamışlardır. İnsan kay-

nakları kalite boyutu ışığında; her ne kadar mesleki gelişim için seminer ve konferansa katılım imkanı verilse de bu imkanların yetersiz olduğu vurgulanmıştır. Bilgi yönetimi kalite boyutu ışığında; bilgi ve iletişim akışında sorunlar yaşandığı gerçeği ortaya çıkmıştır. Yönetimde yaşanan değişikliklerin, politikada yaşanan dengesizliklerin, ekonomik ve teknolojik altyapı yetersizliklerinin, bilgi akışı ve iletişimi yetersiz kıldığı katılımcılar tarafından belirtilmiştir. Kuramsal çerçevede yer alan müşteri memnuniyeti odaklı kalite boyutuna göre; öğrenci merkezli öğrenimin göz önünde bulundurulduğu ancak etkililiği konusunda emin olunamadığı belirtilmiştir. Aynı zamanda öğrencilerin ihtiyaç ve beklentileri düşünülmekte ancak uygulamadaki sonuçların neler olduğu konusunda kesin bir yargının olmadığı ortaya çıkmaktadır. İşbirliği kalite boyutuna göre; kurumun içerisinde ve dışarısında yapılan işbirliği faaliyetleri ele alınmıştır. Bilgi yönetiminde yaşanan sıkıntıların, bu kalite boyutuna da yansıdığı açıkça görülmektedir. Kurum dışında yapılan işbirliği ele alındığı zaman, kurumun sadece Türkiye'de bulunan üniversitelerle istişare içerisinde olduğu ortaya çıkmaktadır. Bunlara ek olarak, araştırma bulguları; çalışan kadrosunu artırmak ve altyapı eksikliklerini gidermek için kurumun ekonomik desteğe ihtiyacı olduğu gerçeğini de ortaya çıkarmaktadır.

Araştırmanın Sonuçları ve Önerileri: Araştırma sonucuna göre, Uzaktan Eğitim Kurumunun henüz oluşum sürecinde kaldığını ve altı kalite boyutu konusunda farkındalığın oluşmadığı görülmektedir. Sürekli değişen yönetim, ekonomik, politik belirsizlik ve teknolojideki altyapı problemleri, kurumun ve sistemin kaliteyi yakalamasına engel olmaktadır. Çoklu veri toplama süreci sonucunda ortaya çıkan bulgular; Uzaktan Eğitim Kurumunun her ne kadar kalite için aksiyon planı geliştirmesini öngörse de, katılımcıların bakış açılarına bağlı olarak denilebilir ki altı kalite boyutu tam olarak etkin gelişim göstermemektedir. Araştırmanın kuramsal çerçevesini oluşturan toplam kalite yönetimi altı kalite boyutundan kurumun liderlik, bilgi yönetimi ve müşteri memnuniyeti açısından; insan kaynakları, işbirliği ve eğitim yönetimi kalite boyutlarına kıyasla daha güçlü olduğu görülmektedir. Yapılan araştırma, uzaktan eğitim kurumlarında toplam kalite yönetiminin uygulanmasına ışık tutmakta ve çoklu veri toplama yöntemleri kullanıldığı için zengin bir nitel araştırma özelliği yansıtmaktadır. Araştırma sonuçlarına bağlı olarak: Kurumun üyeleriyle birlikte her kalite boyutu üzerinde bilinçli, stratejik ve işbirlikli çalışma gerçekleştirmesi, kaliteye ulaşmak adına kültür yapısına bağlı model geliştirmesi ve bunu diğer kurumlarla paylaşması gerekmektedir. İleride yapılacak araştırmalarla, farklı kurumların toplam kalite yönetimi uygulama değerleri ele alınabilir ve karşılaştırmalı durum çalışması yapılarak kurumların iyileştirilmesine ışık tutulabilir.

Anahtar Sözcükler: Uzaktan eğitim, yüksek öğretim, kalite, toplam kalite yönetimi

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Developing a Scale for Communication Apprehension with Lecturers

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Abstract

Problem Statement: Communication apprehension has become a subject of major concern in education. A sizable body of research exists on communication apprehension in the literature. It is observed that students who have CA do not participate in classroom discussions, do not ask for the missing parts of the lecture, do not ask for help when in need and are not willing to learn in class. The Turkish context also needs comprehensive studies on CA in order to conceptualize and solve the problem. Therefore, we primarily need a communication apprehension scale which is valid and reliable for different age groups in the Turkish culture.

Purpose of the study: The aim of this study is to develop a scale in order to measure the communication apprehension that the university students are experiencing when interacting with their lecturers.

Method: The validity and reliability of the scale was tested with 210 college students for construct validity and item analysis; concurrent validity was tested with 140 students, and the test-retest reliability was tested with 150 students.

Findings and Results: At the end of the exploratory factor analysis, it was found that Communication Apprehension with the Lecturers Scale (CALS) consisted of 19 items and three factors. These factors explained 54.2 % of the total variance. Item-total score correlations of the scale were examined

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and satisfied results were obtained. The construct validity of the scale was tested by using confirmatory factor analysis. The findings indicated that the scale had construct validity. To test concurrent validity, the correlation between students' scores on CALS and Social Anxiety Scale (SAS) were examined and a significant relationship (r=.62) was obtained. The Cronbach-alpha coefficient for the scale was found to be .82 and the test-retest reliability coefficient was found to be .90. Considering the analysis results, it was decided that CALS had sufficient psychometric properties.

Conclusions and Recommendations: Further validity and reliability studies held with larger samples at different universities and different faculties will be beneficial to provide more sufficient psychometric properties.

Keywords: Communication apprehension, reliability, validity, university students.

All instructional activities within a class are acts of communication without which neither learning nor teaching would take place. That is why it is of utmost importance that the communication between student and instructor is efficient and healthy. However, due to various reasons, it is observed that there are students who fear or avoid communication within their classes. This fear is perceived differently from the fear of initiating talk in drama activities, meetings at school, and discussions within a class, all of which are quite widespread fears (Ergin & Birol, 2000). Communication Apprehension is defined as a kind of social anxiety which is only specific to the situations of establishing communication. Social anxiety, on the other hand, is the anxiety one experiences in social settings with the fear of not wanting to leave a negative impression on people (Leary & Kowalski, 1995).

Communication apprehension (CA), the fear or anxiety associated with either real or anticipated communication with others (McCroskey, 1984), has become a subject of major concern in the education process. This fear can be experienced in various settings like the work environment, when giving a public speech, or when communicating in class with the teacher (McCroskey, 1980). Communication apprehension experienced particularly when a teacher is present is defined as a specific anxiety which occurs when the student interacts with the teacher (Daly & McCroskey, 1984, cited in: Abrams, 1997).

Unwillingness to communicate is accepted as one of the most important reasons for communication apprehension. Willingness or unwillingness of individuals to communicate is a widespread typical inclination (McCroskey, 1992). In this respect, there are two elements of communication apprehension: written communication apprehension and oral communication apprehension. Written communication apprehension is the unwillingness of students in writing which is usually attributed to the student's lack of writing skills. Oral communication apprehension, on the

other hand, is a real fear and expresses the individual's unwillingness to communicate with others (Elias, 1999).

Studies carried out related to the development of communication apprehension show that variables responsible for this fear include personality traits coming from birth such as shyness, reticence, embarrassment (Breatty, McCroskey & Heisel, 1998), problems in speech and language development (McCroskey, 1980) and communication skills deficiency (McCroskey, 1980; Roach, 1999). In addition, reinforcing and social learning which are shaped by environmental factors are among the most important reasons for communication apprehension specific to certain situations (Breatty et al., 1998; Ayres, 1998). Studies in this field indicate that there is an increase or decrease in the level of communication apprehension depending on whether feedback received from parents and teachers is supportive or not (Ayres, 1998; Hsu, 2002). Daly & McCroskey (1984). Istead, they see this as a fear developed in response to threatening situations teachers may create (cited in: Abrams, 1997). One such threatening situation may be when teachers have too high or negative expectations from the students, which contributes to the formation of communication apprehension (McCroskey & Daly, 1976). Thus, communication apprehension specific to communication with teachers changes depending on the qualities of the environment created by the teacher and the teacher's behavior (Abrams, 1997). On the other hand, it is also pointed out that students who have high levels of communication apprehension which developed due to various reasons may have the tendency to perceive their classroom environment and their teacher negatively (McCroskey & Daly, 1976). Hence, students may experience fear specific to communication with teachers due to threatening qualities of the environment fostered by teacher behavior or past learning experiences. These may affect their perception of reality in communication situations and lead to communication apprehension. As Hays (2003) states, the class atmosphere, which depends on communication between the teacher and students, is shaped depending on how students perceive the communication between themselves and the teacher.

In studies carried out in the US, almost 20% of students have been shown to have communication apprehension (McCroskey, Richmond & McCroskey, 2002). Although communication apprehension seemed to affect their years of study negatively, it did not appear to have a significant relationship with academic success (Bourhis & Allen, 1992; Comedana & Prusank, 1998; Diaz, Glass, Arnkoff & Tanofsky-Kraff, 2001), cognitive performance (Bourhis & Allen, 1992), affective learning and motivation for learning (Frymier, 1993; Messman & Jones-Corley, 2001). In other studies, it was also observed that students with high levels of communication apprehension did not participate in class discussions, could not ask for clarifications or for help in general (Borzi & Mills, 2001) and that both the quality and quantity of communication skills dropped gradually (Allen & Bourhis, 1996). Whithers & Vernon (2006) pointed at shyness as an important predictor of communication apprehension. Petress' (2001) research findings indicated that the

most salient traits of students with high levels of communication apprehension were indifference to the learning process, shyness, isolating oneself from the learning community and choosing environments where s/he could have minimum contact with others. According to Elias (1999) the students with this fear did not want to sit in the front rows and did not want to be in classes with a small number of students. The reason for this is that the most typical behavior of students with high levels of communication apprehension is refraining from communication by creating environments where they can have minimal contact with others as much as possible (McCroskey & Leppard, 1975) and usually preferring to work alone (McCroskey & Daly, 1976; McCroskey, 1980). These students withhold communication with their teachers or friends because they generalize the discomforting situations in communication experienced in the past to communication situations in their present class and school, or they continue experiencing situations similar to the ones in the past. Besides communication apprehension, they also develop negative feelings and behavior towards this environment. These students with communication apprehension may also be seen as aloof, reluctant to learn and irresponsible by their teachers (McCroskey, 1980).

According to a study carried out by Şahin (1997) in Ankara with 402 students in nine schools (164 in primary, 107 in secondary, 131 in high school), 35% of students were experiencing verbal communication anxiety in moderate to above moderate levels. In the same study, it was also noted that students cited their teachers, friends, their own personality traits, and their families as the sources of their verbal communication anxiety, respectively. In addition, this study also revealed that verbal communication anxiety was experienced in different levels according to the source of the anxiety, and that students who stated the source of their anxiety as teacher behavior had higher levels of verbal communication anxiety than those who stated other reasons as the source of their anxiety.

Wiman, in his work published in 1969, suggested that education would witness serious changes in the future. He put forward that the most significant of these changes would be the expanding need to take cognizance of the importance to establish productive communication in classes (cited in: Hays, 2003). In recent years, there has been much research on the subject of communication apprehension in educational contexts, showing that Wiman's views were quite realistic.

Today it is believed that developing scales with efficient psychometric properties to help with the measurement of communication apprehension experienced in situations where students at different levels of education have to communicate with lecturers or teachers is an important need in the instructional process. A survey of the literature has revealed that there is not a scale to be used to measure communication apprehension in situations where there is a direct communication with the teacher or the lecturer. However, there are various scales developed with the purpose of measuring communication apprehension in its different dimensions. Among these scales, there is one which is frequently used in research developed by McCroskey

(1997). This scale, "Personal Report of Communication Apprehension (PRCA-24)," has been developed with the intention of measuring communication apprehension that comprises statements involving feelings related to communication with others and four situational factors (group discussion, meetings, interpersonal, public speaking).

Another scale developed by McCroskey (1992) is called "The Willingness to Communicate Scale (WTC)." This scale, developed to measure the willingness to communicate, includes statements that reflect the participants' willingness or unwillingness to communicate in situations or with people encountered frequently. This scale has subscales that define different communication situations like PRCA-24. In the literature, there is another scale by Neer (1987), "The Classroom Apprehension Participation Scale (CAPS)," which is used to measure communication apprehension within class. Thanks to these scales and others like them, it is possible to carry out research which points to the importance of the matter and which supports the initiation of preventive studies. In this respect, there is a need for a scale which is appropriate to the conditions of Turkey and can measure communication apprehension in different age groups in valid and reliable ways. It is important to define the fear experienced by university students, who will soon be in business life taking on important roles in multicultural settings, while communicating with lecturers who are authority figures. This act of defining is not only important for the success of education but also for the psychological health of a society. In this respect, it is important to develop scales which will help in conducting studies to define the existing situation. Therefore, this study aims to develop a valid and reliable scale which will measure a specific type of communication apprehension, which is the university students' communication apprehension with lecturers.

Method

This section focuses on the process of developing the pilot version of Communication Apprehension with the Lecturers Scale (CALS), the research groups on which validity and reliability anlayses were carried out, the anaysis of the instrument for measurement used as a criterion and the analysis of data.

Developing the Pilot Version of Communication Apprehension with the Lecturers Scale (CALS)

While developing the pilot version of Communication Apprehension with the Lecturers Scale (CALS), the related literature and similar scales (PRCA-24, WTC, CAPS) were analyzed for theoretical construct. Group discussion, dimensions like interpersonal communication or different communication situations like interacting with a police officer or secretary form the factors of these scales. Owing to this, in determining the possible factors of CALS, which was developed with the purpose of evaluating communication apprehension specific to a situation (interacting with a lecturer), the subscales of the mentioned scales could not be used. In determining the

important dimensions to be represented in the scale and in the items, theoretical viewpoints and research findings were consulted. In addition, a descriptive study was carried out which used open ended questions based on literature research aimed at 110 students with the intention of determining the situation (Şeker & Gençdoğan, 2006). It was seen that a significant number of the items determined as a result of this study could be included within the item bank that was being developed. Special attention was paid to writing items in approximate amounts under the three dimensions determined as a result of literature research. The dimensions were determined in light of several research findings. The first dimension was named (a) a threat perceived due to teacher behaviour, because of the relationship of communication apprehension with the threatening situations evolving due to teacher's behavior, the way it is percieved by students and negative past learning experiences indicated by McCroskey & Daly (1976), McCroskey (1980), Daly & McCroskey (1984), Abrams (1997), Ayres (1998) and Hsu (2002); the second was named (b) inclined personal traits, because of the relationship of communication apprehension with the lack of communication skills, personal traits like shyness and embarrassment as mentioned by McCroskey (1980), Petress (2001), Whithers & Vernon (2006); and the third was named (c) typical avoidance behavior because of the relationship between communication apprehension with not participating in discussions in class, not asking questions, not asking for help from the teacher and avoiding contact with him/her as put forward by McCroskey & Leppard (1975), McCroskey (1980, 1984), Elias (1999), Petress (2001) and Borzi & Mills (2001). There were statements appropriate to the content of each dimension that comprised within and outside of class and school, and that reflected the unwillingness, discomfort or avoidance in real or possible situations where communication had to take place with the lecturer. In this way, the first pilot scale with 60 items was developed. This scale was given to eight experts in three different universities working in the departments of psychological counseling and guidance, educational psychology, instructional technology and program development in education. According to the feedback recieved from them, two other items were added and several of the items were revised. The pilot scale with 62 items was administered to 280 students. As a result of the factor analysis applied, it was found out that the scale had three independent factors. Ten items with factor loadings below .30 and 3 items with close factor loadings in different factors were removed from the scale, ending up with 49 items in total. The items in the scale were revised again, clarifying the meaning of items with factor loadings between .30 and .40. In addition, criticisms made concerning the point "Undecided" in the five-point Likert scale were taken into consideration and changes were made to the points in the scale. According to Raaijmakers, Van Hoof, Verbogt & Vollebergh's (2000) research results, while choice of "undecided" was perceived as the mid point in the Likert scale by some of the adolescent participants, by the others it was perceived as a different point on the rating scale evaluating "I don't know" or "I can not say anything" (cited in Hodge & Gillespie, 2003). It was also claimed previously that not interpreting the choice of undecided as a real mid point in the

Likert scale with equal distance between responses may cause serious mistakes in measurement (Hodge & Gillespie, 2003). The response categories in the scale were replaced by other expressions such as "never," "rarely," "sometimes," "frequently," and "always," which were thought to be more appropriate alternatives for the responses in the scale. In this way, CALS was prepared with 49 items and a five-point Likert scale and was ready for factor analysis.

Study Groups

The factor analysis and item analysis of the scale were carried out in the 2006-2007 fall term at Kocaeli University, Faculty of Technical Education and the Faculty of Arts and Sciences with 210 students (85 girls, 125 boys) in their 1st, 2nd and 3rd years of study; a similar scale validity study was carried out in the spring term of 2006-2007 at Kocaeli University, Faculty of Arts and Sciences with 140 students (58 girls, 82 boys) in their 1st, 2nd, 3rd and 4th years of study. The reliability study of the scale was carried out in the spring term of 2006-2007 at Kocaeli University, Faculty of Technical Education with 150 students (50 girls, 100 boys) in their 3rd and 4th years of study.

Measurement Instruments

For the similar scales validity of CALS, the Social Interaction Anxiety Scale (SIAS), developed by Mattick and Clark and adapted to Turkish by Esemenli (1995), was used in order to measure the social anxiety value. The scale covers 20 statements like "I feel anxious when I have to talk to people of authority like a teacher or boss," or "It is difficult for me to make eye contact with others," which define cognitive, emotional and behavioral reactions given in situations that necessitate social interaction. The scoring is done by reversing the four items (5, 9, 10 and 11) besides 16 items, which have been answered according to the five-point Likert scale with response categories ranging between 0 and 4. The studies carried out for validity and reliability by Esemenli (1995) showed that CALS measured the communication apprehension of university students in our country in a reliable and valid way.

Data Analysis

In terms of the construct validity of CALS for exploratory factor analysis, the SPSS 10 program was used. First, in order to test whether the data obtained was compatible with factor anlaysis, the results of Kaiser-Meyer-Olkin (KMO) and Bartlett Sphericity tests were analyzed (Büyüköztürk, 2006). The value obtained as a result of the KMO test, which was applied to determine the efficiency of data obtained from the sampling, was .86. This value is within acceptable limits known as "very good." The results of the Bartlett Sphericity test were analyzed in order to determine whether the data obtained was coming from multiple variable normal distribution and was found to be meaningful at the level of .001 (Tavşancıl, 2002). In

addition, principle component analysis was used which is frequently used for factoring (Büyüköztürk, 2006).

It was stated that the items with a high common factor variance and with a .45 or higher factor loading in the factor they are found in would constitute better criteria in eliminating the items that do not measure the same construct in factor analysis (Büyüköztürk, 2006). In this study, the criteria were decided as common factor variance being .40 minimum and an item having .50 or more factor loading in one single factor. In addition, the difference between each item's high factor loading in one factor and high factor loading in other factors being minimum .10 was also among acceptable criteria for item selection.

The program LISREL 8.30 was used in order to verify the construct of the scale with factor analysis and to do the Confirmatory Factor Analysis (CFA). The following indexes were used to evaluate the appropriacy of the model: Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Normed fit index (NFI), Non-normed Fit Index (NNFI), Comparative Fit Index (CFI), Standardized Root Mean Square Residual (SRMR) and Root Mean Square Error of Approximation (RMSEA).

Results and Comments

This section evaluates the results of factor analysis of CALS and reliability and validity of the scale.

Studies on Validity for CALS

CALS' construct validity. First of all, the construct validity of CALS has been analysed with exploratory factor analysis. In the principle component analysis that was carried out without any restrictions, 13 factors have been obtained with Eigen values bigger than one. The total variance explained by these 13 factors is 63.7%. However, when scree plot in Figure 1, which is drawn according to Eigen values, is examined it is seen that there is a sharp decrease after the first factor, descending decrease after the second factor and the line almost becomes horizontal after the third factor. Therefore, it is decided that the factor number should be limited to three.

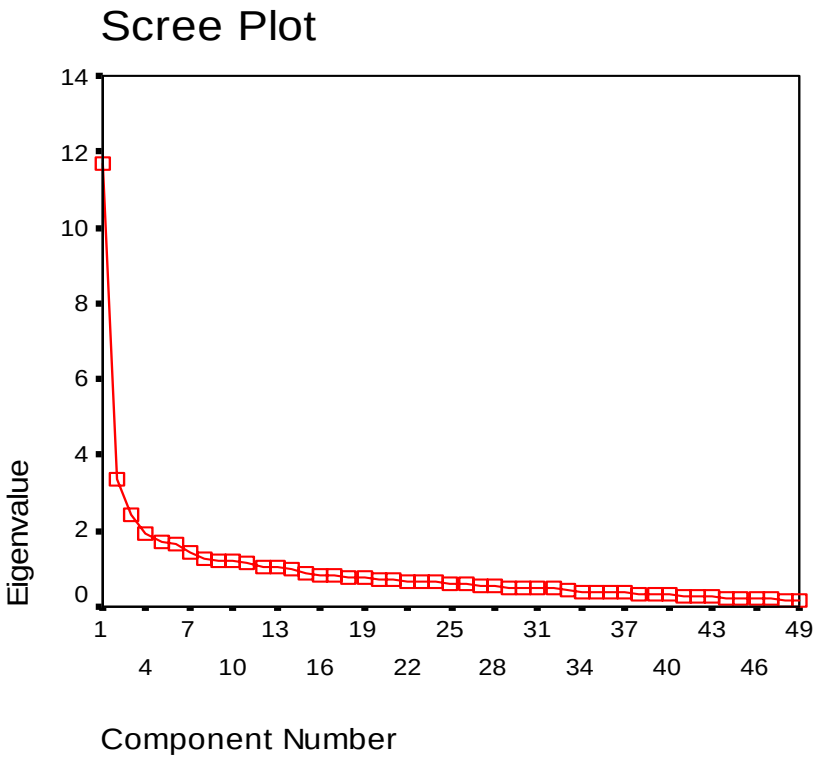

Figure 1. Scree plot according to Eigen values

It has been observed that 19 of the 49 items, to which varimax orthogonal rotation has been applied, meet the criterion mentioned above. The factor analysis results of the items which are decided to be kept are shown in Table 1.

Table I

Exploratory Factor Analysis Results for CALS.

Item No	Communalities	Factor loading after rotation			
		Fac.1	Fac. 2	Fac. 3	
(4) 1.	.618	.746			
(5) 2.	.619	.757			
(6) 3.	.527	.712			
(7) 4.	.618	.786			
(8) 5.	.467	.653			
(9) 6.	.590	.743			
(26) 7.	.416	.563			
(19) 8.	.618			.751	
(20) 9.	.592			.746	
(21)10.	.513			.701	
(30)11.	.554			.668	
(32)12.	.411			.618	
(33)13.	.631			.776	
(36)14.	.623			.695	
(37)15.	.455			.597	
(3) 16.	.495				.702
(14) 17.	.555				.744
(27) 18.	.572				.740
(45) 19.	.425				.647
Explained variance: Factor-1: 21.9%; Factor -2: 20.9%; Factor -3: 11.4%; Total: 54.2%					

The descriptive factor analysis results shown in Table 1 can be summarized as below: CALS is composed of three factors (dimensions) which have been determined to be significant. The first of these factors explains 21.9% of the total variance for the scale, the second 20.9%, and the third 11.4%. While total variance explained by these three factors is 54.2%, common variance explained in items varies between 41% and 63%.

It is seen that after factor rotation the first factor is composed of seven items, the second factor eight items and the third factor four items. It is also observed that the items in the first factor have factor loadings changing between .563 and .786, the second between .776 and .597 and the third between .744 and .647. These factors have

been named by considering the items' content and the determined dimensions. The subscale which is found in the first factor and has seven items is called "inclined personal traits." In this subscale there are statements like "Since my communication skills are not sufficient I do not want to interact with lecturers," and "I am afraid of being disgraced in front of the lecturer since I cannot control my anxiety while talking." The subscale found in the second factor and that has eight items is called "the perceived threat concerning the lecturer's behaviour." In this subscale there are statements like "It makes me anxious to talk in the class of lecturers with strict rules," and "I become tense when I feel that the lecturer is forcing me to talk." The third factor, which is comprised of four items, has statements that represent typical avoidance behaviour in a limited sense and has items that represent the wish to stay away from and avoid the lecturer. That is why this factor is called "the tendency to stay away from the lecturer." In this subscale there are statements like "I feel anxious when I sit somewhere close to the lecturer," and "I avoid entering the lecturer's room even when I have to." In the five-point Likert scale the response categories are as follows: Never=1, Rarely=2, Sometimes=3, Frequently=4, Always=5. This means, as points increase so does the communication apprehension of students with the lecturers. The highest point possible one can get with this scale is 95 and the lowest is 19.

The relation between CALS and subscales among each other. Table 3 below shows the three factors of CALS with 19 items, which were determined after factor analysis, and the relationship among these factors.

Table II

Correlation Matrix Between CALS and the Points of Subscales

	CALS	**Factor 1**	**Factor 2**	**Factor 3**
CALS	1			
Factor 1	.75**	1		
Factor 2	.81**	.47**	1	
Factor 3	.43**	.08	.02	1

**p<.01

Table II shows the correlation between CALS and subscales (dimensions) as .75, .81, and .43 respectively. In other words, this means that every subscale has a meaningful relationship (p<.01) with total scale points. While the correlation between the first and second subscales is .47 and they have a significant relationship (p<.01), there is a low and insignificant correlation (.08 and .02) between these two and the third scales. This means that while the third subscale can be used among the total

points, different from the first and second subscales, it is also able to measure implicit feature on its own

Item analysis of CALS. In the item analysis studies concerning the validity of CALS, total point correlation of items has been examined. The results of these can be found in Table 3 below.

Table III

Results of Item Analysis for CALS

Item No	Item Total Correlations		
	1st Factor	2nd Factor	3rd Factor
1.	**.68**		
2.	**.68**		
3.	**.62**		
4.	**.65**		
5.	**.55**		
6.	**.66**		
7.	**.51**		
8.		**.69**	
9.		**.65**	
10.		**.61**	
11.		**.63**	
12.		**.45**	
13.		**.69**	
14.		**.68**	
15.		**.56**	
16.			**.46**
17.			**.50**
18.			**.51**
19.			**.41**

In Table III it is seen that the items that make up the first factor have total item correlation between .51 and .68, the items in the second factor between .45 and .69, and the items in the third scale between .41 and .51. These results strengthen the evidence that the relation of the scale with the dimension it belongs to is sufficient and that the scale has construct validity.

Confirmatory factor anaysis of CALS. Confirmatory Factor Anaysis (CFA) can be carried out in addition to the exploratory factor analyis used originally for

developing scales (Şimşek, 2006). CFA has been performed in order to verify the construct of CALS determined with exploratory factor analysis. In this way, the three mentioned hidden variants in the scale have been analyzed together with inferential statistics and modification index results. The path diagram obtained as a result of the analysis is shown in Figure 2. According to the anaysis, the results are as follows; χ^2=252.99 (N=210, sd=149, p=.000), χ^2/sd=1,70, GFI=0.89, AGFI=0.86, NFI=0.84, NNFI=0.91, CFI=0.92, SRMR=0.066 and RMSEA=0.058. When overall inferential statistics are considered, they indicate that the factor construct confirms the data at a high level. In addition, when the results of the modification index are analysed it is observed that there is not an important modification suggestion. All the suggestions are low at a level that would make the χ^2 value change at a lower value than 0.5. The correlation between hidden variants and indicators changes between 0.46 and 0.77. When all these findings are considered all together it can be concluded that CFA results verify the construct validity of the scale.

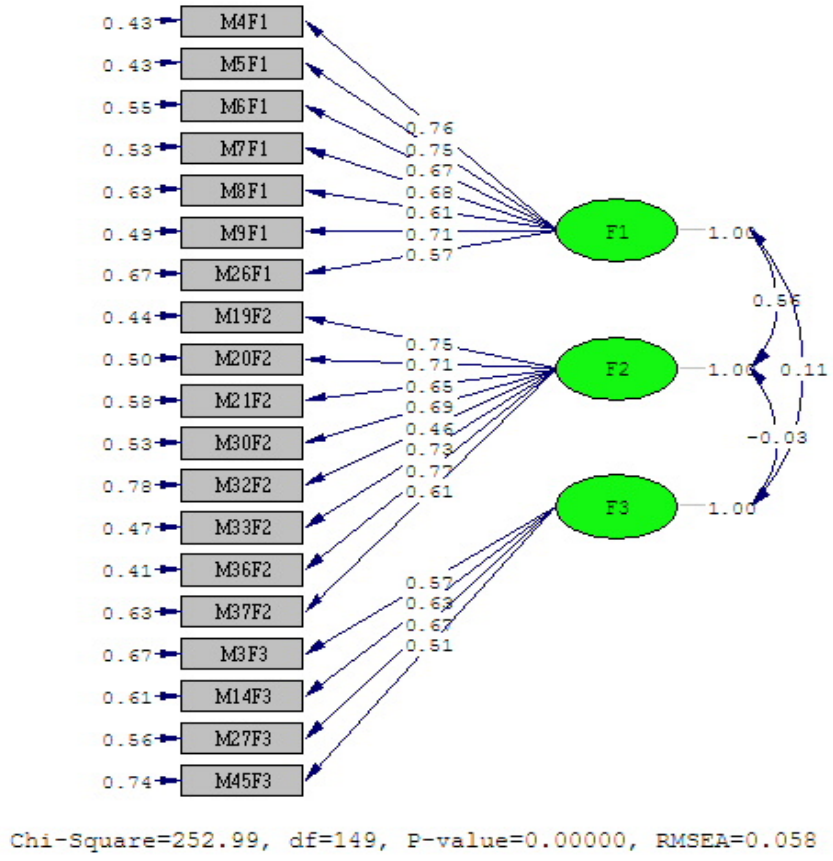

Figure 2. CFA results of Communication Apprehension with the Lecturers Scale

Criterion based validity of CALS. CALS has been applied together with the Social Interaction Anxiety Scale (SIAS) at one sitting to a group of 140 students and it has been found that the correlation coefficient between the total points students received from both scales is .62 ($p<.01$). In the light of these results, it can be said that there is a positive meaningful relationship between scores obtained from CALS and social anxiety scores obtained from SIAS and that CALS has similar scales validity.

Reliability Studies of CALS

In order to maintain reliability for CALS, first of all internal consistency reliability and then the test-retest method was used.

Internal consistency reliability of CALS. The Cronbach-Alfa coefficient computed with the data received from 210 students for internal consistency reliability studies of CALS has been found to be .82, the value for the first subscale .86, the second subscale .87, and the third subscale .68. Although the third subscale has a low reliability coefficient compared to the few numbers of items it has, it can be argued that there is consistency and similarity between the items in CALS, thus it can have reliable measurement at a sufficient level.

*Test-retest reliability of CALS***.** The scale has been administered to 150 students twice in two weeks and the correlation coefficient for the scores from both times have been computed for the test-retest reliability study for CALS. These correlation cooefficients are: .90 for total scores in CALS, .88 for inclined personal traits subscale, .86 for the perceived threat concerning the lecturer's behaviour subscale and .74 for the inclincation to stay away from the lecturer subscale. When reliability cooefficients of CALS are analysed, it can be concluded that CALS can have a reliable measurement of communication apprehension of university students with the lecturers.

Conclusions and Recommendations

This study analysed the validity and reliability of the CALS scale which was designed with the purpose of measuring communication apprehension of university level students with their lecturers. It also examined the psychometric features of the scale. As a result of exploratory factor analysis carried out with two samples during construct validity studies, a three factor scale of 19 items, which explains 54% of the total variance, was obtained. After factor rotation, the following names "inclined personal traits," "perceived threat concerning lecturer behaviour," and "the tendency to stay away from the lecturer" were found to be appropriate for the subscale with seven items in the first factor, the subscale in the second factor with eight items, and the third factor with four items, respectively. The scale, a five-point Likert scale, was given the following response categories: Never=1, Rarely=2, Sometimes=3, Frequently=4, Always=5. Thus, the maximum point one could get from the scale was

95 and the lowest was 19. As the points increased, so did the students' communication apprehension with the lecturer.

It was observed that there was a siginificant relationship ($p<.01$) between the total scores of CALS and the subscale scores. Item analysis results obtained as a result of subscale total item correlation also corroborated the result above. The results of verifying factor analysis which was carried out in order to verify the construct of the scale with the exploratory factor analysis showed that the factor sturucture is compatible with the data at a high level and that there is not an important suggestion for a modification. These results verified the construct validity of the scale. As a result of criterion based validity study carried out with SIAS for CALS, a significant ($p<.01$) correlation coefficient was obtained. To determine the reliability of CALS, the internal consistency reliability and test-retest reliability were computed. According to these results, the scale appeared reliable. Studies of reliability and validity for CALS were carried out at Kocaeli University, Faculty of Technical Education and the Faculty of Arts and Sciences. In the future, other studies need to be carried out for validity and reliability in different universities and among faculties with a wider sample.

References

Abrams, J.R. (1997). The relationship among teacher immediacy, student predicted outcome value, and classroom communication apprehension. (MA Thesis) California State University. (www.proquest.com) Publication number AAT 138 7550.

Allen, M., & Bourhis, J. (1996). The relationship of communication apprehension to communication behavior: A meta analysis. *Communication Quartely* , 44, 214-226.

Ayres, J. (1998). Antecedents of communication apprehension: A reaffirmation. *Communication Research Reports*, 5, 76-83.

Breatty, M.J., McCroskey, J.C., & Heisel, A.D. (1998). Communication apprehension as temperamental expressions: A communibiological paradigm. *Communication Monographs,* 65. Retrieved February 22, 2007, from http://www.ebsco.com

Borzi, M., & Mills, T. (2001). "Communication Apprehension in Upper Level Accounting Students An Assesment of Skill Development". *Journal of Education for Business,* 76(4). Retrieved February 22, 2007, from http://www.ebsco.com

Bourhis, J., & Allen, M. (1992). "Meta-analysis of the relationship between communication apprehension and cognitive performance". *Communication Education*, 41, 68-76.

Büyüköztürk, Ş. (2006). *Sosyal bilimler için veri analizi el kitabı.* (6. Baskı) Ankara: PegemA Yayıncılık.

Comedana, M. E., & Prusank, D. T. (1988). Communication apprehension and academic achievement among elemantary and middle school students. *Communication Education,* 37, 270-277.

Diaz, R.J., Glass, C.R., Arnkoff, D.B., & Tanofky-Kraff, M. (2001). Cognition, anxiety, and prediction of performmance in 1st-year law students. *Journal of Educational Psychology, 93* (2), 420-429.

Elias, R. Z. (1999). An examination of non-traditional accounting students' communication apprehension and ambiguity tolerance. *Journal of Education for Business, 75* (1). Retrieved February 22, 2007, from http://www.ebsco.com

Ergin, A., & Birol, C (2000). *Eğitimde iletişim.* Ankara: Anı Yayınları.

Esemenli, S. (1995). *Sosyal fobi ve diğer anksiyete bozukluklarında belirti dağılımı, anksiyete alanları ve sosyal anksiyete taramasına ilişkin bir araştırma.* Unpublished doctoral dissertation, Ankara University, Ankara, Turkey.

Frymier, A.B. (1993). The relationship among communication apprehension, immediacy and motivation to study. *Communication Reports*, 6, 8-17. Retrieved February 20, 2007 from http://www.proquest.umi.com./pqdweb

Hays, E.R (2003). Ego-threatening classroom communication: A factor analysis of student perception. *The Speech Teacher*. 43-48. Retrieved May 13, 2005 from http://www.ebsco.com

Hodge, D. R., & Gillespie, D. (2003). Phrase comletions: An alternative to Likert scales. *Social Work Research,* 27 (1). Retrieved March, 2008 from http://www.ebsco.com

Hsu, C. F. (2002). The influence of self-contruals, family and teacher communication patterns on communication apprehension among college students in Taiwan. *Communication Reports,* 15 (2), Retrieved January 20, 2007 from http://www.proquest.umi.com. /pqdweb

Leary, M. R., & Kowalski, R. M. (1995). *Social anxiety*. New York: The Guilford Press.

McCroskey, J. C. (1980). Quiet children in the classroom: On helping not hurting. *Communication Education*, 29, 239-244.

McCroskey, J. C. (1992). Reliability and validity of the willingness to communicate scale. *Communication Quarterly*, 40, 16-25.

McCroskey, J. C. (1997). Self-report measurement. In J.A. Daly, J.C. McCroskey, J. Ayres, & T. Hopf (Eds). *Avoiding communication: Shyness, reticence and communication apprehension*. Cresskill, NJ: Hampton Pres.

McCroskey, L. L., Richmond, V. P., & McCroskey, J. C. (2002). The scholarship of teaching and learning: Contributions from the dicipline of communication. *Communication Education,* 51, 383-391.

McCroskey, J. C., & Leppard, T. (1975, March) *The effects of communication apprehension on nonverbal behavior.* Paper presented at the annual convention of the Eastern Communication Association, New York, USA.

McCroskey, J. C., & Daly, J. A. (1976). Teachers' expectations of the communication apprehensive child in the elementary school. *Human Communication Research, 3(1)*, 67-72.

Messman, S. J., & Jones-Corley, J. (2001). Effects of communication environment, immediacy, and communication apprehension on cognitive and affective learning. *Communication Monograph*, 68, 184-200. Retreived April 11, 2007 from http://sciencedirect.com

Neer, M. R. (1987). The development of an instrument to measure classroom apprehension. *Communication Education*, 36, 154-166.

Petress, K. (2001). The ethics of student classroom silence. *Journal of Instructional Psychology*, 28 (2): 104-107.

Roach, K. D. (1999). The influence of teaching assistant willingness to communicate and communication anxiety in the classroom. *Communication Quarterly*, 47 (2), 166-182.

Şahin, F. (1997). *Öğrenme-öğretme sürecinde öğrencinin sözel iletişim endişeleri.* Unpublished master's thesis, Ankara University, Ankara, Turkey.

Şeker, H., & Gençdoğan, B. (2006). *Psikolojide ve eğitimde ölçme aracı geliştirme*. Ankara: Nobel Yayın Dağıtım.

Şimşek, Ö. F. (2006). *Yapısal eşitlik modellemesine giriş: Temel ilkeler ve LİSREL uygulamaları*. Ankara: Ekinoks Yayınevi.

Tavşancıl, E. (2002). *Tutumların ölçülmesi ve SPSS ile veri analizi*. Ankara: Nobel Yayın Dağıtım.

Whithers, L. A., & Vernon, L.L. (2006). To err is human: Embarrassment, attachment, and communication apprehension. *Personality and Individual Differences*, 40 (1), 99-110.

Öğretim Elemanı İle İletişim Kurma Korkusu Ölçeğinin Geliştirilmesi

(Özet)

Problem Durumu: Diğer insanlarla iletişim kurarken ya da iletişim kurma beklentisi içindeyken yaşanan korku ya da kaygı olan iletişim korkusu eğitim sürecinde önemli bir sorun olarak görülmektedir. İletişim korkusu, çeşitli sosyal ortamlarda bulunurken ve davranırken, başkaları üzerinde olumsuz bir izlenim bırakacağı beklentisi ile yaşanan sosyal kaygının sadece iletişim kurma durumlarına özgü bir türü olarak kabul edilmektedir. Bu korku, iş ortamında ve topluluk karşısında yaşanabileceği gibi sınıfta ya da öğretmenle etkileşim durumlarına özgü olarak da yaşanabilir. Okul ortamında öğretmene özel olarak yaşanan iletişim korkusu, öğrencinin öğretmenle iletişime girme durumunda yaşadığı özgül bir kaygı tipi olarak tanımlanmaktadır. Alan yazın incelendiğinde iletişim korkusunun en önemli nedenlerinden biri olarak iletişime girme isteksizliği gösterilmektedir. Bunun yanında öğretmen davranışlarıyla oluşan tehtitkar durumların öğrenciler tarafından algılanma biçiminin ve olumsuz öğrenmeler geçmişinin; iletişim becerileri eksikliğinin, sıkılganlık ve utangaçlık gibi kişisel özelliklerin ve sınıftaki tartışmalara katılmama, soru sormama, öğretmenden yardım istememe ve onunla iletişime girmekten kaçınma gibi davranışların iletişim korkusu ile anlamlı ilişkinin olduğu görülmüştür.

İlgili yabancı alan yazına bakıldığında doğrudan öğretmen ya da öğretim elemanı ile iletişim kurma durumlarında yaşanan iletişim korkusu ölçeğine rastlanılmamıştır. Ancak iletişim korkusunu farklı boyutlarıyla ölçme amacıyla geliştirilmiş çeşitli ölçekler bulunmaktadır. Bu ölçekler yardımıyla sorunun önemini gösteren ve önleyici çalışmaların başlamasını destekleyen araştırmalar yapılabilmektedir. Bu bağlamda ülkemiz koşullarına uygun, farklı yaş grupları için iletişim korkusunu geçerli ve güvenilir bir biçimde ölçecek ölçme araçlarına gereksinim vardır. Özellikle kısa bir süre sonra profesyonel iş görme etkinlikleri içine girecek ve çoklu iletişim durumlarında yetişkin rollerine uygun davranma göreviyle karşılaşacak olan üniversite öğrencilerinin, otorite konumunda olan öğretim elemanları ile iletişim kurarken yaşadıkları korkuya ilişkin varolan durumu betimlemeye ve başa çıkmaya yönelik çalışmaların yapılmasına aracılık edecek ölçme araçlarının geliştirilmesine gereksinim vardır.

Araştırmanın amacı: Bu çalışmada iletişim korkusunun özgül bir tipi olan üniversite öğrencilerinin öğretim elemanları ile iletişim kurma korkusunu ölçmeye hizmet edecek geçerliği ve güvenilirliği olan bir ölçme aracı geliştirmek amaçlanmıştır.

Araştırmanın Yöntemi: Öğretim Elemanı İle İletişim Kurma Korkusu Ölçeği'nin (ÖİKÖ) maddelerini belirleme çalışmalarının sonunda oluşturulan 62 maddelik deneme formu ilk olarak 280 öğrenciye uygulanmıştır. Bu uygulamadan elde edilen verilerle yapılan açımlayıcı faktör analizi sonucunda beşli Likert ile yanıtlanan 49

madde elde edilmiştir. Ölçeğin bu formunun geçerlik ve güvenilirlik çalışmaları kapsamında tekrar açımlayıcı faktör analizi yapılmış, sonra madde analizi, doğrulayıcı faktör analizi ve ölçütlere dayalı geçerliği yapılmıştır. Ölçeğin güvenilirliği için test-tekrar test ve iç tutarlılık güvenilirliğine bakılmıştır.

Ölçeğin faktör analizi, madde analizi ve iç tutarlılık güvenilirliği 2006-2007 güz yarı yılında Kocaeli Üniversitesi Teknik Eğitim Fakültesi ve Fen-Edebiyat Fakültesi 1., 2. ve 3. sınıftaki 210 (85 kız, 125 erkek) öğrenciden; ölçeğin ölçütlere dayalı geçerliği için 2006-2007 bahar yarı yılında Kocaeli Üniversitesi Fen-Edebiyat Fakültesi 1., 2., 3. ve 4. sınıftaki 140 (58 kız, 82 erkek) öğrenciden; ölçeğin güvenilirlik çalışması için 2006-2007 bahar yarı yılında, Kocaeli Üniversitesi Teknik Eğitim Fakültesi 3. ve 4. sınıftaki 150 (50 kız, 100 erkek) öğrenciden alınan verilerle gerçekleştirilmiştir.

Bulgular ve Sonuçlar: Yapılan açımlayıcı faktör analizi sonucunda ÖİKÖ'nün 19 maddeden oluştuğu ve önemli üç faktörünün olduğu görülmüştür. Faktör döndürme sonrasında ölçeğin birinci faktörde yer alan ve yedi maddeden oluşan alt ölçeğine "yatkınlaştırıcı kişisel özellikler", ikinci faktöründe yer alan ve sekiz maddeden oluşan alt ölçeğine "öğretim elemanının davranışlarına ilişkin algılanan tehdit" ve dört maddeden oluşan üçüncü faktörüne "öğretim elemanından uzak durma eğilimi" isimleri uygun görülmüştür. Bu faktörlerden birincisi ölçeğe ilişkin toplam varyansın %21.9'unu, ikincisi %20.9'unu, üçüncüsü de %11.4'ünü açıklamaktadır. Bu üç faktörün açıkladığı toplam varyans %54.2 olup, faktörlerin maddelerde açıkladıkları ortak varyans da %41 ile %63 arasında değişmektedir. Birinci faktörde yer alan maddelerin faktör yük değerlerinin .563 ile .786 arasında; ikinci faktördekilerin .776 ile .597 arasında; üçüncü faktördekilerin ise .744 ile .647 arasında değişmektedir.

ÖİKÖ'nün alt ölçeklerle korelasyonunun sırasıyla .75, .81, ve .43 olduğu, yani her bir alt ölçeğin toplam ölçek puanları ile anlamlı ilişkisinin olduğu görülmüştür. ÖİKÖ'nün alt ölçeklerin madde toplam korelasyon değerlerine dayalı olarak yapılan madde analizi sonuçları da bu sonucu desteklemektedir. Ölçekte birinci faktörü oluşturan maddelerin .51 ile .68 arasında; ikinci faktörü oluşturan maddelerin .45 ile .69 arasında; üçüncü faktörü oluşturan maddelerin ise .41 ile .51 arasında madde toplam korelasyon değerleri elde edilmiştir. Bu sonuçlar ölçeğin ait oldukları boyutla ilişkilerinin yeterli olduğunu ve ölçeğin yapı geçerliğine ilişkin kanıtları güçlendirdiğini göstermektedir. Doğrulayıcı faktör analizi sonuçlarına göre, uyum istatistikleri birlikte dikkate alındığında faktör yapısının verilerle iyi düzeyde uyum gösterdiği, modifikasyon indeksi sonuçlarında önemli bir modifikasyon önerisi olmadığı, dolayısıyla ölçeğin yapı geçerliğinin doğrulandığı görülmüştür. Yapılan benzer ölçekler geçerliği çalışmasında ÖİKÖ ile Sosyal Kaygı Ölçeği arasında anlamlı bir ilişki bulunmuştur (r=.62).

Ölçeğin Cronbach-Alfa katsayısı r=.82; test-tekrar test güvenilirlik katsayısı ise r=.90 olarak bulunmuştur. ÖİKÖ'nün güvenirlik katsayılarına bakıldığında, üniversite öğrencilerinin öğretim elemanlarıyla iletişim kurma korkularını güvenilir bir biçimde ölçebileceği söylenebilir. Ölçeğin puanlaması Hiçbir zaman=1,

Nadiren=2, Ara sıra=3, Sık sık=4, Her zaman=5 alacak şekilde düzenlenmiştir. Dolayısıyla ölçekten alınabilecek en yüksek puan 95, en düşük puan 19'dur. Puanlar yükseldikçe öğrencilerin öğretim elemanlarıyla iletişim kurma korkusu artmaktadır.

Sonuç ve Öneriler: Yapılan analizler sonucunda, ÖİKÖ'nün yapı ve kapsam geçerliğinin ve güvenilirliğinin olduğu görüldüğünden yeterli psikometrik özelliklere sahip olduğuna karar verilmiştir. ÖİKÖ'nün geliştirilme çalışmaları Kocaeli Üniversitesi Teknik Eğitim Fakültesi ve Fen-Edebiyat Fakültesi öğrencileriyle gerçekleştirilmiştir. Farklı üniversite ve fakültelerden oluşturulacak daha geniş örneklemler ile ölçeğin geçerlik ve güvenilirliğine ilişkin yapılacak çalışmalar daha yeterli psikometrik özelliklere sahip olması bakımından yararlı olacaktır.

Anahtar Sözcükler: İletişim korkusu, geçerlik ve güvenilirlik, üniversite öğrencileri.

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Using Concept Maps as an Alternative Evaluation Tool for Students' Conceptions of Electric Current

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Abstract

Background: Concept maps developed as teaching tools by Novak et al. depending on Ausubel's cognitive learning theory display the relationships and hierarchy between the concepts. Concept maps, having been used mostly as teaching tools, display the relationships between the concepts concretely and therefore are qualified to be utilized as an alternative evaluation tool in terms of research on students' cognitive structures.

Purpose: This study aims to determine the cognitive structures of secondary level students regarding electric current through the concept mapping technique.

Programme description: First, an activity was conducted with the students, which aimed to inform the students about concept mapping during a lesson hour. Then, students were given 26 concepts related to electric current and were asked to create their concept maps. The conceptual structures of students were determined through the examination of their concept maps via the descriptive statistical methods.

Sample: The research was conducted with a total of 244 (119 female – 125 male) students aged between 15 and 17, who attend Year 12 in eight different secondary schools in Ankara within the 2003-2004 academic year.

Design and methods: This research is a qualitative study that uses concept mapping technique to determine the students' conceptions of secondary level students related to electric current. The conceptual structures of students were determined through the examination of their concept maps via the descriptive statistical methods. As the data collection tool, the concept maps created by the students as well as the semi-structured and structured interviews with 20% of each class were utilized. Moreover, all students interviewed also experienced a structured interview where two

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simple electric circuits consisting of a battery, resistance and electric bulb were discussed. The obtained responses were analyzed under separate categories.
Results: The research concluded that students had various alternative conceptions regarding electric current. Some of these alternative conceptions held by the students were found to be different from the ones in the literature. "Electric current is stored in the generator.", "Electric current moves in the opposite direction of (-) load" and "Electric current is spent at the resistances" represent some of the misconceptions of the students.
Conclusions: With the help of the concept maps, the alternative concepts in the conceptual structures of the students could also be determined. As in this study, concept maps provide the determination of alternative conceptions that were already thought to be held by the students, as well as different alternative conceptions.
Keywords: Concept maps, electric current, alternative conception, secondary school students

PISA (2003) and TIMSS (2000) results show that Turkish students have low performance levels in science and mathematics courses. The Ministry of National Education (M.E.B.) in Turkey has been revising primary and secondary level curricula in order to address this problem (M.E.B., 2003, 2005). The reformation started with the extension of the obligatory primary school program to eight years in 1997. Later, the science course was revised and renamed Science and Technology. Currently, studies on the secondary level curriculum are in progress. Secondary level education at high schools has been extended to four years. The content of the science courses is being modified accordingly. Within this period of reformation, there has been a focus on topics and concepts for students. Students' conceptions could be utilized as a starting point for these curriculum development studies. They could be diagnosed by the examination of their cognitive structures. One of the most common tools, used in educational research in order to examine and diagnose the cognitive structure, is the concept map (Edwards & Fraser, 1983).

What is a Concept Map?

Concept maps were first developed as teaching tools by Joseph Novak and his colleagues in Cornell University at the beginning of 70s (Novak & Gowin, 1984). Concept maps, which depend on Ausebel's cognitive learning theory, display the relationship and hierarchy among concepts (Novak & Musonda, 1991). According to Ausubel (1968), meaningful learning occurs when previous knowledge is connected and united with new knowledge in the cognitive structure. Since the previous knowledge forms the basis of the new knowledge, it has an important role in the construction of knowledge. The utilization of concept maps as an indicator of knowledge unity mostly depends on the studies of Novak in science education. Using concept maps, students could be taught what concepts they need to learn and how these concepts are connected to each other. Concept mapping is an effective teaching strategy since it enables visualization by making abstract concepts concrete, empowering the relationship between previous and new knowledge, making

learning meaningful, helping the acquired knowledge to be constructed in long-term memory, testing if the students are able to discover the relationship between the concepts, addressing different learning styles and individual differences, setting a beneficial alternative in terms of explaining the relationships between the concepts, and displaying relationships within a system in a concrete way.

With the help of concept maps, which are the schematic expressions of the relationships between concepts, students' cognitive structures could be reflected in order to determine how much they learned (Novak & Gowin, 1984; Shymansky et al. 1997). Goldsmith and Johnson mentioned that in the assessment of learning, mostly single-dimensional techniques were used and student performance was evaluated via their responses to multiple choice questions in tests (Markham, Mintzes, & Jones, 1994). With such an evaluation technique, how much a student has learned may not be fully determined (Novak, Gowin, & Johansen, 1983). Therefore, concept maps create an assessment and evaluation environment for teachers, where students participate before and/or after learning. Teachers can determine the students' conceptions as well as learning difficulties through examining how students connect the concepts in their cognitive structures via the concept maps (Çıldır & Şen, 2006a) Sen, 2002).

In utilizing the concept map as an assessment and evaluation tool, it is very important to determine the aim of the concept map. For example, if the aim is to examine the development of the learning process in a student cognitive structure and to determine the individual differences, then quantitative analysis methods should be administered. In concept maps the qualitative data could usually be obtained through various evaluation methods such as holistic, relational, and structural (McClure, Sonak, & Suen, 1999; Novak & Gowin, 1984; Ruiz-Primo & Shavelson, 1996; Yin, Vanides, Ruiz-Primo, Ayala & Shavelson, 2005). For instance, in the structural evaluation method, as applied in studies by Novak and Gowin, one point could be given to each concept, five points could be given to each hierarchical level, one point could be given to each correct link, and 10 points could be given to each correct crosslink in order to reach a total score (Novak & Gowin, 1984). Another method could be the preparation of an ideal expert concept map by the experts, and the scoring of the students' concept maps could be done by comparing them with that of the experts (White & Gunstone, 1992). Administration of qualitative analysis methods would be more appropriate if the aim is to reflect students' previous knowledge, determine the learning difficulties, or examine opinions on a certain topic. Şen and Koca (2003), in their qualitative research, examined at which level a concept was linked to others in the concept maps. They were able to observe the structural details of the concepts with this method.

Different concept mapping techniques are described in the literature, such as collaborative concept mapping, fill-in-the-blanks concept mapping, concept mapping from scratch, and a flow chart mapping method (Edwards & Fraser, 1983; Ruiz-Primo, Schultz, & Shavelson, 2001; Stuart, 1985). In collaborative concept mapping techniques, students create their concept maps under the supervision of their teachers or together with their friends. The fill-in-the-blanks concept mapping is the technique in which students fill in the blanks on a previously prepared concept map according to related concepts. Students complete the map by filling in the blanks

with the appropriate concepts. Concept mapping from scratch could be administered in two ways, one in which students are asked to produce concepts with the given concepts, limited in number. The second way is where students are free to add as many concepts as they wish to the main concepts that are given. In the flow chart mapping technique, students are given concepts and asked to list them in correct sequence to create their concept maps. According to Kilic (2003) and Bahar (2001) the application of concept mapping is limited in Turkish because of the structure of the Turkish language. The concept maps, which were developed by Novak and his study group, were designed in line with English linguistic structure. While the English sentence structure consists of a subject, verb, and object, the Turkish sentence structure is sequenced as subject, object and verb. This different sequence is because the two languages, Turkish and English, belong to different linguistic groups. Turkish is a suffixed language therefore the suffixes come to the end of words. That is why the concept maps in Turkish should be reviewed differently from the English concept maps. Kilic (2003) stated that the concept maps, which are designed without taking Turkish grammar structure into consideration, could be difficult for students at the elementary level.

Problem Statement

Students' ideas, which do not match with scientific fact, can only be revealed through examining the relationships in their cognitive structures. In this study, students' conceptions were reflected via concept mapping, where the relationships between the concepts were displayed. In the light of this aim, this study sought answers to the following problems:

1. What are the roles of concept maps in determining the alternative concepts of students?

2. What are the alternative concepts of students regarding "electric current"?

Method

Type of Research and Sampling

This research is a qualitative study that uses concept mapping technique to determine the students' conceptions of high school students related to electric current. A total of 244 (119 female – 125 male) grade 10 students from eight different schools in Ankara aged between 15 and 17 participated in the research during the 2003-2004 spring semester. The students were from 12 classes at general high school, foreign language high school and Anatolian high school students. The general high school students are admitted to these schools without any admission specifications. The students at foreign language high schools are admitted according to their primary school averages, and the others at Anatolian high schools are placed at these schools according to the results of a national exam administered by the Ministry of National Education. The students at foreign language high schools and Anatolian high schools receive a one-year preparation program, which involves a full scope of English.

Data Collection

The data collection tools of the research were the concept maps prepared by the students as well as the structured and semi-structured student interviews made with the 20% of each class. The semi-structured interviews were done according to the relationships constructed by students in their concept maps and were mainly done with students who were found to have alternative conceptions in their concept maps. Additionally, students were interviewed about two different electric circuits, which consisted of a battery, bulb, and resistance. The responses taken were analyzed under separate categories. Prior to the application, a pilot study was administered to 30 students in order to test the validity of the data collection tool. The pilot study was concluded with the descriptive statistical evaluation of the concept maps and categories were formed for each concept separately. In these categories, the suggestions indicating the relationship of each concept with other concepts were listed as true, false, meaningless, or acceptable.

Procedure

The procedure was started after teaching the topic of electric current. In addition, students were taught about concept maps via a single-hour lesson involving a previously prepared activity. At the end of the activity, the students were observed to be able to apply concept mapping to a new topic, and they were given 26 concepts to create their concept maps. Students constructed relationships between concepts that they assumed to be related and they explained the content of the relationship via arrows in their concept maps. The twenty-six concepts, which were planned to be attained by the students, were chosen from the grade 10 physics program within the Turkish National Curriculum. These determined concepts were used by the researchers in order to construct a concept map related to electric current. In order to test the validity, the concept map was submitted to 10 experts, five physics teachers, three physics experts, and two physics education experts. The expert concept map is thought to involve the correct relationships that could be between the concepts related to electric current. The analysis of the concept maps prepared by the students was analyzed according to the relationships on the expert concept map.

Data Analysis

The findings of the research were analyzed by five experts, consisting of two physics and three physics education experts, to test the reliability. The categories were reorganized in the light of the views taken and the experts were consulted again. The categories took their final shapes after the views of the experts were again considered. For the analysis of the structured and semi-structured student interviews, student views on electric current were categorized and alternative conceptions regarding electric current were revealed.

Findings of the Study

The findings related to the sub problems of the research were obtained as a result of the analysis of concept maps made by students on electric current and the interviews made. The analyses concluded that students had various alternative conceptions under different categories related to electric current (See. Table 1). The

number of students indicated on the table represents the students who had related the concepts with each other. At the end of the study, it was found that some of the misconceptions determined were different from the misconceptions indicated in the literature.This study mainly focuses on the student views, which are determined to be different from the ones in the literature (Table 1 displays these views italic).

Students' conceptions regarding electric current mainly clustered around generator and negative charge (See Table 1). Table 1 displays that students have alternative conceptions regarding electric current, similar to the results of the studies in the literature. The findings obtained revealed the students' ideas that the electric current is stored in the generator, spent in the resistances and that the resistance is the opposite direction force applied on the electric current (See Table 1 and student interviews).

Table I

Major Alternative Conceptions Related to Electric Current

Students' Conceptions of Electric Current

Concept	Alternative Conception	NSCR f	NTM f	NMAS f	PM (%)
Generator	Electric current is stored in the generator	44	15	15	57.14
(-) Charge	*Electric current moves in the opposite direction of (-) charge*	*44*	*15*	*15*	*57.14*
Electricity	*Electricity creates electric current.*	*29*	*13*	13	*44.83*
Electric Field	*Electric current creates the electric field*	*7*	*2*	*2*	*28.57*
Potential difference	*By changing the amount of electric current, the potential difference of the circuit could be changed.*	*21*	*5*	*3*	*23.80*
	Electric current occurs as a result of the change in the potential difference.			*2*	
Resistance	Electric current is spent at the resistance.	*101*	16	*7*	15.84
	The value of resistance changes according to the electric current flowing.			7	
	Resistance is the force that is applied in the opposite direction of the electric current.			*2*	

NSCR: Number of students that constructed relationships, **NTM:** Number of total alternative conceptions, **NMAS:** Number of alternative conceptions according to subcategories, **PM:** Percentage of alternative conceptions.

In order to investigate the alternative student view that *electric current is spent at the resistance,* which was obtained through both the literature and the analysis of the students' concept maps, student interviews were made. Students were asked about two more structured questions about simple electric circuits. They were asked to compare and contrast the amounts of current on point A and point B, points on a simple electric circuit that consisted of resistance and a battery (See Figure 1). The potential battery differences for both circuits and the resistance values of the bulb and the resistance were given as equal. Out of the participating students, eight students (16%) were determined to think that in point A, the electric current would change according to the characteristics of the resistance and bulb. Three (6%) of these students believed that the electric current flowing through the bulb would be greater than the current flowing through the resistance, whereas the remaining five (10%) believed that the electric current flowing through the bulb would be smaller than the current flowing through the resistance. Sixteen (32%) students were determined to think that at Point B, the electric current would decrease after it would flow through the resistance and the bulb.

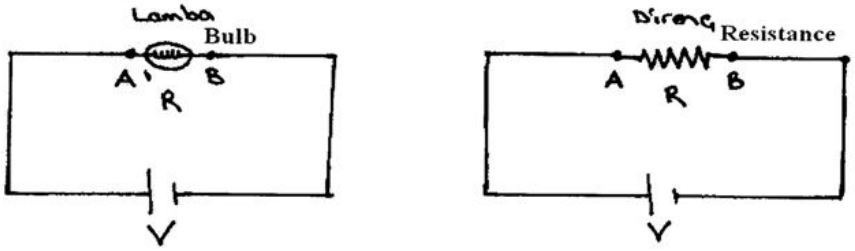

Figure I. Simple electric circuits made of a bulb and resistance.

Students explained why the electric current would decrease after it passes through the bulb and the resistance as follows: (R: Researcher, S: Student, 1: Female Student, 2: Male student, #: Student number)

S (2, 29): The electric current amounts at Point A are equal**.**

R: Why?

S (2, 29): Because the bulb is also a resistance.

R: OK. What would be the value of electric current at Point B after the current flows through it?

S (2, 29): Decreases?

R: Why? Would it decrease in both?

S (2, 29): Yes. Because both are resistances.

R: Why is that?

S (2, 29): The reason for that is, I mean, the resistance sets an obstacle, and it decreases the amount of electric current.

These interviews involved the explanations of students that supported the conceptions found in their concept maps. In the light of these results, it could be said that students have the alternative conception that *the electric current is consumed in the resistances*. Moreover, it is observed that the concept maps are as effective as the other assessment tools that are used to determine students' views. The following parts of the study focuses on the student views which did not take place in the literature but were obtained through concept maps.

Looking at the relationships between electric current and (-) charge, students were observed to have a different conception which was not seen in the literature before. Out of 44 students, who had linked electric current to the (-) charge, 15 students (57.14%) were observed to think that *electric current and electron flow were different things* (Table 1).

Another finding of the study was that the students took electric current and electron flow as completely different concepts. Students, in their concept maps, expressed their alternative conceptions using statements such as "electric current comes from the (+) pole," "(-) pole is where the electric current is finalized," and "electric current moves in the opposite direction of the (-) charge." Figure 2 displays how a student with such an alternative conception constructed this relationship in his/her concept map.

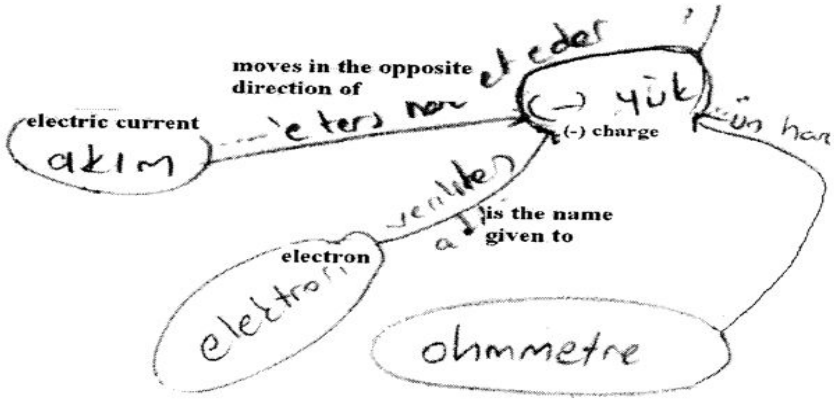

Figure II. The concept map involving the statement "Electric current moves in the opposite direction of (-) charge.

During the interviews made in order to support the alternative conception that *electric current moves in the opposite direction of the (-) charge,* students used the following expressions in explaining the relationships they had constructed between the concepts of electric current, (-) charge, (+) pole, (-) pole and generator:

S (1, 54): The (-) pole is the place where the electrons are and start moving. There is more electric charge in (-) pole and the (+) pole.

R: Is the electricity located in the (+) and (-) poles?

S (1, 54): Electric current flows from the (+) pole to the (-) pole. But electrons move from the (-) pole to the (+) pole.

The semi-structured student interviews indicated also that students perceived electric current and charge flow differently and they thought that their flows in the circuit were in opposite directions.

Being different from the ones in the literature, another alternative conception regarding the electric current was determined after the examination of the relationships constructed between the concepts of electric current and electricity. Twenty-nine of the participating students constructed a relationship between electric current and electricity. Out of these students, 13 (44.83%) were observed to have conceptions related to electric current and electricity. Thirteen of the students with alternative conceptions were found to have the idea that *electric current occurred as a result of electricity*. Students expressed their perceptions on their concept maps with statements such as "electricity provides electric current" (see Figure 3).

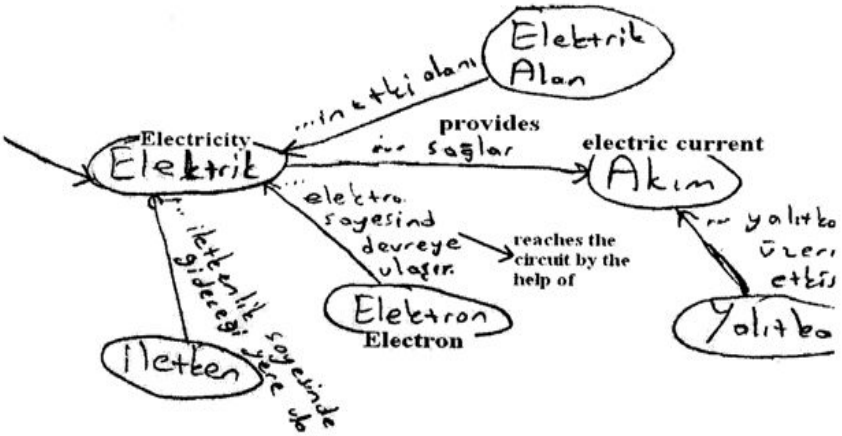

Figure III. Concept map indicating the statement "Electricity provides electric current."

In the interviews, what students expressed about the relationships they had constructed between electric current and electricity are as follows:

R: Is there a relationship between electric current and electricity?

S (2, 13): There is. As far as I know, the more the electricity flows the greater the electric current becomes.

R: Are they same things or different things?

S (2, 13): They are different things. As far as I know, electric current increases according to electricity. It changes according to the resistances.

Students were observed to have made explanations in the student interviews supporting their conceptions that "electricity provides electric current." Students expressed their conceptions as "the more there is electricity the more electric current

would be". It could be concluded from these interviews that students perceived electricity and electric current as different things.

Two of the seven students (28.57%) who constructed a relationship between the concepts of electric current and electrical area were determined to assume that *the electrical area is formed as a result of the electric current*. Students indicated this alternative conception of theirs in their concept maps with statements as "The current creates electric field" (See Figure 4).

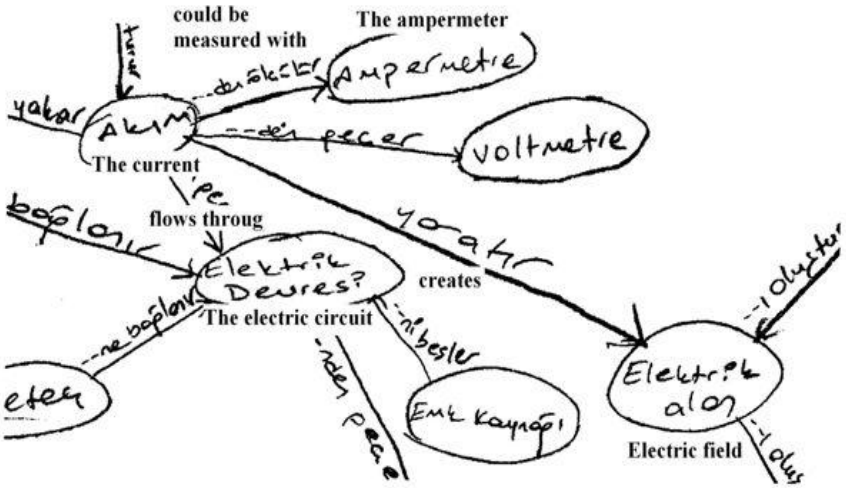

Figure IV. The concept map displaying the statement that "The current creates electric field."

Students were asked to explain this relationship they had constructed in their concept maps and they claimed the following in favor of the alternative concepts "current creates electric field":

R: What is electric field? How would you describe electric field?

S (2,39): I can say that electric field is the places where the electric current flows.

S (1,23): Electric field, the electric current flowing through the electric circuit creates the electric field

Looking at the relationships students constructed between the concepts of electric current and potential difference, it is observed that five of the 25 students (23.80%) had alternative conceptions. Three students with misconceptions were found to have the view that *the potential difference of the circuit could be changed through changing the amount of electric current flowing*. Students indicated these in their concept maps with statements such as *"Potential difference depends on the current."* or *"Current affects the potential difference"* (See Figure 5). Again two students with alternative conceptions were determined to think that current occurred as a result of a change of the potential difference.

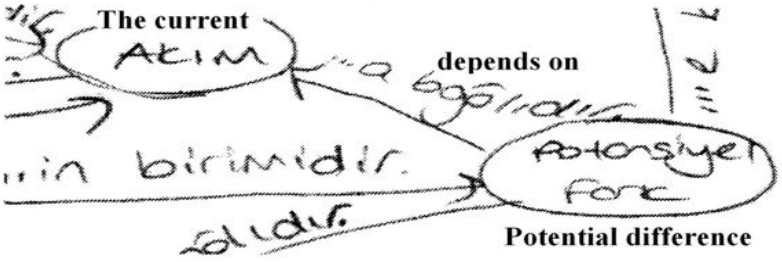

Figure V. The concept map indicating "Potential difference depends on the current."

In the semi-structured interviews made, students explained the relationships they had constructed in their concept maps related to the concepts of current and potential difference as follows:

R: Could current occur in the absence of the potential difference in the circuit?

S (2,1): If there is no resistance in the circuit, then there won't be any potential difference but the current would flow continuously.

R: Could we change the potential difference of the circuit by changing the current?

S (2,44): We could change the current and its potential difference depending on the generator. Potential difference is already something that is created by the generator. The current is something that occurs as the electrons in the generator moves.

Table 1 displays that, out of the 16 students with alternative conceptions regarding resistance and electric current, unlike from the alternative conceptions in the literature, seven were observed to have the conception that *the value of the resistance would change according to the amount of current passing through it*. Students expressed this in their concept maps with statements such as "Current affects the resistance" (see Figure 6).

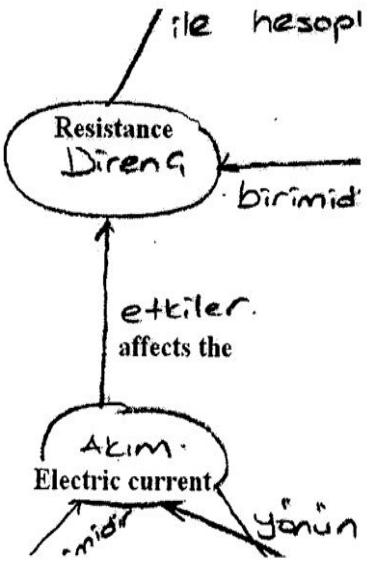

Figure VI. The concept map involving the statement that "Electric current affects the resistance."

In semi-structured interviews, students expressed their conceptions similar to the following expressions:

R: Could I change the value of a resistance, which has a 5 ohm resistance, by changing the amount of electric current and potential difference of the circuit?

S (1,16): Yes, we could change depending on each other.

R: How? For example, if I would like to increase the resistance value, what should I do?

S (1,16): For example, there is a formula like this V= I R. When we change the resistance, electric current and the potential difference, here, the values in the formula change eventually. If we change the numerical values of electric current and potential difference, then, consequently, the value of the resistance would change too.

As the interviews indicate, it could be said that students thought *the value of the resistance could change according to the electric current flowing through*. Students also thought that as the value of the current changed, the resistance value on the circuit would change accordingly.

Conclusion and Discussion

In this study, the conceptions of high school students on electric current were investigated with the help of concept maps and the students were found to have some various alternative conceptions involving electric current concept. The most important outcome of the study was that the concept maps, which were utilized as teaching tools in researches, were determined to be alternative evaluation tools to be utilized in revealing students' alternative conceptions. The research studies in literature mainly used multiple-choice or open-ended questions supported with interviews in determining student conceptions related to electric current (Asami, King, & Monk, 2000; Cohen, Eylon & Ganiel, 1983; Heller & Findley, 1992; Licht, 1991; Örgün, 2002; Psillos, Koumaras & Tiberghien, 1988; Sencar & Eryilmaz, 2004; Shipstone et al., 1988). While only the conceptions of students could be determined through the multiple-choice tests, as this study indicates, in addition to the expected alternative conceptions, different conceptions could be identified through the utilization of the concept maps. Therefore, the concept tests to be administered should involve three or four step questions. This would avoid the determination of wrong answers, which stem from lack of knowledge or simple mathematical mistakes, as alternative conceptions. According to Tezbasaran (2001) questions, which would refer to the higher levels of knowledge, could be prepared in traditional tests. Nevertheless, this would require more effort and more test question developing skills when compared to the concept maps.

Another conclusion of the study was the determination of students' having conceptions similar to or different from the results of the studies in the literature regarding electric current. As in the studies by Cohen, Eylon & Ganiel (1983), Çepni & Keleş (2006), Duit & Rhöneck (1998), Lee & Law (2001), Örgün (2002), Pardhan & Bano (2001), Psillos, Koumaras & Tiberghien (1988) and Shipstone et al. (1988) students were observed to assume that the electric current was stored in the

generator, it was spent in the resistances and the resistance was the opposite directional force applied on the electric current. What made this study different from the other studies was that students were determined to have alternative conceptions different from the ones in the literature (What are that you found different from the literature conceptions). At the end of the study, students were found to take electric current and electron flow as different concepts. The reason for the students' misconceptions could be described as the display of electric current and electron flow in different directions in course books. For example, in the grade 10 physics course textbook, the directions of electric current and electron flow were shown as different (see Figure 7).

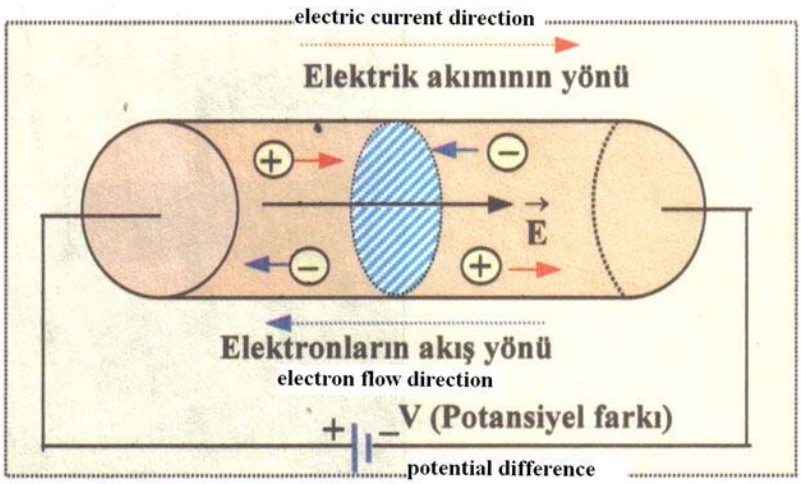

Figure VII. The display of electron flow direction and electric current direction in the physics course book (Karaarslan, Altunbaş, Zengin & Tütüncü, 1999).

Students have to be informed that this is just a display and they should not assume electric current and electron flow as different things. The study also concluded that students thought that the *electric current was formed as a result of electricity*. The reason for this misconception was their taking electric current and electric as completely different concepts. Another alternative thought stemmed from the relationships constructed between electric current and electric field was the students idea that *the electric field was formed as a result of the electric current.* The reason for these alternative conceptions was that the students assumed electric field as the place where the electric current flowed. At the end of the study, students were also found to think that *the potential difference of the circuit could be changed by changing the amount of electric current.* The reason for this alternative conception could be the students' thoughts that *the potential difference was formed as a result of the current, where in fact they should have assumed that the current was formed as a result of the potential difference.* Another conclusion of the study was that, regarding resistance, the students were observed to think that *the value of the resistance could change according to the electric current flowing through.* The main reason for students' having this idea about resistance is their consideration of V=I.R formula as a simple mathematical statement. Generally, the reason for these alternative perceptions of the students was

all electric current related concepts' being abstract as well as students' relevant experiences from daily life.(the sentence is not clear)

During this study, no challenges were experienced regarding the Turkish language structure, which was indicated as a limitation for the utilization of the concept maps in lessons (Bahar, 2001; Kilic 2003) The students need to be well-educated about the importance of the direction of the arrow – that the direction of the arrow indicates the second concept and that while reading the concept maps, the first concept should be read first; the second concept should be read second, and then the relationship between the concepts should be read. This would avoid problems in the utilization of the concept maps.

The alternative conceptions those were determined both in this study and in the literature reveal that the traditional methods were not very successful in teaching electric current concepts. It is obvious that these topics, which are quite abstract, require alternative teaching approaches. Concept maps, in addition to being used as assessment tools, could be used as alternative teaching and learning tools in physics courses. Students would be able to better comprehend the course contents by relating them to each other. During such a course with close relationships between the concepts involved, any possible alternative conceptions would affect other relationships negatively. In physics courses, such relationships could be taught as a whole by using the concept maps. Many research studies have shown that concept maps promoted meaningful learning and increased students' achievement levels (Ault, 1985; Elhelou, 1997; Fry & Novak, 1990; Kinchin & Hay, 2000; Novak, 2002). Additionally, out of 30 teachers who participated in studies by Çıldır & Şen (2006b), 24 (80%) thought that teaching with concept maps would play an important role in creating a positive attitude in students towards the physics course. Teachers implied that many students, who previously had negative attitudes towards the course and were unsuccessful, became more interested in physics and developed positive attitudes after the study.

References

Asami, N., King, J., & Monk, M. (2000). Tuition and memory: Mental models and cognitive processing in Japanese children's work on DC electrical circuits. *Research in Science and Technological Education, 18* (2), 141-155.

Ault. C. R. (1985). Concept mapping as a study strategy in earth science. *Journal of College Science Teaching, 15*(1), 38-44.

Ausubel, D. P. (1968). *Educational psychology, a cognitive view*. New York, Holt, Rinehart, Winston.

Bahar, M. (2001). Biyoloji eğitiminde kavram haritalarının kullanımı. *Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 1*(1), 25-40.

Cohen, R., Eylon, B., & Ganiel, U. (1983). Potential difference and current in simple electric circuits: *A Study of students' concepts. American Journal of Physics, 51*(5), 407-412.

Çepni, S., & Keleş, E. (2006). Turkish students' conceptions about the simple electric circuits. *International Journal of Science and Mathematics Education, 4,* 269-291.

Çıldır, I., & Şen, A. İ. (2006a). Identification of high school students' misconception about electric current by concept maps. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 30*, 92-101.

Çıldır, I., & Şen, A. İ. (2006b). *Kavram haritalarının fizik dersine uygulanabilirliği ile ilgili öğretmen görüşleri*. 7. Ulusal Fen ve Matematik Eğitimi Kongresi, 423, 7-9 Eylül, Ankara.

Duit, R., & Rhöneck, C. (1998). *Learning and understanding key concepts of electricity*. Retrieved March, 15, 2004, from http//www.physics.ohio-state.edu/jossem/ICPE/C2MC.htlm

Edwards, J., & Fraser, K. (1983). Concept maps as reflectors conceptual understanding. *Research in Science Education, 13*(1), 19-26.

Elhelou, M-W. A. (1997). The use of concept mapping in learning science subjects by Arab students. *Educational Research, 39*(3), 311-317.

Fry, J. A., & Novak, J. D. (1990). Concept mapping brings long-term movement toward meaningful learning. *Science Education, 74*(6), 461-472.

Heller, P. M., & Finley, F. N. (1992). Variable uses of alternative conceptions: A case study in current electricity. *Journal of Research in Science Teaching, 29*(3), 259-275.

Karaarslan, I., Altunbaş, A., Zengin, F., & Tütüncü, A. (1999). *Fizik lise 2.* Eskişehir: M.E.B. Devlet Kitapları.

Kilic, G. B. (2003). Concept maps and language: A Turkish experience. *International Journal of Science Education, 25*(11), 1299-1311.

Kinchin, I. M., & Hay, D. B. (2000). How a qualitative approach to concept map analysis can be used to aid learning by illustrating patterns of conceptual development. *Educational Research, 42*(1), 43-57.

Lee, Y., & Law, N. (2001). Explorations in promoting conceptual change in electrical concepts via ontological category shift. *International Journal Science Education, 23*(2), 111-149.

Licht, P. (1991). Teaching electrical energy, voltage and current: An alternative approach. *Physics Education, 26*, 272-277.

Markham, K. M., Mintzes, J. J., & Jones, M. G. (1994). The concept map as a research and evaluation tool: Further evidence of validity. *Journal of Research in Science Teaching, 31*(1), 91-101.

McClure, J. R., Sonak, B., & Suen, H. K. (1999). Concept map assessment of classroom learning: Reliability, validity and logistical practicality. *Journal of Research in Science Teaching, 36*(14), 475-492.

M.E.B. (2005). *OECD PISA- 2003 araştırmasının Türkiye ile ilgili sonuçları, Ulusal Nihai Rapor*. Retrieved March, 10, 2007, from http://earged.meb.gov.tr.

M.E.B. (2003). *TIMSS 1999, Üçüncü uluslar arası matematik ve fen bilgisi çalışması, Ulusal Rapor*. Retrieved March, 10, 2007, from http://earged.meb.gov.tr.

Novak, J.D. (2002). Meaningful learning: The essential factor for conceptual change in limited or inappropriate propositional hierarchies leading to empowerment of learners. *Science Education, 86*(4), 548-571.

Novak, J. D., Gowin, D. B., & Johansen, G. T. (1983). The use of concept mapping and knowledge vee mapping with junior high school science students. *Science Education, 67*(5), 625-645.

Novak, J. D., & Gowin, D. B. (1984). *Learning how to learn*. New York: Cambridge University Press.

Novak, J. D. & Musondo, D. (1991). A twelve–year longitudinal study of science concept learning. *American Education Research Journal, 28*, 117-153.

Örgün, E., (2002). *Lise öğrencilerinin elektrik akımı konusundaki kavram yanılgılarında yapıcı öğretim yaklaşımının etkisi*. Unpublished master's dissertation, Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü, İstanbul.

Pardhan, H., & Bano, Y. (2001). Science teachers' alternate conceptions about direct-currents. *International Journal of Science Education, 23*(3), 301 – 318.

Psillos, D., Koumaras, P., & Tiberghien, A. (1988). Voltage presented as a primary concept in an introductory teaching sequence on DC circuits. *International Journal of Science Education, 10*(1), 29-43.

PISA (2003). *First results from PISA 2003: Executive summary*. Retrieved June, 10, 2007, from http://www.oecd.org/dataoecd/1/63/34002454.pdf.

Ruiz-Primo, M. A., Schultz, S. E., Li, M., & Shavelson, R. J. (2001). Comparison of the reliability and validity of scores from two concept-mapping techniques. *Journal of Research in Science Teaching, 38*(2), 260-278.

Ruiz-Primo, M. A., & Shavelson, R. J. (1996). Problems and issues in the use of concept maps in science assessment. *Journal of Research in Science Teaching, 33*(6), 569-600.

Sen, A. I. (2002). Concept maps as a research and evaluation tool to asses conceptual change in quantum physics. *Science Education International, 13*(4), 14-24.

Sencar, S., & Eryilmaz, A. (2004). Factors mediating the effect of gender on ninth-grade turkish students' misconceptions concerning electric circuits. *Journal of Research in Science Teaching, 41*, 603–616.

Shipstone, D. M., Rhöneck, C. V., Jung, W., Karrqvist, C., Dupin, J., Joshua, S., et al. (1988). A study of secondary students' understanding of electricity in five european countries. *International Journal of Science Education, 10*(3), 303-316.

Shymansky, J.A., Yore , L.D., Treagust , D.F., Thiele, R. B., Harrison, A., Waldrip, B.G, et al. (1997). Examining the construction process: a study of changes in level 10 students' understanding of classical mechanics. *Journal of Research in Science Teaching, 34*, 571-593.

Stuart, H. A. (1985). Should concept maps be scored numerically? *European Journal of Science Education, 7*(1), 73-81.

Şen, A. İ., & Koca, S. A. O. (2003). Kavram haritalarının analizinde niceliksel ve niteliksel metodların kullanımı ve karşılaştırılması. *Çukurova Üniversitesi Eğitim Fakültesi Dergisi*, 2, 1-9.

Tezbasaran, A. (2001). Designing teaching and learning based on concept mapping. *Cognitive Technologies in Education (issue No. 9)* [Newsletter].

TIMSS (2000). *Student background with mathematics achievement: Main survey: Third international mathematics and science study repeat*. Chestnut Hill, MA: Author. Retrieved June, 10, 2007, from http://timss.bc.edu/timss1999i/questionnaires.html.

White, R. T., & Gunstone, R. (1992). *Probing understanding*. New York: Falmer Press.

Yin, Y., Vanides, J., Ruiz-Primo, M. A., Ayala, C.C., & Shavelson, R.J. (2005). Comparison of two concept-mapping techniques: implications for scoring, interpretation, and use. *Journal of Research in Science Teaching, 42*, 166–184.

Öğrencilerin Elektrik Akımı Konusundaki Kavramlarının Tespit Edilmesinde Kavram Haritalarının Alternatif Değerlendirme Aracı Olarak Kullanılması

(Özet)

Problem Durumu: Ausebel'in bilişsel öğrenme teorisine dayalı olarak Novak ve arkadaşları tarafından öğretim aracı olarak geliştirilen kavram haritaları, kavramlar arasındaki ilişkiyi ve hiyerarşiyi göstermektedir. Daha çok öğretim aracı olarak kullanılan kavram haritaları, kavramlar arasındaki ilişkileri somut olarak ortaya koyduğundan, öğrencilerin bilişsel yapılarının araştırılmasında alternatif değerlendirme aracı olarak da kullanılabilir niteliktedir. Bu çalışmada da, kavram haritaları yardımıyla öğrencilerin alternatif kavramlarını tespit etmedeki rolü ve orta öğretim öğrencilerinin elektrik akımı konusunda sahip oldukları alternatif kavram yanılgıları araştırılmıştır.

Araştırmanın Amacı: Bu araştırma, orta öğretim öğrencilerinin elektrik akımı kavramına ilişkin bilişsel yapılarını kavram haritalarıyla belirlemek amacıyla yapılmıştır.

Araştırmanın Yöntemi: Araştırma, 2003-2004 öğretim yılı bahar döneminde Ankara'nın 8 farklı orta öğretim okulunda öğrenim görmekte olan 15-17 yaş arası toplam 244 (119 kız-125 erkek) 10. sınıf öğrencinin katılımıyla gerçekleştirilmiş nitel bir çalışmadır. Araştırmada ilk olarak, öğrencilere kavram haritalarını oluşturmaları için verilecek kavramlar tespit edilmiştir. Öğrencilerin elektrik akım konusuyla ilgili olarak kazanması hedeflenen 26 kavram, Türk Orta Öğretim müfredatındaki 10. sınıf fizik ders programından belirlenmiştir. Belirlenen bu kavramlar araştırmacılar tarafından kullanılarak, elektrik akımı konusu ile ilgili bir kavram haritası oluşturulmuştur. Oluşturulan bu kavram haritasının geçerliğini sağlamak amacıyla; hazırlanan kavram haritası, 5'i fizik öğretmeni, 3'ü fizik ve 2'si fizik eğitiminde uzman olan 10 kişiye verilerek uzman görüşleri alınmıştır. Uzman kavram haritasının, elektrik akımı konusunda geçmekte olan kavramlar arasında kurabilecek doğru ilişkileri içerdiği düşünülmektedir. Öğrencilerin uygulama sırasında oluşturmuş oldukları kavram haritalarının analizleri bu uzman kavram haritasındaki ilişkiler göz önüne alınarak yapılmıştır. Araştırmada veri toplama aracı olarak, öğrencilerin oluşturmuş olduğu kavram haritaları ve her sınıfın % 20'si ile yapılan yarı yapılandırılmış ve yapılandırılmış öğrenci görüşmeleri kullanılmıştır. Yarı yapılandırılmış görüşmeler, öğrencilerin oluşturdukları kavram haritalarındaki ilişkiler doğrultusunda gerçekleşmiş ve daha çok kavram haritasında kavram yanılgısı bulunan öğrenciler ile yapılmıştır. Ayrıca görüşmeye katılan her öğrenci ile pil, direnç ve lambadan oluşan iki ayrı basit elektrik devresiyle ilgili yapılandırılmış öğrenci görüşmeleri yapılmıştır. Elde edilen yanıtlar ayrı ayrı kategorilendirilerek analiz edilmiştir. Uygulamaya başlamadan önce veri toplama aracının geçerliliğini test etmek için 30 kişilik bir öğrenci grubu ile pilot çalışma gerçekleştirilmiştir. Pilot çalışma sonucunda öğrencilerin kavram haritaları betimsel istatistiksel yöntemler kullanılarak değerlendirilmiş ve her kavram için ayrı ayrı kategoriler oluşturulmuştur. Bu kategorilerde, her bir kavramın diğer kavramlarla olan ilişkisi sonucunda ortaya çıkan önermeler, doğru, yanlış, kabul edilebilir ve anlamsız olduğu durumları içermektedir. Örneğin; akım ve direnç kavramları arasındaki ilişkide "Direnç, elektrik akımını azaltır" yanlış bir önerme, "Direnç, e-

lektrik akımının geçmesindeki zorluktur" doğru bir önerme olarak değerlendirilmiştir. Kabul edilebilir önermeye "Elektrik akımı, dirence bağlıdır" önermesini, anlamsız kabul edilen önermeye ise "Elektrik akımı, direnç vardır" önermesini örnek gösterebiliriz. Araştırmada kullanılacak olan bulgularını, oluşturulan kategorilerin içindeki yanlış kabul edilen önermelerin bulunduğu kısım oluşturmaktadır. Bu nitel çalışmanın güvenirliğini sağlamak için, oluşturulmuş olan bulgular 2 fizik ve 3 fizik eğitiminde uzman 5 kişinin bilgisine sunularak uygun kategorize edilip edilmediği irdelenmiştir. Alınan görüşler sonucunda kategoriler yeniden düzenlenmiş ve uzmanlara tekrar gönderilerek görüşleri alınmıştır. Uzmanların olumlu görüşleri alındıktan sonra kategoriler son hallerini almışlardır. Yapılan yarı yapılandırılmış ve yapılandırılmış öğrenci görüşmelerinin analizinde ise, öğrencilerin akım ve direnç ile ilgili görüşleri ayrı ayrı kategorilendirilmiş ve bu kategorilerin incelenmesi yoluyla öğrencilerin bu kavramlara yönelik alternatif düşünceleri ortaya çıkarılmıştır. Uygulama, araştırmaya katılan sınıflarda elektrik akımı konusu işlendikten sonra gerçekleştirilmiştir. İlk olarak, öğrenciler kavram haritaları hakkında bilgilendirilmişlerdir. Bunun için bir ders saati kavram haritalarıyla ilgili önceden hazırlanmış etkinlik uygulanmıştır. Etkinlik sonucunda öğrencilerin kavram haritalamayı yeni bir konuda rahatlıkla uygulayabildikleri görüldükten sonra, elektrik akımı konusu ile ilgili 26 kavram verilerek kavram haritalarını oluşturmaları istenmiştir. Öğrenciler, ilişkili olduğunu düşündükleri kavramlar arasında ilişki kurmuşlar ve aradaki ilişkiyi okların üzerine yazarak kavram haritalarını oluşturmuşlardır.

Araştırmanın Bulguları ve Sonuçları: Öğrencilerin kavram haritaları ve yapılan mülakatlar sonucunda elektrik akımı kavramına yönelik farklı kategorilerde çeşitli alternatif kavramlara sahip oldukları belirlenmiştir. Ayrıca araştırma sonucunda tespit edilen alternatif kavramların bir kısmının literatürde tespit edilen alternative kavramlardan farklı olduğu görülmüştür. "Elektrik akımı, üretecin içinde depo edilir", "Elektrik akımı, (-) yüke ters yönde hareket eder" ve "Elektrik akımı, dirençlerde harcanır" şeklindeki alternatif kavramlar öğrencilerin sahip olduğu kavram yanılgılarından bazılarıdır.

Öneriler: Kavramlar arasındaki ilişkilerin somut grafikleri olan kavram haritaları yardımıyla, öğrencilerin kavramsal yapılarındaki alternatif kavramlar da tespit edilebilir. Literatürdeki araştırmalar incelendiğinde, öğrencilerin elektrik akımı konusundaki alternatif kavramlarının daha ziyade, çoktan seçmeli veya görüşmelerle desteklenmiş açık uçlu sorular kullanılarak tespit edildiği görülmektedir. Çoktan seçmeli hazırlanan bir test ile öğrencide sadece olduğu düşünülen kavram yanılgıları tespit edilebilirken, kavram haritalarıyla bu araştırmada da olduğu gibi, öğrencilerde olduğu düşünülen kavram yanılgılarının yanında farklı kavram yanılgıları da tespit edilebilir. Çoktan seçmeli testlerde öğrencilerin yanıtı bilmese dahi işaretlemede bulunması aslında olmayan bir kavram yanılgısını varmış gibi gösterebilir. Kavram haritalarıyla, bu araştırmada da olduğu gibi; öğrencilerde olduğu düşünülen alternatif kavramların yanında farklı alteranatif kavramlar da tespit edilebilir.

Anahtar Sözcükler: Kavram haritası, elektrik akımı, alternatif kavramlar, orta öğretim öğrencileri

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Teacher Unions, New Unionism and Shifting Cultural Metaphors

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Abstract

Problem Statement: Since the 1980s, classical industrial unionism has been transforming itself in terms of redefining basic value system and strategies they use. Teacher unions are no exception. This paper draws on a study of a teachers union to initiate school-based change in a single state in the United States. The research was conducted as part of a broader initiative to examine the role of "new unionism" in local and state school reform.

Purpose of the study: The purpose of this study is to portray the past, present and future images of teachers unions from the perspectives of three clusters of important educational policy agents in the state of Minnesota: Bureaucrats or state educational officials, teacher activists or union officials, and policy participants (business, legislature and school superintendents).

Method: A qualitative research design was used to collect data.. As part of the study, representatives of involved union employees, internal and external stakeholders of education were interviewed on two occasions about the role of the union in promoting school reform.

Findings and results: Analysis of data revealed an internal culture conflict within the union between the image (and practice) of union employees who were balancing traditional role obligations and efforts to become "new union" activists for school change. At a later point, other relevant policy actors from a number of sectors (elected and appointed officials, state education agency employees, district administrators and representatives of business groups) were also interviewed about the role of teacher unions in school reform at the state level. As part of the data collection, we elicited metaphors to reflect the cultural position of the union in the past, in the present, and as anticipated in the future. The data

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illuminate the way in which culturally embedded expectations about educational actors shift during periods of educational reform, and implications are drawn for the role of unions in influencing change.
Conclusions and recommendations: Four topics emerge: Unions are "returning to their roots"; there is ambivalence about admitting unions to the playing field of change agents; reluctance to view unions as forces for positive change is most pronounced at the political level and least at the local level; and unions need to consider multiple strategies for evolving as leaders for change.
Keywords: Teacher unions, new unionism, school/educational reform, metaphors, unions as change agents.

Teacher unions, modeled after private sector unions, are increasingly challenged to reinvent their purposes or become obsolete. Recent calls by National Education Association (NEA) president Bob Chase for "new unionism," again modeled after manufacturing sector changes, calls for a shift from traditional collective bargaining activities to incorporate teacher participation and leadership in education reform efforts. This shift, however, has been derailed by the bureaucratic organizational structures and cultures that have defined teacher unions since the early 1900s. This paper examines the role of organizational culture as an agent of change in this shift toward "new unionism."

Background

Labor unions and teachers. The National Education Association (NEA) and American Federation of Teachers (AFT) represent three million members in 14,000 school districts and focus on traditional salary and working conditions negotiations (Louis, Seppanen, Smylie, & Jones, 2000). Historically, these unions were modeled after post-WWII manufacturing labor unions and brought administrators, school board members, and teachers together to discuss important issues. In the 1950s, a formal relationship between districts and teachers emerged that afforded unions with the power to negotiate wages, hours, and employment conditions in good faith with local districts (Bredeson, 2001). Thus, teacher unions began to use collective bargaining strategies to improve workers' professional lives and have emerged as powerful political action groups in the national landscape (Cobble, 1999).

Recently, the NEA and AFT reached a partnership agreement that included strategies for joint-negotiation of traditional union bread and butter issues. This agreement stipulates that the union will work to constrain health care costs for union members as well as fight both private school vouchers and tuition tax credits. Additionally, the union would help state and local affiliates to implement the Elementary and Secondary Education Act. However, the partnership also promises to work toward improvement of low-performing and priority schools (NEAFT). This reflects a fundamental shift in the way union interactions with teachers and school districts.

It is as much the duty of the union to preserve public education, as it is to negotiate a contract. – Albert Shankar, American Federation of Teachers.

Recent philosophical and practical shifts. Union organizational arrangements reflect the management structures of school districts (Kerchner, 1999). Increased

competition for public funds from state and federal governments has challenged teachers and union leaders to reinvent themselves or become defunct (Chase, 1997). Cobble (1999) argues that unions must rethink their organizational practices and culture. Union organizational structures were built in the late 19th century and become stronger during the New Deal era. The hierarchical, vertically integrated, bureaucratic structures served the manufacturing sector at that time (Cobble, 1999). What unions represent (the agency function) has changed since the early 1900's yet the structure remains the same. Internally, the unions represent teachers through collective bargaining. Externally, however, leadership is linked to local school superintendents. The unions represent only those currently employed in districts, as well as some who are laid off or retired (Kerchner, 1999). Increasingly teachers identify with their occupation rather than a specific school site. Union members want portable benefits that can move with the workers rather than remain at the work site. Unions, comfortable with giving management the responsibility for standard setting, discipline, and discharges at specific sites, must shift to become leaders who develop good teaching standards (Cobble, 1999). This call has become even more important in considering the political context that impinges upon the teaching profession.

Confidence in public education nose-dived after the 1983 release of A Nation At Risk. Schools that continued to support and produce poor-performing students contributed to this abrupt decline in public satisfaction. Today, 23 states have laws for low-performing schools that involve restaffing and school closings. State courts are becoming increasingly involved with low-performing schools. This has forced unions to assess their role in school performance (Rose, 1998).

Recent state- and federally - driven educational reforms conflict with traditional union bargaining activities and force union leaders to redesign union activities. Many educational reform initiatives require teachers to become school managers or management partners in both daily school operations and long-term strategic planning including mission development. These challenges contrast sharply with traditional union foci on teacher autonomy and control. The "New Unionism," borrowed from the private sector and incorporated most recently at the NEA, shifted from a sole emphasis on traditional union issues to include educational reform activities. The underlying assumption related to "New Unionism" suggests that management and labor must collaborate with one another to meet organizational goals. NEA president Bob Chase called on state NEA affiliates to confer and collaborate with local school districts and boards to improve poor-performing schools. Flexibility at the local level encourages teachers to participate with management in reform development and ultimate efforts (Louis, Seppanen, Smylie, & Jones, 2000).

A similar shift occurred with the American Federation of Teachers (AFT) in the1998 resolutions adopted at the national level. The AFT emphasized that the unions need to play an active role in school effectiveness and advocated for standardized criteria to evaluate school performance that could guide reform efforts. This would permit teachers and administrators to identify why and how a specific school is ineffective through both internal and external evaluations. The AFT would also provide resources and professional development for teachers and paraprofessionals to learn how to conduct and evaluate the assessments. However,

the AFT also cautioned that any state or district interventions that arise from these evaluations must also provide multiple options to solve or redesign a failing school (Rose, 1998).

These two efforts indicate that teacher unions have begun to define educational norms and values, differently. Concerned with peer review and staff development issues, national unions have increasingly involved teachers in school management issues and processes. However, there are limits to what support the locals can give individual schools. When unions collaborate with local school districts, the small union staff becomes overburdened. Kerchner (1999) argues that the out-dated union structures limit union efficacy and force them to direct their efforts on traditional union issues. Despite the organizational structural impediments that constrain new unionism, some recent strategies have succeeded while others provide more opportunities to examine what is required to implement union reform.

Word from the trenches: Research that describes 'new unionism.' The "KEYS" program, initiated by the NEA, remains the most visible new unionism systematic strategy to involve the labor unions in educational reform. "KEYS", an unconventional initiative, challenged the way that both teachers and administrators viewed the union's role in school improvement. The national effort was developed as a pilot project that represented the new unionism ideals. The main components of the program included school quality activities; administration of an assessment instrument at the school level; state/local association engagement with schools; and, training and technical support to involve teachers in school improvement. State and local unions were reluctant to embrace the Initiative because it was not widely understood. Delivery mechanism related to current organizational structures at all levels (states, locals, schools, and the national union) impeded progress. Furthermore, sites complained that preparation, technical support, and follow-through were inadequate to sustain long-term changes in either schools or school districts. It became clear that "KEYS" ultimate success relied upon both union leaders' and members' perceptions of work roles, values, and working relationships. Union members remain entrenched in the traditional union idea and could not move toward a new unionism that would facilitate their emergent roles as school management partners ((Louis, Seppanen, Smylie, & Jones, 2000).

Using research-based programming as a centerpiece of educational reform, the AFT assessment efforts have provided more substantive results. For example, a staff self-assessment facilitated the collaboration of the union and a school district that expanded school decision-making and strengthened communication between administrators and teachers. One school mission focused efforts on literacy, which resulted in increased reading scores. Although the union was successful at this site, the national leadership cautions that the union must also work to negotiate school redesign or closing when schools will not work regardless of reform strategies (Rose, 1998).

Despite the improvements made through collaborative arrangements between unions and school districts, new unionism is criticized considerably. Opponents argue that new unionism subordinates educational consumerism and is useful only to serve school employees through the implementation of their own value systems (Bredeson, 2001). Thus, one of the strengths of new unionism – the communication

of educational norms and values – also becomes a criticism of union activities and influence. Clearly, the early results indicate that leadership is important to new unionism and the growth of professional learning. However, studies also show that new unionism is expressed through structural and organizational culture shifts, yet the quality and flexibility of the new unionism ideal has not yet been achieved (Bredeson, 2001). This paper focuses on the organizational structural and cultural issues that serve to either facilitate or impede union reform.

Statement of Problem

The purpose of this paper is to portray the past, present and future images of teachers unions from the perspectives of three clusters of important educational policy agents in the state of Minnesota: Bureaucrats or state educational officials, teacher activists or union officials, and policy participants (business, legislature and school superintendents). The data collection for this image study based on articulated metaphors and analogies by the representatives of these three interest groups was focused on exploring the following sub problems:

1. Is there a real change in the traditional union concept in Minnesota as espoused and declared by NEA and AFT leadership?

2. What metaphor, image, analogy, animal or living organism would best describe the teacher unions of the pre-1990s?

3. What typical union strategies and tactics have the teacher unions employed to support these images?

4. What metaphor, image, analogy, animal or living organism would best describe the teacher unions of today?

5. What typical strategies and tactics have the teacher unions employed to support these new images?

6. What factors at the national and state levels may have had the greatest impact on efforts to involve teacher unions in school reform and school improvement in Minnesota?

7. What in-school factors may have played role on the efforts to involve teacher unions in school reform and school improvement in Minnesota?

8. What should the unions of future look like (e.g. at the year 2020)?

9. What practical strategies, actions and initiatives by teacher unions may make this dream possible?

Methods

Metaphors as a methodological innovation in social sciences have attracted the attention of scholars studying often implicit and symbolic side of organizations. Lakoff and Johnson's now classical work on metaphors (1980) was the first significant work leading to this methodological innovation. They argued that metaphors constitute a figurative or imaginative language that is very common in our daily language: "Our concepts structure what we perceive, how we get around in the world, how we relate to other people… the way we think, what we experience

and what we do every day is a matter of metaphor" (Lakoff and Johnson, 1980, p. 3). Morgan (1986), taking this lead, used metaphors as tools of diagnostic reading and critical evaluation of organizational phenomena that are, according to him, complex, ambiguous and paradoxical.

A number of studies, mostly in organization theory and change, have utilized metaphors as data collection methods (Morgan, 1986; Morgan, 1993; Steinhoff and Owens, 1989; Simsek and Louis, 1994; Simsek, 1997). Others have also used metaphors in analyzing different aspects of education such as images held by school children and teachers about their school (Schlechty and Joslin, 1986; Dana and Pitts, 1993; Ormell, 1996; Inbar, 1996; Ozar and Simsek, 1999; Beck, 1999).

Besides their methodological practicality, metaphors also become critical tools of diagnosis and evaluation of situations where there is great deal of language constraints and conceptual ambiguity. As Marshak argued, "metaphors serve as a primary method for understanding and expressing abstract, affective and intuitive experience" (1993, p. 44). They are also equally important useful tools in situations of either political or psychological sensitivity or volatility. It is our argument that metaphors may become effective tools of eliciting information by going beyond the constraints of everyday language especially on highly volatile, politicized issues. Potential value of metaphors in sensitive policy issues, such as teachers unions and how they are seen by various policy actors in a highly volatile political environment where teachers unions are seen as the resistors of recent educational reform movement in the state of Minnesota, has not been utilized much. With union issues, people have the language but it is constrained by conventional responses based upon "group membership" (or position).

This research is a typical qualitative study where real world situations are studied as they unfold naturally. The aim is not verification of a predetermined idea or a set of hypotheses, but discovery that leads to new insights (Sherman and Webb, 1988, p. 5). A standardized open-ended interview guide approach (Patton, 1990) was followed to collect the data. The guide contained twelve open-ended questions on various aspects of teacher unions, e.g. teachers unions of the pre-1990s, teachers unions of today, teachers unions of future, education-related and non-education related factors forcing teachers unions to change, etc. Among these, three questions were particularly on metaphors and analogies where the participants were asked to generate metaphors, analogies or images that would describe the unions of the past, the present and the future.

Sampling design was a *"purposeful sampling."* This sampling strategy was thought to be particularly useful (or even required) to maintain a balanced representation of the views of important educational players on teachers unions in Minnesota. Interviewees were selected among a large group of people representing three clusters of educational interests groups: state officials or bureaucrats, teacher activists or union representatives, and policy participants involving business, legislature and school officials like superintendents.

A typical interview took about 30 minutes to 45 minutes of interviewing time and each interview was tape recorded by the consent of participants. Each interview tape was later verbatim transcribed by professional typist.

The transcribed notes were analyzed by using a typical "content analysis" technique by which important segments of text were cut and clustered under relevant idea categories. The initial formation of these idea categories was based on the categories of questions that formed the interview guide. During the data analysis, these initial twelve idea categories (drawn from the interview guide) gave way to more elaborate sub categories. Metaphors, analogies and images produced by the interviewees were also categorized based on their metaphoric similarity or the descriptors used to define a particular metaphor.

Results

Is there a Real Change in the Traditional Union Concept in Minnesota as Espoused and Declared by NEA and AFT Leadership?

There are three response categories emerged out of the interview data regarding whether or not there has been some real changes in teacher unions in terms of philosophy, policy and strategies they employ: No change, some degree of change and a great deal of change. A few people among the respondents think that there has been real, important changes in teachers unions as advocated by the national leadership of two powerful teacher organizations, NEA and AFT. The president of Association of School Administrators made the following comments:

Longer than 1997, we can go back to the early 1990s and identify a number of ways in which this has played itself out in Minnesota. 1989, we're at the capitol during a legislative session. There's a legislative proposal that would require school districts to de-centralize by creating site teams and district teams which are composed of very specific composition… And I think we all as an educational organization saw that piece of legislation and said, "if that thing passes, it is very poor legislation. It won't help reform and indeed will probably stifle it..." And then the groups went line by line through that legislation and then recommended changes to them that we said would be helpful… They made every change that we asked… So that's a very concrete example of unions working with management and policy makers, boards, to help reform schools… And I could probably cite half a dozen more given time…

Interestingly, those who observe changes in the overall union identity and practices seem to have close relationships with teacher unions at district or school levels. At least one of these persons was a union official, so s/he was an insider to the unions:

AFT started thinking about change a lot earlier like 1983-85. Our president Al Shanker commented about the need for change for a professional model teachers. The theme was to make teaching a professional area, professionalizing teaching. We emphasized collaborative relationships rather than hostile and antagonistic relations (with school administrations). Early 1990s, we hired a futurist to do "futures report" on our organization. After that report, we are convinced that we must focus on *students*, to be concerned about the *health of institutions we work in*, and *empowerment of teachers*.

Unfortunately, change in unions in terms of strategy and image observed by these individuals were not shared by other respondents who did not have this close proximity to unions, however all coming from different levels and circles of school system and education business in the state of Minnesota. For example, the person representing the Minnesota Business Rountable said the following:

Unions haven't changed tremendously. There are signs of change in some districts, but in many of them, primary concern is still salary, compensation and work environment; simply more resources…

Interestingly, the most intense resistance to the idea of whether or not teacher unions have changed in terms of basic strategies they follow came from state education agency officials, one legislature and some district and school officials. Here are some representative views of different individuals from these different stakeholder groups:

Overall, I don't see a change. As far as the teachers are concerned, they are not interested in children's learning. They stand in the way of reform. They are still more interested in money and benefits. Change is not possible without active involvement of teachers.

With regard to teacher training initiatives in Minnesota, we have got very little from the teacher unions. They did not care and provide any support.

In Rosemonth and Apple Valley school districts, they demanded increases in compensation that much exceeded the district's financial ability. Compensation is legitimate but it's not the only important thing.

The standards movement in our state. They haven't given the support expected from them.

I see some change, but not a great deal. Systemic reform is not the case when it comes to the unions. These comments are more relevant for the national level. We don't see a great deal of change at the local level consistent with these comments. This may be because of the fact that unions do not have control over the local levels. Unions are political organizations; they are supposed to be democratic. So they hesitate to tell what to do and how to do to their members, to dictate from the top. They are still more busy with bread and butter issues.

One thing becomes clear that if union officials are serious about change and if they think they have taken important steps for a new union image and identity, they have a serious problem of "public relations," that is, explaining and proving the case of change to educators and general public in a convincing manner.

What Metaphor, Image, Analogy, Animal or Living Organism Would Best Describe the Teacher Unions of the Pre-1990s?

We tried two different ways of collecting data on metaphorical description of the pre-1990s union concept. First, we asked an open ended question to the respondents to generate a metaphor. This method was found a little problematic for the respondents; however we were able to gather very valuable metaphoric descriptions on teacher unions. Second, we showed them a printed page (which was borrowed from Gareth Morgan's influential management book, "Imaginization"-- 1993) that

holds about 30 different pictorial images and asked the respondents to choose one or two images from this page. Since we knew that descriptions or adjectives were more important than the images themselves, we, in turn, asked the respondents to explain why they chose the images of their choice. Here are the list of images that were both self-generated and chosen:

Images generated:

* **Sitsu dog** (a little dog which is very protective of whatever she is supposed to protect and care –in our case, it's our youngest child-. She wouldn't hesitate to hurt you if you get in her way).

*** Gate keepers:** in terms of decision making, they decide what goes in and what not.

*** Raw unionism, labor/management, and factory:** Between 1976 and 1988, it was the primary concern of teacher unions to focus on salary, benefits and work conditions. Teachers were like workers, coming to work, doing some assigned tasks and going home.

*** Something that doesn't like change**, likes status-quo.

*** Factory workers** (1960s and 1970s, our primary concern was basic needs and resting the power away from the employer as a reflection of general labor movement-- Civil servant mentality

*** A battle-ground** (usually around pay)

Unions= A blue-collar identity, worker mentality

*** Mother bear:** Very protective, fierce, I know what is best for you kind of an attitude (or my way or highway kind of a tough minded attitude)

* **Old boys' club**

Images chosen:

* **A Rhino:** Acts in straight lines, locks on a single target, God help you if you are in his path.

* **Iceberg—**there is more than what most people would realize

* **Hammer:** trying to use force of hammer to hit people

* **Man with blindfold and cowboy hat:** holding up a district

* **Dollar sign**

* **Hammer—**control, my way or…., force…

*** Hammer and electric drill** as a reflection of trades and industrial unions

*** Hammer:** this is what we want and we will fight until we get it

*** Dollar sign:** primary concern of salary and material issues

* **Robin Hood**

* **Sheep:** Most of their members are like sheep, or they at the top see and treat their members as sheep

The list above includes images collected from all the respondents including the union officials. There seems to be a great deal of uniformity in the views of all the participants on the teacher unions of the pre-1990s, that is the old union conception is solely based on protection, threat, force, bread and butter emphasis, and industrial worker mentality.

What Typical Union Strategies and Tactics have the Teacher Unions Employed to Support these Images?

Majority of the respondents including the ones who were relatively close to the operational levels like schools and districts and even the union insiders mentioned that the typical strategies or tactics the teacher unions used as a reflection of the old union identity were collective bargaining, salary and benefits, protection of membership, compensation and work environment issues. One of the respondents provided a startling example of how these issues were holding the center stage in collective bargaining process:

Until 1982, there was a declining enrollment in many districts. This led to budget cuts and less resources. In these difficult days, districts said: if you demand this much then we have to increase the class size. The union said "yes" to this proposal. They said, give us as many kids as you'd like, our main concern is a livable salary. I don't think they would do it today.

Even a union official made similar remarks on the same issue:

Before the 1980s, we thought ourselves as factory workers. During the 1960s and the 1970s, our primary concern was basic needs and resting the power away from the employer as a reflection of general labor movement."

A state education official supported this view: "What they [teacher unions] do is mainly bargaining. Every two years a new contract comes and we see quite active union people around in those days."

Another state official mentioned strikes, grassroots strategies, public gatherings and contracts as typical strategies and tactics used by the teacher unions as a reflection of their industrial labor image. These strategies are very supportive of the previously listed images provided by the participants.

What Metaphor, Image, Analogy, Animal or Living Organism Would Best Describe the Teacher Unions of Today?

By following the same method data collection described under # 2, participants were asked to generate metaphorical images that would describe the teacher unions of today. The provided images are listed below:

Metaphors created:

* **Still a sitsu dog:** it's too early to tell anything new, they are still the same

* **A tree starting to split** (as an indication of change at its initial phase). There has been slow and gradual change as a result of pressures, however, the old paradigm is still there.

* **A team working on solutions:** much more reform minded, willing to be flexible and collaborative. We had very limited contact and cooperation in the old days. Now we talk and communicate more.

* **Still a hammer**

* **Professional development:** people supporting and helping each other

* **Round table:** A lot of professionals working together

* **Getting in front of the fickle**, smelling where the money is and going there

* **A righteous fight:** fighting an invisible enemy, battling with wind mills, but that enemy is not there anymore

* **Smoke-filled backroom**, heavy handed

* **A player at the table:** they want to have a voice in policy making

Metaphors chosen:

* **The spider plant**—the plant starting to get shoots (indication of change)

* **Superwoman:** an effort to improve our schools

* **Eye glasses:** we have a clear vision to work together

* **Gene lamp:** we have the potential to unlock the reform in education

* **Still a hammer**

* **Wonder woman (superwoman):** professional support

* **Swiss jackknife:** they do have more tools today and they are more sophisticated in marketing ideas

* **Iceberg:** Union is just the tip; they don't represent the population of teachers, an unseen force

* **Roundtable:** they are trying to change their image to a more collaborative type. They haven't succeeded yet but compared to earlier times, they are at least present at the table

* **A bullhorn:** they are talking about certain issues out loud today.

The list above proves a rather divided image of the teacher unions of today. The positive images that signals some degree of change were provided by union people and educators and school officials who have some degree of close contact with the unions. The negative images, however, were most provided by state education agency officials, the business representative, high level district officials and one legislature. This may tell us that unions have rather different images in the minds of people who may be called insiders and outsiders. On the other hand, while people close to the operational level are having more positive views of today's teacher unions, people at the policy level do not conform to this positive perception.

What Typical Strategies and Tactics have the Teacher Unions Employed to Support these New Images?

Analyzed data on this issue coupled with the metaphors listed earlier provide enough evidence that many people see no real change in teacher unions in terms of strategy, tactics and philosophy they use today. Only the union official was able to provide some evidence of change in her own organization:

Profession is becoming young. Young people have different ideas about the profession, about teaching. So, we need to reflect this change in our own agenda and how we approach to our members… In 1989, we negotiated the word "peer review" system which is a result of our professionalization vision… We are moving from civil service mentality to a professional mentality… There is an ongoing program and policy work in our organization. With NEA, we have Teacher Union Reform Network (half is composed of NEA members, and half is of AFT members). We have other ongoing works on achievement of students, quality teaching, democratization, and teacher professionalization.

However, how all these works will have an impact on the union image held by outsiders are not yet known.

What Factors at the National and State Levels may have had the Greatest Impact on Efforts to Involve Teacher Unions in School Reform and School Improvement in Minnesota?

Respondents cited the following factors as sources of pressures for change in teacher unions. According to the respondents, these forces either have already impacted teacher unions for change or they will in the near future.

* Standards movement

* Charter schools

* Public school reform

* Changing demographics

* Limited resources in the future

* Business interest and pressures on public schools

* Growing demand for educational accountability (largely from public and business community)

* Changes in state policy regarding education and unions

* Teacher training institutions

* Different value system and expectations of the new generation entering to the profession

* The profession not being able to attract the best and the brightest anymore (especially women seeking for alternative career paths rather than entering the teaching profession)

* Recent immigration waves from other countries and from other urban centers

* Poverty

* Strong union leadership at all levels to turn things around

* New market paradigm and it's incompatibility with socialist mentality

Clearly, the list above proves the point that largely external factors and forces have resulted in some degree of change in union identity from the views of the participants. As many educational reforms conform to this rule, similarly culturally

embedded expectations about educational actors shift during periods of educational reform. This also seems to be true for the teacher unions.

What In-School Factors may have Played Role on the Efforts to Involve Teacher Unions in School Reform and School Improvement in Minnesota?

The following in-school or education related factors were cited the most by the respondents as the ones that may have impacted the teacher unions to involve more in school reform issues:

* A new kind of union leadership (advocating reform) for teacher unions

* Teachers: They need to bend together to question outdated union practices

* More and better information about how our schools do, perform, how our students do in school. As long as we get more and better information about these indicators, unions will realize the need for change.

* Restructuring, standards, accountability.

* Profiles of Learning: Teachers and administrators are scared to death of this standards movement, certainly the unions.

* Charter schools, vouchers

* Stable or less public spending for education in the future

What should the Unions of Future Look Like (E.G. At The Year 2020)?

By following the same method data collection described under # 2 and # 4, participants were asked to generate metaphorical images that would describe the teacher unions of future. The provided images are listed below:

Metaphors created:

* **A study group:** identify a topic for a year, work on it, and learn together as professionals.

* **An action research cadre**

* **A member association,** a professional organization (like doctors' and lawyers')

* **A professional organization** like doctors' and lawyers' organizations

* **Roundtable** where people are seated to solve issues and problems

* **A guild:** provider of professionals, quality control of the profession. An organization that is more flexible, less hierarchical, more geared to assisting teachers in the work place

* **Butterfly:** Needs to be transformed and this has to be done quickly

* **Baking:** they should work making every ingredient ready for teachers. They should make the life of their members easy by preparing conditions.

Metaphors chosen:

* **A roundtable**

* **Roundtable with chairs around**—you bring a topic to the table, work and focus on it.

* **Eagle, Robin Hood, Scholarly Bust:** An organization that is vigilant, but to a degree, also hands off.

* **An owl:** we can use our time and efforts wisely

* **An owl:** Whatever we do, we need to do it wisely, and we need to be smart on what we do

* **An Owl:** We have the wisdom to change things in a nontraditional way

* **Three stepping stones** in a river

*** Lighthouse:** it should show the way, light the way (the ways that there may be other ways the things can be done).

* **Lighthouse:** Rather than demanding, they should light the way

* **Lighthouse:** Showing and lighting the way

The images of roundtable, study group, action research cadre, a professional organization were provided by union officials and union people close to the operational level. They have an image of teacher unions that is more professional like classical membership organizations such as doctors' and lawyers' organizations. Other images provided by other stakeholders share a similar vision for the future of teacher unions. Overall image data provided so far indicate that the school reform stakeholders including the union officials share a similar view of teacher organizations of the past and the future. However, they have a rather divided perception on the teacher unions of today.

What Practical Strategies, Actions and Initiatives by Teacher Unions may Make this Dream Possible?

Majority of the respondents think that teacher unions need a radical reorientation in their thinking, strategy, tactics and philosophy. Some think that the overall union idea is a by-product of the industrial era and since it's over, teacher unions must eventually follow a new direction consistent with post-industrial environments if they wish to survive. Others think that there is still need and enough room for teacher unions if they change themselves and take the lead. As one of the respondents pointed out, they may start asking some tough questions:

They need to start admitting that all things are not as we would like to see. We are not doing a good job in public education anywhere. Unions may take a lead on opening a public dialogue on the issue of public education reform. Unions in Minnesota generally say "no, period," rather than saying "no" and coming up with some alternatives.

Other respondents also provided some important aspects of change and reform in teacher unions. Here are some of the ideas they think the teacher unions need to focus on:

* Start focusing on teacher quality

* Set professional standards for the profession

* Set professional standards for teachers

* Take the lead for professional development of teachers

* Negotiate one time pay for skills set, pay for staff development, make teacher development a standard bargaining item.

* Create a need for an urgent institutional transformation

* Provide strong leadership at all levels to bring about this transformation

* Promote pay for performance

* Be close to the school and classroom levels, pay attention to teachers, and listen to their members at the operational levels

* Create a new organizational configuration; a flat organizational design close to the classroom levels rather than hierarchical.

Discussion and Conclusions

Preliminary analysis shows there is more consistency in what the union has been than what the union currently is or will be. The image of "hammer" was the most repeated metaphor or analogy among others suggesting that participants have a more clear picture of an organization in the past (lived and experienced) than present (ambiguous) and future (uncertain). As Simsek and Louis argued (1994), this ambiguity of the present may equally be a sign of change and flux in the target phenomenon (teachers unions in this case) where the case of change may create a fuzzy imagery among the observers. Stabilization occurs when there is a shift from one consistent image to another.

Interviews with the representatives of three clusters of educational constituents in the state of Minnesota [bureaucrats (state education officials), activists (union people), and, policy participants (legislature, business, superintendents, etc)] reveal some interesting theoretical insights: Bureaucrats seem to be the most culturally and perhaps ideologically homogeneous group whose representatives come from different layers of the state educational bureaucracy consistently expressing a rather negative image of teachers unions. Union activists, on the other hand, represent the most layered view. While officials close to the top of the organization representing rather liberal views and expressing a need for change in their own philosophy and strategy, people at the lower levels represent a more conservative orientation on change. Interestingly these union activists become the ones who represent their organizations at the school and district levels. This dichotomy may best be represented by the image of "iceberg" denoting to this multi-layered establishment.

It seems that the image or positions of the participants are very much influenced by the positions of people in a single organization and their professional interests. However, there still seems to be a remarkable consistency among the images provided by these constituents representing a diverse individual, professional and organizational differences. This may tell us the existence of another highly diffused case of "paradigm membership" (Simsek and Louis, 1994) among a different series of populations on the issue of teachers unions.

To conclude, we would like to emphasize the following seven sets of ideas as a result of our research on teacher unions in Minnesota:

1. Despite the general rhetoric of the teachers unions leadership at the national level, participants, especially the ones representing state educational bureaucracy and other policy participants such as business do not perceive real change in overall union identity, philosophy, strategy and tactics they use. They generally associate unions with resistance to important reform efforts in the state of Minnesota such as Profile of Learning, the latest and the most important state-wide standards movement in public schools.

2. When they were asked to generate metaphors or analogies to describe the unions of the pre-1990s, the participants used metaphors or analogies that have the qualities of force, protection, threat, struggle, and fierceness. The most repeated metaphor (even by a union official) was "hammer" denoting to such qualities as naked force, control, and inflexibility: "trying to use force of hammer to hit people" [usually the administration], "…as a reflection of trades and industrial unions," "…this is what we want and we will fight until we get it." A shitzu dog (a guarding mentality to protect his/her own territory), a mother bear (protective, fierce and I know what is best for you kind of an attitude), a rhino (acts in straight lines, locks on a single target, and God help you are in his path) were interesting descriptive images that were used by the participants to describe the unions of pre-1990s. The third cluster of metaphors that were repeated the most were the images of factory and worker resembling teachers unions to trades and labor unions of the 1960s and 1970s in terms of general strategy and tactics.

3. The typical strategies and tactics the teachers unions have utilized in the past (and even today according to state educational bureaucrats and some policy participants) were (and are) collective bargaining, salary and benefits, protection of membership, compensation and work environment issues. When compared with metaphors describing the old union concept, there seem to be a striking match between these strategies and tactics representing the behavior of unions and the metaphors and analogies representing their symbolic image among a number of educational constituents.

4. When asked to describe the unions of today, some of the participants (especially from the state educational bureaucracy and business) used the same images that they used to describe the unions of the past, meaning that their image of the teachers unions of today is no different than the unions of the past. In this sense, they repeated the same metaphors or analogies they used to describe the pre-1990s unions (still a shitzu dog, still a hammer). On the other hand, some of the participants especially from union activist groups, and some policy participants (association of school principals) saw a degree of change in overall union identity and practices. This is why they generated such metaphors as "a tree starting to split," "the spider plant starting to get shoots," "a team working on solutions," "a roundtable in terms of being more collaborative," "a player at the table wanting to have a voice in policy making," and, "a bullhorn indicating the intend of the union's leadership to talk about certain issues out loud." Among all these, we think the most interesting metaphor or analogy was the image of "iceberg" representing the essence of all those images in the most vivid way: there seems to be the case of change, but we just see the tip of the iceberg, we don't know what is under water. We have to

wait and see whether or not a real and dramatic transformation will come through in teachers unions.

5. The participants think that such social, educational, political and economic forces and trends would have the biggest impact on teachers unions to change: standards movement, charter schools, public school reform, changing demographics, further business interest and pressure on public schools, growing demand for educational accountability, pre-service teacher training practices, different value system and expectations of the new generations entering the profession, strong union leadership and increasing pace of the market paradigm outdating the socialist mentality of the unions of the past.

6. When asked what metaphor or analogy they would use in describing an ideal teachers union of the future, three clusters of images came out quite strongly: a) a study group around a round table solving problems together, learning together as professionals; b) a professional organization like doctors' and lawyers' association or a guild (association of professionals setting and maintaining quality control standards, an organization more flexible, less hierarchical and geared more to assisting teachers in the work place); c) a lighthouse showing and lighting the way. Three people also used the image of an "owl" to suggest that the change can be brought about by wise and smart policies, by using time and efforts wisely and using wisdom to change things around in a non-traditional way.

7. Finally, the participants provided some ways of achieving the ideal image they provided for teachers unions: start focusing on teacher quality, set professional standards for the profession, take the lead for professional development of teachers (make professional development a standard item of collective bargaining), create a need for urgent institutional transformation, develop and promote standards for pay for performance, provide strong leadership at all levels to bring about change and transformation, be close to schools and classroom where the real action is (the operational levels), create a new organizational configuration (for unions) based on a flat organizational design close to the classroom level.

References

Beck, L.G. (1999). Metaphors of educational community: An analysis of the images that reflect and influence scholarship and practice. *Educational Administration Quarterly*, 35(1), 13-45.

Bredeson, P.V. (2001). Negotiated learning: Union contracts and teacher professional development. *Education Policy Analysis Archives*, 9(26). Retrieved May 10, 2006, from http://epaa.asu.edu/epaa/v9n26.html.

Chase, B. (2005). *"United mind workers": Our unions must organize around quality.* Retrieved October 9, 2005, from http://www.nea.org/bt/6-association/052597.pdf.

Cobble, D.S. (1999). History, women's work, and the new unionism. *Thought & Action*, 19-24. Retrieved January 21, 2000 from http://www.nea.org/he/heta99/f99p19.pdf.

Inbar, D. E. (1996, Spring). The free educational prison: Metaphors & images. *Educational Research*, 38(1), 77-92.

Jenkins, K. (1988). Metaphor and mindset for educational leadership. *The Educational Forum,* 52(2), 43-151.

Kerchner, C. (1999). Knowledge workers: Trade unionism's new frontier. *Thought & Action,* 11-17. Retrieved January 27, 2000 from http://www.nea.org/he/heta99/f99p11.pdf

Lakoff, G. & Johnson, M. (1980). *Metaphors we live by.* Chicago, IL: The University of Chicago Press.

Louis, K.S., Seppanen, P., Smylie, M.A., & Jones, L.M. (2000). Unions as leaders for school change: An analysis of the "KEYS" programs. In K. Riley & K.S. Louis (Eds) *Leadership for learning: International perspectives on leadership in school reform and change.* London: Falmer.

May, S.K. (1993). A Communication course in organizational paradigms and metaphors. *Communication Education*, 42, 235-254.

Morgan, G. (1986). *Images of organization*. Newberry Park, CA: Sage Publications.

Morgan, G. (1993). *Imaginization: The art of creative management.* Newberry Park, CA: Sage Publications.

Rose, M. (1998). Redesigning low-performing schools: It's union work. *The American Teacher*. Retrieved March 17, 2002, from www.aft.org/edissues/rsa/guide/redlps.htm

Schleghty, P.C. & Joslin, A.W. (1986). Images of schools. In A. Lieberman, (ed.), *Rethinking School Improvement: Research, Craft and Concept,* New York, NY: Teachers College Press.

Simsek, H. (1998). Metaphorical images of an organization: The power of symbolic constructs in reading change in higher education organizations. *Higher Education,* 33(3), 283-307.

Simsek, H. & Louis, K.S. (1994). Organizational change as paradigm shift: The case of a large, public university. *Journal of Higher Education*, 65(6), 670-95.

Steinhoff, C. R. & Owens, R. G. (1989). The organizational culture assessment inventory: A metaphorical analysis in educational settings. *Journal of Educational Administration,* 27(3), 17-23.

Öğretmen Sendikaları, Yeni Sendikacılık ve Dönüşen Kültürel Mecazlar (Özet)

Problem Durumu: 1980'lerde beri klasik endüstriyel sendikacılık kavramında dikkate değer bir dönüşümün yaşandığı ileri sürülmektedir. Sendikacılık klavramının üzerine oturduğu temel algı, varsayım, ideoloji, ilkelerin ve sendikacıların kullandığı temel strateji ve taktiklerin köklü bir şekilde değiştiği genellikle kabul görmektedir. Öğretmen sendikalarının bu değişim ve dönüşümün dışında kalması düşünülemez. Bu gözlem ve varsayımlardan hareketle, bu araştırma Amerika Birleşik Devletleri'nin Minnesota eyaletinde öğretmen sendikalarının okul reformu konusunda önderlik almalarını inceleyen bir çalışmaya dayanmaktadır. Makaleye kaynaklık eden araştırma "yeni sendikacılığın" yerel ve eyalet düzeyinde okul reform sürecindeki rolünü incelemeyi amaç edinen daha geniş kapsamlı bir araştırmanın parçası olarak gerçekleştirilmiştir.

Araştırmanın amacı: Araştırma Minnesota eyaletinde eğitim politikaları konusunda önemli role sahip üç önemli paydaşın öğretmen sendikalarının dünü, bugünü ve geleceği hakkında sahip oldukları imajları elde etmek ve öğretmen sendikaları kavramı üzerindeki algılarını öğrenmektir. Sözü edilen üç önemli paydaş şunlardır: Eyalet düzeyinde eğitim kararları üzerinde söz sahibi olan bürokratlar veya eyelet hükümet görevlileri, öğretmen sendikalarının üye ve yöneticileri ve eğitim politikalarının şekillenmesini doğrudan veya dolaylı yollardan etkileyen iş çevreleri, eyelet meclis üyeleri ve eğitim bölgelerinin yöneticileri. Araştırma şu alt problemler çerçevesinde tasarlanmıştır:

1. Ulusal Eğitim Derneği (National Education Association-NEA) ve Amerikan Öğretmen Federasyonu (American Federation of Teachers-AFT) yöneticileri Minnesota eyaletinde geleneksel sendikacılık kavramında bir değişiklik olup olmadığı konusunda ne düşünmektedirler?

2. Hangi mecaz, imaj veya analoji 1990'lar öncesinin öğretmen sendikalarını en iyi tanımlayabilir?

3. Öğretmen sendikaları eylem ve çalışmalarında bir önceki alt problemde ifade edilen mecaz, imaj veya analojileri destekleyecek ne tür strateji ve taktikler kullanmışlardır?

4. Hangi mecaz, imaj veya analoji bugünün öğretmen sendikalarını en iyi tanımlayabilir?

5. Öğretmen sendikaları bugünki eylem ve çalışmalarında bir önceki alt problemde ifade edilen mecaj, imaj veya analojileri destekleyecek ne tür strateji ve taktikler kullanmaktadırlar?

6. Minnesota eyaletinde, ulusal veya eyalet düzeyindeki ne tür ektenler öğretmen sendikalarının okul reform çalışmalarına etkin katılımları konusunda etkili olmuştur?

7. Minnesota eyaletinde ne tür okul-içi etkenler öğretmen sendikalarının okul reform çalışmalarına etkin katılımları konusunda etkili olmuştur?

8. Geleceğin öğretmen sendikaları nasıl olmalıdır?

9. Öğretmen sendikalarını bir önceki alt problemde dile getirilen gelecek tanımına ne tür strateji, eylem veya girişimler götürebilir?

Araştırmanın yöntemi: Yukarıdaki alt problemler çerçevesinde tasarlanan araştırma nitel bir çalışma olarak yürütülmüştür. Temel veri toplama yöntemi olarak gö-

rüşme kullanılmıştır. Bu amaçla oniki adet açık uçlu sorudan oluşan bir görüşme formu geliştirilmiştir. Görüşme formunda ne tür soruların yer alacağına büyük ölçüde alt problemler yol göstermiştir. Her alt problem hakkında en az bir açık uçlu görüşme sorusu geliştirilmiş, yeri geldiğinde sonda sorularla alt problemler hakkında very toplanmıştır. Sözü edilen oniki soru içinde üç tanesi sadece mecaz elde etmek için sorulmuştur. Bu sorular yoluyla görüşülen kişilerden öğretmen sendikalarının dünü, bugünü ve geleceği hakkında mecazlar üretmeleri istenmiştir.

Araştırmada "amaçlı örnekleme" yöntemi kullanılmıştır. Görüşülen kişiler, öğretmen sendikaları ve eğitim/okul reform hakkında zengin bilgi ve deneyime sahip olduğu düşünülen üç paydaş gurubundan seçilmiştir: Minnesota eyalet meclisinde görev alan parlamenterler ve eğitim konusunda rol üstlenen bürokratlar, öğretmen sendikalarının üye ve yöneticileri ve eğitim politikalarının şekillenmesinde rol alan iş çevreleri ve eğitim bölgelerinin yöneticileri.

Tipik bir görüşme 30-45 dakika arası sürmüş, görüşmeler katılımcıların izniyle kaydedilmiş ve sonra profesyonel kişiler tarafından bire bir yazıya dökülmüştür. Yazıya dökülen görüşme kayıtları içerik analizine tabi tutulmuştur. İçerik analizi yapılırken araştırmaya yön veren oniki alt problemin her birisi bir ana kategori olarak alınmış, bu her bir ana kategori altında yeri geldikçe alt kategoriler oluşturulmuştur. Özellikle üçalt problem karşılık gelen mecaz ve imajlar ise benzerlikleri anlamında alt kategoriler halinde sınıflandırılmıştır.

Bulgular ve sonuçlar: Araştırmanın temel bulguları ve sonuçları şunlardır:

1. Öğretmen sendikalarının üye ve yöneticileri, öğretmen sendikalarının genel felsefe, yaklaşım ve eylemlerinde önemli değişimler geçirdiğini iddia etmektedirler. Oysa, eyalet eğitim bürokrasisi ve iş çevreleri gibi eğitimin diğer bazı önemli paydaşları öğretmen sendikalarının duruşları, felsefeleri, kullandıkları temel strateji ve taktikler anlamında çok fazla değişmediklerini öne sürmektedirler. Bu paydaş gurupları öğretmen sendikalarını, Minnesota eyaletinde devlet okullarını iyileştireceği düşünülen ve standartlaşma akımının bir yansıması olan "Öğrenme Profili" (Profile of Learning) gibi çok önemli eğitim reformlarına direnç göstermekle suçlamaktadırlar.

2. 1990'lardan öncesinin öğretmen sendikalarını en iyi tanımladığını düşündükleri mecazlar geliştirmeleri istendiğinde katılımcıların çoğu güç, koruma, tehdit, mücadele ve cesaret sıfatlarını içeren mecazlar kullanmışlardır. Sendika üye ve yöneticileri de dahil en fazla tekrar edilen mecaz yalın güç, control ve katılığı ifade eden "çekiç" mecazıdır. "Çekiç" mecazını niçin kulandıkları sorulduğunda katılımcılar şu tür açıklamalar getirmişlerdir: Genellikle okul ve eğitim yöneticileri ile mücadelede çekiçin sonuç alıcı gücünü kullanmak, sanayi sendikacılığının bir yansıması olarak, istediğimiz bu ve bunu alıncaya kadar savaşacağız, vb. Çekiç mecazına ek olarak, koruma ve acımasız savunmayı ifade eden "anne ayı," düz çizgiler üzerinde hareket eden, tek bir hedefe kilitlenen, yolunda olduğunuza pişman olabileceğiniz bir "su aygırı" öğretmen sendikalarının geçmişteki imajı hakkında en sık dile getirilen diğer ilginç mecazlardır.

3. Toplu sözleşme, maaş ve özlük hakları, üyelerin korunması, sosyal güvenceler ve çalışma koşullarının iyileştirilmesi konularında pazarlık etmek öğretmen sendikalarının geçmişte en sık kullandıkları strateji ve taktikler olarak dile getirilmiştir. Eyalet eğitim bürokratları ve diğer bazı eğitim paydaşları sendikaların bu strateji ve taktikleri hala bugün bile yaygınlıkla kullandıklarını söylemişlerdir.

4. Öğretmen sendikalarının bugün nasıl göründüklerine ilişkin olarak eyalet eğitim bürokratları ve bazı diğer paydaşlar sendikaların geçmişteki imajlarına ilişkin mecazların aynısını kullanmışlardır. Onlara gore, öğretmen sendikaları bugün de geçmişte olduklarından pek farklı değillerdir. Öte yandan, özellikle sendika üyesi ve yöneticisi olan bazı katılımcılar sendikaların imaj ve eylemlerinde bazı farklılıkların gerçekleştiğine inanmaktadırlar. Dallanan ağaç, çözümler üzerinde çalışan bir takım, işbirliği ve tartışmayı betimleyen bir yuvarlak masa, politika oluşturulmasında söz sahibi olmak isteyen bir oyuncu gibi mecazlar bu değişen imajı tanımlayan mecazlar olarak dile getirilmiştir.

5. Katılımcılara göre, standartlaşma hareketi, charter okulları, devlet okul reform, eğitimde hızla yükselen hesap verebilirlik hareketi, hizmet öncesi öğretmen yetiştirme uygulamaları, öğretmenlik mesleğine yeni giren insanların getirdiği yeni beklentiler ve değerler sistemi, yeni liberal piyasa paradigmasının kendini artan oranda eğitimde hissettirmesi ve dolayısıyla sendikacılığa egemen olan klasik sosyalist anlayışın sorgulanır hale gelmesi öğretmen sendikalarında gözlenen değişimlere kaynaklık eden etkenlerdir.

6. Öğretmen sendikalarının gelecekte nasıl olacağına ilişkin olarak katılımcılar üç kategori altında mecazlar üretmişlerdir. a) yuvarlak bir masa etrafında toplanmış birlikte düşünen ve birlikte çözen bir profesyoneller gurubu, b) kalite standartlarını belirleyen ve izleyen, daha esnek, daha az hiyerarşik, öğretmenlerin mesleki ve profesyonel gelişmelerini daha öne alan ve aynı zamanda avukat ve doktorların meslek örgütlerine benzeyen bir meslek örgütü, c) yön gösteren ve yol aydınlatan bir deniz feneri.

7. Son olarak, öğretmen sendikalarının yukarıda sözü edilen gelecek imajını gerçekleştirebilmek için bir dizi strateji ve taktik önermişlerdir: öğretmen kalitesine odaklanmak, meslek için gerekli olan profesyonel standartları saptamak, öğretmenlerin mesleki ve profesyonel gelişimleri için önderlik rolü üstlenmek (toplu sözleşmelerin en önemli bileşeni olarak bu konuyu öne almak), sendikaların kurumsal dönüşümü için önderliği üstlenmek, performansa dayalı ödeme konusunda standartlar geliştirmek ve yaymak, eğitimin zor süreçlerine dahil olmak, okul ve sınıf düzeylerine daha yakın durmak, daha yatay ve esnek yapılanmış sendika örgütlenme modelleri üzerine odaklanmak.

Sonuç ve öneriler: Genel olarak vurgulamak gerekirse, dört önemli ana başlık öne çıkmaktadır: Öğretmen sendikaları köklerine geri dönmektedirler; öğretmen sendikalarının eğitim ve okul reform çalışmalarında etkili aktörler olduğu genel kabul görmektedir; öğretmen sendikalarının eğitim ve okul reform sürecinde önemine en az inananlar eğitim politikalarının oluşturulmasında en önemli görevi yüklenen politikacılar iken buna en çok inananlar yerel ve okul düzeyine daha yakın olan paydaşlardır; ve son olarak, sendikalar reform sürecinde liderlik rolü üstlenebilmeleri için birden çok ve yeni stratejileri bulma ve uygulama konusunda aktif olmalıdırlar.

Anahtar Sözcükler: Öğretmen sendikaları, yeni sendikacılık, okul/eğitim reformu, mecazlar, değişim etkeni olarak sendikalar.

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Evaluating Sixth Graders' Reading Levels with Different Cloze Test Formats

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Abstract

Problem Statement: In this study, different cloze procedures were investigated in Turkish. Six different cloze test formats, including regular cloze, regular cloze with initial letter-cue, dashed cloze, dashed cloze with initial-letter cue, matching format, and maze format were used to determine how these different cloze formats measure students' reading levels.

Purpose of Study: The main purpose of the study is to see how six different cloze formats measure students' reading levels on Turkish texts at medium difficulty level. The following four questions are investigated in this study:

1. What are the reliability levels of the different cloze test formats?
2. What are the students' reading levels on these formats?
3. Are there any differences among the students' scores on cloze test formats?
4. What are the students' opinions regarding the useful strategies to find the answers and the perceived difficulties of the cloze test formats?

Methods: Sixth grade students (N= 288) selected from four different schools in the district of Yenimahalle participated in the research. Passages were selected from sixth grade textbooks. To analyze the data, percentage, frequency, mean of correct responses, and K-R 20 scores were calculated, and students' scores on different cloze formats were compared using one-way ANOVA test.

Results: The results revealed that: (a) all cloze test formats had high reliability levels, (b) students had the highest scores from the MC format, and the lowest scores from RC and DC formats, (c) omission was the most

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frequently seen error type, (d) significant differences were found among the cloze test formats, and e) inactivated background knowledge, mismatching words and blanks, and finding the correct words among distractors were seen as most experienced difficulties

Conclusions and Recommendations: The results of the study showed that all cloze test formats can be used in Turkish language to determine readability levels of texts and reading levels of students. It is recommended that before selecting a cloze format, evaluators should know about the characteristics of cloze test formats such as difficulties of the test, ease of construction, and placement and interpretation of scores, so that they can select the best cloze test format and make an appropriate decision on texts and reading levels of students.

Keywords : Cloze Test Formats, Turkish, Reading Levels, Readability

The Cloze procedure, as a readability technique, can be used to maintain an appropriate match between readers and texts. The cloze test is based on the Gestalt concept of closure, which is the mind's ability to complete missing words or images. This test was first developed by Wilson Taylor in the early 1950's to assess the readability of texts. Later, cloze tests were used to assess the reading comprehension in both first and second languages. The cloze procedure includes semantic, syntactic, and structural elements of the material. This technique is a highly valid and reliable measure of reading comprehension (Bormuth, 1963, 1968; Rankin, 1958) and a reliable measure of language difficulty (Froese, 1971; Taylor, 1953).

Modifications of the cloze test have been used in several studies to find a more valid and reliable cloze test format. Dashed format, regular or dashed with initial letter-cue format (Helfeldt, Henk, Fotos, 1986; Henk, 1982), matching format (Baldauf & Propst, 1978; Baldauf & Propst, 1979; Cunningham & Cunningham, 1978; Propst & Baldauf, 1979), and multiple choice (maze) format (Baldauf & Propst, 1979; Jonz, 1976; Neville & Pugh, 1976) are among the alternatives of the regular cloze procedure.

Students may regard the blanks on the cloze tests that are left for them to fill in as too difficult (Lembke, 2003). For this reason, the cloze formats give readers cues and alternative choices. For example, in initial letter-cue conditions, students can use these letters to find the missing words. The number of dashes can also be used by students to guess the deleted words. In addition, matching formats allow readers to see the answers that fit the blanks and then try to match the correct replacements with the blanks. In the maze format, instead of producing the missing words, readers select the correct word among two or three distractors.

The maze test was developed in the early 1970s to improve the cloze procedure and to use the test on culturally-disadvantaged students, EFL students, and students with reading disabilities (Parker, Hasbrouck, & Tindal, 1992). Gillingham and Garner (1992) studied word, sentence, and paragraph level mazes and claimed that mazes are a valuable diagnostic tool because they are easy and quick to administer. Some selected research studies related to alternative cloze formats are given in the following section of the study.

Helfeldt, Henk, and Fotos (1986) used repeated-measures design to compare sixth graders' performances on a traditional cloze and three alternative types of cloze tests. Four different kinds of cloze test formats were constructed for the four passages selected from two different science textbooks. There were two independent variables in this study: deleting strategy and cue condition. The four different cloze test formats were every fifth word blank without a letter cue, every fifth word blank with a first letter cue, total random dashed blank without a letter cue, and total random dashed blank with a first letter cue. Sixteen different cloze passages were developed and administered to 64 sixth grade students. Each subject received these four different types. The study results revealed that the total random dashed blanks with a first letter cue format showed the most accurate performance. The study results also showed that every fifth blank with a first letter cue, total random dashed blank without a cue, and total random dashed blank with a cue formats were all more reliable than the traditional every fifth word blank cloze test format.

Baldauf and Propst (1979) compared matching and multiple-choice cloze test procedures to determine the desirability of these approaches for ESL students. One-hundred-eighty-five students from grades four and five participated in this research. Fourth and fifth graders received different 50-item cloze tests. Four variations of the cloze tests were administered: matching cloze with five alternatives, matching cloze with six alternatives, random multiple-choice, and selected multiple choice. The research results showed no significant differences between the means of these four cloze test formats. According to the researchers, as the construction of matching cloze tests were simple, they seemed to be favorable for students.

The cloze test method can be applied to languages other than English (Taylor, 1956). Klare (1974-1975) stated, "the cloze procedure has been used to measure readability in a number of languages. It is especially adaptable for this purpose, since it does not involve a count of language variables" (p. 94). Cloze procedures were used in Korean (Taylor & Lee, 1954), Vietnamese (Klare, Simaiko, & Stolurow, 1972), Thai (Oller, Bowen, Dien, & Mason, 1972), Japanese (Shiba, 1957), Arabic (Abanami, 1982), and French (De Landsheere, 1963). Literature review revealed only one cloze test related research (Ulusoy, 2006) that was employed on Turkish elementary students.

In this present study, six different cloze test formats, including regular cloze, regular cloze with initial letter-cue, dashed cloze, dashed cloze with initial-letter cue, matching format, and maze format were used to determine how these different formats measure students' reading levels. The following four questions are investigated in this study:

1. What are the reliability levels of the different cloze test formats?
2. What are the students' reading levels on these formats?
3. Are there any differences among the students' scores on cloze test formats?
4. What are the students' opinions regarding the useful strategies to find the answers and the percieved difficulties of the cloze test formats?

Method

Sample

Two-hundred-eighty-eight sixth-grade students (150 female and 138 male) selected from four different schools in the district of Yenimahalle, Ankara participated in the research. Elementary schools were randomly selected from different parts of the district. Instruments were conducted in two randomly selected classrooms from these four schools. Two hundred sixteen of the 288 students answered the open ended questions attached to the cloze tests.

Instrumentation

In this descriptive study, two kinds of instruments were used: different cloze test versions and an open-ended questionnaire.

Cloze test versions. One social studies and one science passage were selected from the sixth-grade social studies and science textbooks that were published by Ministry of National Education (MONE). Texts were purposefully selected from textbooks to maintain an appropriate difficulty level of the tests. The readability levels of these texts were also calculated by using Ateşman's (1997) readability formula. The calculation results of the science and social studies texts revealed 61.22 and 64.23 readability scores respectively, representing medium difficulty levels.

Cloze tests require that the selections of texts have not been read by the students. For this reason, 200-250 word long passages were selected from the sixth-grade science and social studies textbook units which had not been read by the students. The topics of the passages were related to the description of the South Eastern Anatolian Project for social studies and the spread of sound for science. As Ulusoy's (2006) research showed the sixth-word deletion version of cloze tests successfully differentiated students' reading abilities, it was decided to use the following every sixth word deleted version of cloze test formats selected from sixth-grade social studies (Genç et al., 2006) and science (Tunç et al., 2006) textbooks. Science and social studies cloze tests included 25 blanks each, for a total of 50.

a) Regular Cloze (RC): The first and last sentences of the passages were left intact, and, beginning with the second sentence, every sixth word was deleted. If the sixth word was a proper noun, it was skipped and the next word was deleted (Mariotti & Homan, 2001).

b) Regular Cloze with Initial Letter Cue (RC/C): The only difference from RC was to give an initial letter cue for each blank.

c) Dashed Cloze (DC): Every letter of the deleted words was represented with a dash in this version. It was expected that students use the number of dashes to find the deleted words.

d) Dashed Cloze with Initial Letter Cue (DC/C): Every letter of the deleted words was represented with a dash. In addition, initial letters of the every missing word were provided. It was hypothesized that students use the number of dashes and the initial letters to guess the replacements.

e) Matching Cloze (MC): Every sixth word of the passages was deleted, but randomly ordered missing words were provided as a group at the right side of the

paper. It was expected that students choose the correct words from the given list and match them with blanks.

f) Maze (M): Every sixth word of the passages was deleted. Three distractors and the missing words were given in the text. As a distractor selection strategy, Parker, Hasbrouck, and Tindal's (1992) following recommendations on Maze format were followed:

"Choose distracters that are (a) the same part of speech as the deleted word, (b) meaningful and plausible within the one sentence, (c) related in content to the passage (when possible), (d) as familiar to the reader as the deleted word, and (e) either clearly wrong or less appropriate, given broader passage content" (p. 214).

Questionnaire. An open-ended questionnaire was attached to every cloze test version to receive students' written responses. Students answered two open-ended questions. Mainly, they were asked to have information regarding strategies they used to answer the blanks and the difficulties they experienced while answering the tests.

Data Collection

After obtaining permission from MONE, the investigator visited elementary schools in the 2006/2007 school year. Students were provided with five practice sentences before administering the cloze tests. Cloze test formats were distributed to the students randomly, so that each student had an equal chance to receive one of the six different formats. Students were told that each blank should be filled out with one word. In addition, to find the correct replacements of the first letter cue and dashed conditions, they were told to use the first letter cues and the number of dashes as context clues. In matching format condition, students were told to match the blanks and the words given on right side of the papers. In Maze format, students were asked to find the correct word among the distractors. Each cloze test session lasted 50 minutes. Examples of these formats can be seen in Figure 1.

Regular Cloze Format
Durgun bir suya hiç taş attınız mı? Atmadıysanız ya da attığınızda ne
_____ (1) fark etmediyseniz ilk fırsatta deneyin _____ (2) olanları gözlemleyin...

Regular Cloze/Cue Format
Durgun bir suya hiç taş attınız mı? Atmadıysanız ya da attığınızda ne
o_____ (1) fark etmediyseniz ilk fırsatta deneyin v_____ (2) olanları gözlemleyin...

Dashed Cloze Format
Durgun bir suya hiç taş attınız mı? Atmadıysanız ya da attığınızda ne
_ _ _ _ _ _ _ _ (1) fark etmediyseniz ilk fırsatta deneyin _ _ (2) olanları gözlemleyin...

Dashed Cloze/Cue Format
Durgun bir suya hiç taş attınız mı? Atmadıysanız ya da attığınızda ne
o _ _ _ _ _ _ _ (1) fark etmediyseniz ilk fırsatta deneyin v _ (2) olanları gözlemleyin...

Matching Cloze Format

Durgun bir suya hiç taş attınız mı? Atmadıysanız ya da attığınızda ne _____ (1) fark etmediyseniz ilk fırsatta deneyin _____ (2) olanları gözlemleyin...	da ve suya olduğunu

Maze Format
Durgun bir suya hiç taş attınız mı? Atmadıysanız ya da attığınızda ne
_____(1) fark etmediyseniz ilk fırsatta deneyin _____(2) olanları gözlemleyin...

a. taşlar	a. ve
b. şeyler	b. fakat
c. olduğunu	c. ile
d. geldiğini	d. ne

(Have you ever thrown a stone to a calm water? If you did not do that or if you could not realize what happened, try it when you have a chance and observe what will happen.)

Figure 1. Examples of the six cloze test formats.

Data Analyses

In order to answer the research questions, percentage, frequency, mean of correct responses, and K-R 20 reliability scores were calculated. In addition, students' scores on different cloze formats were compared by using the one-way ANOVA test. To determine the cloze formats that are significantly different from each other, the Scheffe post hoc comparison test was used. Only the exact answers were scored for the cloze tests (not a synonym). The most widely used criteria, developed by Rankin and Culhane (1969), were used to judge the cloze test scores. According to their criteria, scores of 60% and higher indicate that the passage can be read independently by the students. Scores between 40% and 59% show that the students can read the passage with instruction. A score below the 40% designates that the passage is too difficult for the students.

To determine the possible strategies students employed when they answered the RC, RC/C, DC, and DC/C versions of cloze tests, error analyses were used. During the error analyses, a language specialist's help was frequently needed regarding the classification of the errors. Cloze test errors were classified using the following categorization (Mariotti & Homan 2001; Shearer, 1982):

a) Semantically Appropriate (SEM): Despite not fully reflecting the intended meaning, replaced words make sense in the passage.

b) Synonyms (SYN): Words that have the same meaning as the deleted words.

c) Semantic/Not Syntactic (SEM/NStc): Replaced words may be meaningful, but they are not syntactically appropriate.

d) Syntactically Appropriate (STC): Words are not semantically appropriate, but they are the same part of speech as the deleted words, with appropriate tense and number.

e) Nonsense Errors (NON): Replaced words are not syntactically and semantically appropriate.

f) Omissions (OM): Deleted words are not answered.

Written open-ended questions were analyzed by counting the frequency of the students' answers for each question. Only an answer that has a frequency of four or more was indicated in the tables.

Results

The results section is organized under the two main headings, including statistical analyses of cloze test formats and students' opinions about these formats.

Analyses of Cloze Test Formats

The first research question was related to the reliability of the cloze tests. In Table 1, K-R 20 scores, ranged between .80 and .88, indicating that the internal consistency of students' answers throughout the cloze tests was high. These K-R 20 scores also showed that all cloze test formats had high reliability levels.

Table I

K-R 20 Reliability Scores for Cloze Tests

Passages	RC	RC/C	DC	DC/C	MC	M
Social Studies	.85	.84	.88	.81	.88	.83
Science	.80	.83	.87	.85	.87	.88

Note. RC = regular cloze, RC/C = regular cloze with initial letter cue, DC = dashed cloze, DC/C = dashed cloze with initial letter cue, MC = matching cloze, M = maze

Table 2, 3, and 4 answer the second research question, which is about the analyses of cloze test formats. As shown in Table 2, students had the highest mean scores in matching format cloze test from science (M = 18.08, SD = 5.33) and social studies (M = 21.71, SD = 4.17) passages. In addition, they had the second highest scores on maze format in these two passages (M = 18.06, SD = 4.63; M =17.62, SD = 5.48 for social studies and science, respectively). Students had the lowest scores on social studies (M = 7.49, SD = 4.24) and science (M = 8.51, SD = 4.30) passages from the regular cloze procedure. The second lowest scores were taken from the dashed format on social studies (M = 7.67, SD = 5.08) and science (M = 9.65, SD = 5.19) passages.

The means ranging from 7.49 to 9.65 in RC and DC formats represent percentage scores ranging from 29.96% to 38.6%. According to Rankin and Culhane's (1969) criteria, all of these percentages are within the frustrational reading levels in the RC and the DC formats. In addition, students' mean scores in the RC/C and DC/C formats range between 11.09 and 12.71, representing percentage scores between 44.36% and 50.84%. These percentages revealed that the RC/C and DC/C passages were read at the instructional reading levels. Finally, students' MC and M mean scores range between 17.62 and 21.71, representing percentage scores ranging from 70.48% to 86.84%. These percentage scores indicated that students read the MC and M cloze tests at their independent reading levels.

Table II

Means and Standard Deviations of Cloze Test Formats in Science and Social Studies Texts

Types of Cloze Tests	Social Studies			Science		
	N	*M*	*SD*	*N*	*M*	*SD*
Regular Cloze	47	7.49	4.24	47	8.51	4.30
Regular Cloze/Cue	47	11.09	4.83	47	12.02	4.83
Dashed Cloze	48	7.67	5.08	48	9.65	5.19
Dashed Cloze/Cue	48	11.15	4.33	48	12.71	5.12
Matching Cloze	48	21.71	4.17	48	18.08	5.33
Maze	50	18.06	4.63	50	17.62	5.48

Table 3 represents the results of the cloze test scores at each instructional level for six different formats. The cloze test results revealed that the majority of the students were at their frustrational reading levels in the RC and DC formats. The high number of students in frustrational reading levels showed that the RC and DC versions were difficult for the students. In the RC/C and DC/C formats, 48.94% to 66.17% of students could read the science and social studies texts at their instructional level, meaning that they needed their teachers' help to read and understand the texts. In addition, the majority of the students read the passages at their independent reading levels in the MC and M formats. Based on Table 3, it could be concluded that students could read and understand the MC and M passages without needing help from their teachers.

Table III
Distribution of Students at the Independent, Instructional, and Frustrational Levels

Cloze Formats	Social Studies								Science							
	60% and above (Independent)		Between 40-59% (Instructional)		Below 40% (Frustrational)		Total		60% and above (Independent)		Between 40-59% (Instructional)		Below 40% (Frustrational)		Total	
	f	*P*	*f*	*P*	*f*	*P*	*f*	*P*	*f*	*P*	*f*	*P*	*f*	*P*	*f*	*P*
RC	2	4.26	3	6.38	42	89.36	47	100	2	4.26	11	23.40	34	72.34	47	100
RC/C	5	10.64	23	48.94	19	40.42	47	100	8	17.02	26	55.32	13	27.66	47	100
DC	3	6.25	3	6.25	42	87.5	48	100	5	10.42	14	29.16	29	60.42	48	100
DC/C	4	8.33	32	66.67	12	25	48	100	12	25	26	54.17	10	20.83	48	100
MC	45	93.75	2	4.17	1	2.08	48	100	37	77.08	6	12.5	5	10.42	48	100
M	38	76	11	22	1	2	50	100	36	72	9	18	5	10	50	100

Note. *f* = frequency, *P* = percentage, RC = regular cloze, RC/C = regular cloze with initial letter cue, DC = dashed cloze, DC/C = dashed cloze with initial letter cue, MC = matching cloze, M = maze

As can be seen in Table 4, the error analysis results revealed that the most frequently seen error type was omission in these four different cloze test formats. Instead of trying to find the correct replacements, students left them blank. Nonsense errors and semantically correct replacements were also among the frequently seen error types. In semantically correct replacements, students could not find the correct replacement, but filled the blanks with words that made sense in the sentence. In addition, synonyms, syntactically correct, and semantically correct but syntactically incorrect replacements were among the least frequently seen types of errors.

Table IV

Percentages of Error Analysis

Category	Social Studies				Science			
	RC	RC/C	DC	DC/C	RC	RC/C	DC	DC/C
	P	*P*	*P*	*P*	*P*	*P*	*P*	*P*
1. EXACT REP.	29.96	44.34	30.67	44.58	34.04	48.09	38.67	50.83
2. SYN	2.38	0.94	1.92	1.33	1.28	2.30	1.33	1.58
3. SEM	21.87	15.49	13.42	6.67	23.49	11.74	8.33	4.00
4. SEM/NStc	3.40	2.21	1.5	1.00	3.15	2.30	1.83	1.42
5. STC	2.21	0.26	0.33	0.00	0.51	0.00	0.25	0.00
6. NON	13.87	18.38	12.33	4.00	13.28	20.94	14.17	3.25
7. OM	26.30	18.38	39.83	42.42	24.26	14.64	35.42	38.92

Note. P = percentage, RC = regular cloze, RC/C = regular cloze with initial letter cue, DC = dashed cloze, DC/C = dashed cloze with initial letter cue, MC = matching cloze, M = maze, EXACT REP = exact replacement, SYN = synonym, SEM = semantically appropriate, SEM/NStc = semantic not syntactic, STC = syntactically appropriate, NON = non-sense error, OM = omission.

The third research question was related to determining if there was a significant difference among the different cloze versions. As illustrated in Table 5, there was a significant difference, $F(5, 282) = 77.45$, $p < .01$, among the students who answered these cloze test formats. The Scheffe post hoc comparison test revealed that there were differences between the following cloze formats:

a) Between RC and RC/C, MC, and M

b) Between RC/C and DC, MC, and M

c) Between DC and DC/C, MC, and M

d) Between DC/C and MC, and M

e) Between MC and M

Table V

ANOVA Test Results Among the Different Cloze Test Formats

Source	*SS*	*df*	*MS*	*F*	*Sig.*
Between Groups	8048.38	5	1609.68	77.45	.000*
Within Groups	5860.79	282	20.783		
Total	13909.16	287			

*$p < .01$

Students' Opinions about the Cloze Test Formats

The fourth research question regarding students' opinions about the cloze test versions was examined in this section of the research. As illustrated in Table 6, students most frequently used the strategy of focusing on the meaning of the sentences in all formats. In the RC, DC, and DC/C formats, students used the strategy of thinking deeply about the possible replacements second most frequently. In addition, in the RC/C and MC formats, they used the strategy of activating background knowledge second most frequently. Using trial and error method was the second most frequently used strategy in the M format.

Table VI

Frequency of Useful Strategies by Cloze Test Formats

Formats	*f*	Useful Strategies to Find the Answers
Regular Cloze	14	Focusing on the meaning of the sentences
	9	Thinking deeply about the possible replacements
	7	Looking for grammatical match between replacements and sentences
Regular Cloze/Cue	14	Focusing on the meaning of the sentences
	5	Activating background knowledge
	4	Using initial letter cues
Dashed Cloze	9	Focusing on the meaning of the sentences
	5	Thinking deeply about the possible replacements
	4	Skimming and scanning the passages
	4	Rereading the sentences
Dashed Cloze/Cue	8	Focusing on the meaning of the sentences
	5	Thinking deeply about the possible replacements
	5	Activating background knowledge
	4	Using initial letter cues
Matching Cloze	17	Focusing on the meaning of the sentences
	6	Activating background knowledge
	4	Using trial and error method
Maze	13	Focusing on the meaning of the sentences
	10	Using trial and error method
	7	Activating background knowledge
	6	Skimming and scanning the passages
	6	Thinking deeply about the possible replacements
	6	Rereading the sentences

As can be shown in Table 7, in the RC and DC/C formats, students most frequently indicated that they could not activate their background knowledge. In the MC and M formats, mismatching words and blanks, and finding the correct words among distractors were seen as the most experienced difficulties. Wrong replacements and non-understandable sentences were seen as the most experienced difficulties by the RC/C and DC groups.

Table VII

Frequency of Experienced Difficulties by Cloze Test Formats

Formats	*f*	Experienced Difficulties
Regular Cloze	8	I could not activate my background knowledge
	8	I could not understand the sentences
	6	Unknown words
Regular Cloze/Cue	9	Wrong replacements precluded me from finding the following blanks
	5	I could not understand the sentences
	4	Unknown words
Dashed Cloze	8	I could not understand the sentences
	7	I could not match the number of dashes and the number of letters in my words
	5	I could not activate my background knowledge
Dashed Cloze/Cue	10	I could not activate my background knowledge
	5	I could not match the number of dashes and the number of letters in words
	4	I could not understand the sentences
Matching Cloze	12	I mismatched the words and blanks
	6	Wrong replacements precluded me from finding the following blanks
	4	Unknown words
Maze	11	I could not find the correct words among distractors
	8	I could not understand the sentences
	4	I could not activate my background knowledge

Discussion and Conclusion

The K-R 20 reliability analyses, ranging between .80 and .88, showed that all cloze test formats are reliable, meaning that these versions can be used in Turkish language to determine readability levels of texts and reading levels of students. A similar result was found in Ulusoy's (2006) research. In his study, regular cloze test format was found as a reliable measure of text difficulty in Turkish language.

Analyses of the cloze test formats illustrated that students had the highest scores from the MC format, and the lowest scores from the RC and DC formats. In addition, they had the second highest scores from the M test. Results also showed that the majority of the students read the passages at their independent reading levels in the MC and M formats. In the RC/C and DC/C formats, 48.94% to 66.17% of students read the same passages at their instructional reading levels. Lastly, the majority of the students read the passages at frustrational reading levels in the RC and DC formats. In light of the arithmetic means of tests, it might be concluded that the RC

and DC formats were difficult, and the MC and M formats were easy for the students.

Feely (1975) claimed that the difficulty felt with the maze technique is not so great and it is easier to select a correct word than to write the correct word in a blank. In addition, it may be easier to match the correct words and blanks instead of writing them. According to Feely, in Maze format 92% or greater scores indicate independent reading levels, scores between 80% and 91% represent instructional reading levels, and scores of 75% or less characterize frustrational reading levels. In this study, all cloze test results were evaluated based on Rankin and Culhane's (1969) criteria. If the same maze scores can be evaluated based on Feely's criteria, it can be shown that students read the social studies (72.24%) and science (70.48%) passages at their frustrational reading levels. In addition, this criteria reveals that students read the social studies text (86.84%) at instructional and science (72.32%) passage at frustrational reading levels in MC format. As Feely said, both cloze and maze scores should be interpreted cautiously because they are not infallible. From this viewpoint, a reasonable recommendation for test evaluators or teachers would be to use their critical judgment to interpret the scores obtained from M and MC formats.

The error analysis results revealed that omission was the most frequently seen error type, meaning that students could not find a meaningful and grammatically correct replacement and just left them unanswered. This result is in line with Ulusoy's (2006) research. In this present study, semantically correct replacements were the second frequently seen error type. Even though students could not find the correct words for the blanks, they thought about them and found meaningful replacements.

One-way ANOVA results revealed significant differences among the different cloze test formats. An interesting finding is that even though the Scheffe post hoc revealed many significant differences between the cloze test formats, it did not reveal significant differences between the RC and DC, and the RC/C and DC/C formats. These results showed that providing the number of dashes as a cue did not increase students' scores in the DC format when these scores compared with the scores obtained from the RC. Scheffe post hoc results also revealed that there were significant differences between the RC and RC/C, and the DC and DC/C formats, meaning that initial letter cues improved students' test scores. This result is in line with Helfeldt, Henk, and Fotos's (1986) research. In their research, RC/C format significantly outperformed the RC format; that is, initial letter cues enhanced students' test scores.

Students' answers on the open-ended questions showed that the strategy of focusing on the meaning of the sentences was most frequently used in all cloze formats. Thinking deeply about the possible replacements, activating background knowledge, and using trial and error method were also among the frequently used strategies. It could be concluded that students used appropriate strategies while they were answering the tests. For example, they focused on meaning to generate replacements, tried to activate their background knowledge, and made connections between new information and what was already known. However, only students who answered the RC format focused on embedded syntactical and grammatical cues in the text to find the correct replacements.

Depending on the answered format, students experienced some difficulties. For example, they could not activate their background knowledge, had mismatched words and blanks, could not find the correct words among distractors, and made wrong replacements. It might be argued that these are not unexpected difficulties. They are, however, among the disadvantages of these different cloze test formats.

Students come to schools from different cultural and linguistic backgrounds. Teachers should be aware of these cultural and historical factors and try to adjust the classroom environment to make all students successful readers and writers. Children of all cultural and linguistic backgrounds can achieve high levels of literacy if educators know how to adjust the learning environment to support students' learning (Au, Carroll, & Scheu, 1997).

In all content areas, teachers can use these six different cloze test formats to measure students' comprehension of texts and readability levels of texts. For example, maze formats may be used to familiarize students with multiple choice tests. If students have weak linguistic backgrounds and if their readings are at the frustration level on RC formats, teachers may decide to give them additional cues by using dashed or initial letter cue conditions. By giving students different kinds of cloze formats, teachers may find a way to determine the needs of individual students.

Content area teachers should know about the characteristics of cloze test formats such as the difficulties of the test, the ease of construction, and the placement and interpretation of scores, so that they can select the best cloze test format and make an appropriate decision regarding texts and reading levels of students. In this study, all cloze test formats were found as highly reliable procedures having the potential to measure sixth graders' reading levels and the readability of content area texts. Future research should be conducted to verify these different formats' utility as reading comprehension and readability tests. The results of this study did not reveal significant differences between regular and dashed formats. Further comparative studies between these two formats should be conducted.

References

Abanami, A. A. (1982). *Readability analysis of the 11th and 12th grade earth science textbooks used in the public schools in Saudi Arabia*. Unpublished doctoral dissertation, The University of Houston.

Ateşman, E. (1997). Türkçede okunabilirliğin ölçülmesi [Measuring readability in Turkish]. *Dil Dergisi, 58*, 71-74.

Au, K. H., Carroll, J. H., & Scheu, J. A. (1997). *Balanced literacy instruction: A teacher's resources book*. Norwood, MA: Christopher-Gordon.

Baldauf, R. B., & Propst, I. K. (1978). Preliminary evidence regarding the validity of a modified cloze procedure for lower elementary ESL students. *Educational and Psychological Measurement*, *38*, 451-455.

Baldauf, R. B., & Propst, I. K. (1979). Matching and multiple-choice cloze tests. *Journal of Educational Research, 72*, 321-326.

Bormuth, J. (1963). Cloze as a measure of readability. *Proceedings of the International Reading Association*, 131-134.

Bormuth, J. R. (1968). Cloze test readability: Criterion reference scores. *Journal of Educational Measurement, 5*, 189-196.

Cunningham, J. W., & Cunningham, P. M. (1978). Validating a limited cloze procedure. *Journal of Reading Behavior, 10*, 211-213.

De Landsheere, G. (1963). Pour une application des tests de lisibilite de Flesch a la language francaise [Application of the Flesch test for the language of French]. *Le Travail Humain, 26*, 141-154.

Feely, T. M. (1975). How to match reading materials to student reading levels: II. The cloze and the maze. *Social Studies, 66*, 252-258.

Froese, V. (1971). *Cloze readability versus the Dale-Chall formula.* Atlantic City, NJ: Paper presented at the meeting of the International Reading Association. (ERIC Document Reproduction Service No. ED051975)

Genç, E., Polat, M. M., Başol, S., Kaya, N., Azer, H., Gökçe, S., et al. (2006). *Sixth grade social studies textbook* (2nd ed.). Milsan.

Gillingham, M. G., & Garner, R. (1992). Readers' comprehension of mazes embedded in expository texts. *Journal of Educational Research, 85*, 234-241.

Helfeldt, J. P., Henk, W. A., & Fotos, A. (1986). A test of alternative cloze test formats at the sixth-grade level. *Journal of Educational Research, 79*, 216-221.

Henk, W. (1982). *An analysis of alternative cloze test formats for use with fourth and sixth grade readers*. Unpublished doctoral dissertation, West Virginia Univerity.

Jonz, J. (1976). Improving on the basic egg. The M-C cloze. *Language Learning, 26*, 255-265.

Klare, G. R. (1974-1975). Assessing readability. *Reading Research Quarterly, 10*, 62-102.

Klare, G. R., Simaiko, H. W., & Stolurow, L. M. (1972). The cloze procedure: A convenient readability test for training materials and translations. *International Review of Applied Psychology, 21*, 77-106.

Lembke, E. S. (2003). *Examining the effects of three reading tasks on elementary students' reading performance*. Unpublished doctoral dissertation, University of Minnesota.

Mariotti, A. S., & Homan, S. P. (2001). *Linking reading assessment to instruction: An application worktext for elementary classroom teachers* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum.

Neville, M. H., & Pugh, A. K. (1976). Context in reading and listening: Variations in approach to cloze tasks. *Reading Research Quarterly, 12*, 13-31.

Oller, J. W., Bowen, D. J., Dien, T. T., & Mason, V. W. (1972). Cloze tests in English, Thai, and Vietnamise: Native and non-native performance. *Language Learning, 22*, 1-13.

Parker, R., Hasbrouck, J. E., & Tindal, G. (1992). The maze as a classroom-based reading measure: Construction methods, reliability, and validity. *The Journal of Special Education, 26*, 195-218.

Propst, I. K., & Baldauf, R. B. (1979). Use matching cloze tests for elementary ESL students. *The Reading Teacher, 32*, 683-690.

Rankin, E. F. (1958). *An evaluation of the cloze procedure as a technique for measuring reading comprehension*. Unpublished doctoral dissertation, The University of Michigan.

Rankin, E. F., & Culhane, J. W. (1969). Comparable cloze and multiple-choice comprehension test scores. *Journal of Reading, 13*, 193-198.

Shearer, A. P. (1982). *A psycholinguistic comparison of second grade good readers and fourth grade good and poor readers on their oral reading miscues and standard and phoneme cloze responses*. Unpublished doctoral dissertation, University of South Florida.

Shiba, S. A. (1957). A study of the measurement of readability- application of the cloze procedure to the Japanese language. *Japanese Journal of Psychology, 28*, 67-73, (Japanese text and English abstract).

Taylor, W. L. (1953). Cloze procedure: A new tool for measuring readability. *Journalism Quarterly, 30*, 415-433.

Taylor, W. L. (1956). Recent developments in the use of cloze procedure. *Journalism Quarterly, 33*, 42-48.

Taylor, W. L., & Lee, K. W. (1954). KM readers lend hand to science: Cloze method works in written Korean and may serve as a tool for Korean language reform. *Korean Messenger,3*, 4-5.

Tunç, T., Ağalday, M., Akçam, H. K., Altunoğlu, U. C., Bağcı, N., Bakar, E., et al. (2006). *Sixth grade science and technology textbook* (2nd ed.). Ankara: Evren.

Ulusoy, M. (2006). *Evaluation of textbook difficulty and adaptation strategies used in Turkish elementary schools*. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.

Altıncı Sınıf Öğrencilerinin Okuma Düzeylerinin Farklı Boşluk Doldurma Testleri ile Değerlendirilmesi

(Özet)

Problem Durumu: Boşluk doldurma tekniği öğrencilerin okuma seviyelerini ve metinlerin okunabilirliğini ölçmede, İngilizce ve diğer dillerde yaygın olarak kullanılmaktadır. Araştırma sonuçları bu testin yüksek derecede geçerli ve güvenilir olduğunu göstermektedir. İlgili literatür taraması bu testin Türkçede ve Türkiye'deki ilköğretim öğrencileri üzerinde uygulanması ile ilgili yeterli araştırma olmadığını göstermektedir. Bu çalışmada farklı boşluk doldurma teknikleri Türkçe metinler kullanılarak incelenmiştir. Altı farklı boşluk doldurma tekniği, (standart boşluk doldurma, ilk harfi ip ucu olarak verilen standart boşluk doldurma tekniği, her harfi çizgi işareti ile verilen boşluk doldurma tekniği, ilk harfi ip ucu olarak verilen çizgili boşluk doldurma tekniği, eşleştirmeli format ve çoktan seçmeli format) öğrencilerin Türkçe metinler üzerindeki okuma seviyelerini belirlemek için kullanılmıştır.

Araştırmanın Amacı: Bu araştırmanın temel amacı orta düzeyde okunabilirlik seviyesine sahip olan metinler kullanarak farklı boşluk doldurma tekniklerinin öğrencilerin okuma seviyelerini nasıl ölçtüğünü belirlemektir. Araştırmada aşağıdaki dört soruya cevap aranmaktadır.

1. Farklı boşluk doldurma tekniklerinin güvenirlik düzeyleri nedir?

2. Öğrencilerin bu formatlar üzerindeki okuma seviyeleri nedir?

3. Öğrencilerin boşluk doldurma formatlarından elde ettikleri puanlar arasında anlamlı bir farklılık var mıdır?

4. Öğrencilerin boşluk doldurma testlerini cevaplarken kullandıkları stratejiler ve hissettikleri güçlükler nelerdir?

Araştırmanın Yöntemi: Ankara ili Yenimahalle ilçesindeki dört farklı ilköğretim okulundan rastlantısal olarak seçilen altıncı sınıf öğrencileri (N = 288) araştırmaya katılmıştır. Araştırmada kullanılan 200-250 kelimelik metinler uygun okuma güçlüğünü sağlamak amacıyla altıncı sınıf sosyal bilgiler ve fen bilgisi ders kitaplarından rastlantısal olarak seçilmiştir. Farklı boşluk doldurma formatlarına uygun olarak hazırlanmış testler öğrencilere rastlantısal olarak dağıtılmıştır. Böylece öğrenciler bu altı formattan birini cevaplamada eşit şansa sahip olmuştur. Testler değerlendirilirken sadece tam olarak doğru cevaplanan boşluklara puan verilmiş ve eş anlamlı kelimeler doğru olarak kabul edilmemiştir. Puanların sınıflanmasında % 60 ve üzeri puanlar bağımsız okuma seviyesi, % 40 ve % 59 arasındaki puanlar öğretimsel okuma düzeyi ve % 40'ın altındaki puanlar endişe düzeyinde okuma olarak değerlendirilmiştir. Öğrencilerin testlere verdikleri yanlış cevaplar da analiz edilmiş ve bu cevaplar anlamsal olarak doğru, eş anlam, anlamsal olarak doğru fakat sözdizimsel değil, sözdizimsel olarak doğru, anlamsız cevaplar ve boş bırakılanlar olarak altı başlık altında incelenmiştir.

Boşluk doldurma testlerini cevaplayan 288 öğrenciden 216'sı testlerden sonra açık uçlu iki soruyu yazılı olarak cevaplamıştır. Sorular, öğrencilerin boşluk doldurma testlerini cevaplarken kullandıkları stratejiler ve testleri cevaplarken hissettikleri güç-

lükler ile ilgilidir. Bu sorular analiz edilmiş ve frekansı dört ve üzerinde olan cevaplar tablolarda verilmiştir.

Araştırma verilerini analiz etmede yüzde, frekans, aritmetik ortalama ve K-R 20 puanları hesaplanmış ve öğrencilerin farklı formatlardan elde ettikleri puanlar arasındaki farklılık tek yönlü varyans analizi ile test edilmiştir. Aralarında anlamlı fark olan grupları belirlemede Scheffe çoklu karşılaştırma tekniği kullanılmıştır.

Araştırmanın Bulguları: Temel araştırma bulguları yedi başlık altında sıralanabilir. Bunlar: (a) Bütün boşluk doldurma formatlarının K-R 20 güvenirlik puanları .80 ve .88 puanları arasında değişmekte ve bu puanlar boşluk doldurma formatlarının yüksek güvenirlik derecesine sahip olduğunu göstermektedir. (b) Öğrenciler en yüksek puanı eşleştirmeli boşluk doldurma testinden ve en düşük puanları standart ve çizgili boşluk doldurma testlerinden elde etmişlerdir. (c) Öğrenciler metinleri standart ve çizgili boşluk doldurma testlerinde endişe düzeyinde, ilk harfi verilen standart boşluk doldurma ve ilk harfi verilen çizgili boşluk doldurma testlerinde öğretimsel düzeyde ve eşleştirmeli ve çoktan seçmeli boşluk doldurma testlerinde ise bağımsız düzeyde okumuşlardır. (d) Hata analizi sonuçları boşlukları cevaplamayarak boş bırakmanın en sık karşılaşılan hata türü olduğunu göstermiştir. Doğru cevapları bulmak yerine öğrenciler boşluklara cevap vermemeyi tercih etmiştir. Cümle içerisinde herhangi bir anlam ifade etmeyen cevaplar ve anlamsal olarak doğru olan cevaplarda sık karşılaşılan hata türleri arasındadır. Sözdizimsel olarak doğru olan cevaplar ve anlamsal olarak doğru fakat sözdizimsel olarak yanlış olan cevaplar ise en az karşılaşılan hata türleri arasındadır. (e) Farklı boşluk doldurma teknikleri arasında anlamlı farklılıklar bulunmuştur. Standart boşluk doldurma testi ve çizgili boşluk doldurma testi arasında anlamlı bir fark bulunmamıştır. Bu durum, kelimelerdeki harf sayısı kadar çizgiyi ip ucu olarak vermenin standart teste göre öğrencilerin puanlarında anlamlı bir artışa yol açmadığını göstermektedir. (f) Bütün test formatlarında öğrenciler doğru cevapları bulmada cümlelerin anlamı üzerine odaklanma stratejisini en sık şekilde kullanmıştır. Buna ek olarak, muhtemel cevapların üzerinde derinlemesine düşünme, ön bilgileri aktif hale getirme ve deneme ve yanılma stratejilerini kullanma da en sık başvurulan yöntemler arasında yer almıştır. (g) Aktif hale getirilemeyen ön bilgiler, kelimeler ve boşlukları yanlış eşleştirme ve çeldiriciler arasından doğru cevabı bulma öğrencilerin testleri cevaplarken en sık karşılaştıkları güçlüklerdir.

Araştırmanın Sonuçları ve Önerileri: Sonuçlar, bu araştırmada incelenen altı boşluk doldurma formatının Türkçede metinlerin okunabilirlik düzeyini ve öğrencilerin okuma seviyelerini belirlemede kullanılabileceğini göstermiştir. Boşlukları cevaplamadan atlamanın en sık karşılaşılan hata türü olması, öğrencilerin anlamlı ve sözdizimsel olarak doğru cevaplar bulmada sorunlarla karşılaştıklarına işaret etmektedir. Öğrencilerin okuma seviyesini ölçen uzmanlara boşluk doldurma teknikleri arasından birini seçmeden önce testin güçlüğü, testin oluşturulma kolaylığı ve testten elde edilen puanların kategorize edilmesi ve değerlendirilmesi gibi faktörler üzerinde düşünmeleri ve böylece ihtiyaçlarına en uygun olan format ile metinlerin okunabilirliği ve öğrencilerin okuma seviyeleri üzerinde karar vermeleri önerilmektedir.

Anahtar Sözcükler: Boşluk Doldurma Formatları, Türkçe, Okuma Düzeyleri, Okunabilirlik

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Identification of Student Types based on their Knowledge and Their Interests When Learning with Computer Simulations

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Problem Statement: Using new media in the teaching - learning process, especially when complex subjects are treated, has recently become very important. Among the various new media environments, computer simulations have a special value, as they offer high potential for interactive learning. Combining a high degree of clearness and autonomy, computer simulations are expected to support learners both cognitively and emotionally, and thus lead to increased learning gains. In order to convey complex biological subject matter, this study used a computer simulation and evaluated its effects with regard to cognitive and motivational learning characteristics. The focus was on knowledge gain as a cognitive learning characteristic and interest as a motivational learning characteristic.
Purpose of the Study: The study aimed to characterize students according to their knowledge and their interests and to evaluate to what extent computer-based simulations change knowledge structures and interest in complex biological subject matter.
Methodology: Our study was conducted in Germany at four schools in Schleswig-Holstein. The random sample group consisted of 167 secondary school pupils in grades 11 to 13. The data was collected in a pre-test/ post-test design with intermediate, computer-based intervention. The pupils completed a test on knowledge and a questionnaire regarding interests in particular topics. Questions on subject-related interests were divided into two domains: questions regarding interests in aspects of human biology and questions regarding interests in biochemical aspects. A latent class analysis was carried out concerning subject-specific interests and developing structures of knowledge.

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Findings: According to their interests and their knowledge structures, four classes could be identified: Class 1, as the biggest group, contains 45.3 % of all test persons. The characteristics of this class can be summarized as "clueless – interested in human-related issues". Class 2 contains 21.8 % of all test persons. The characteristics of this group can be summarized as "experts – highly interested". Class 3 contains 17.4 % of all test persons. This group could be characterized as "experts – interested in human-related issues". Class 4 contains 15 % of all test persons. This group can be characterized as "clueless – not interested".
Keywords: student types, simulation, respiratory chain, knowledge gains, interest, latent class analysis

Media conveying information via computer and its learning software are called "new media" (Stähler, 2001). Ever since computers have become a vital part of social life, the importance of new media has increased both in school and in job training. There are frequent claims to use new media in class, because their implementation is expected to raise the quality of classroom education. A specific feature of new media is the integration of text, and static and dynamic pictures and sound, which allows them to appeal to a number of sensual channels. Furthermore, they offer a rich medial scope of design and thus the individualization of the learning process (Prechtl, Schenzer, Urhahne, & von Davier, 2000). For those reasons, the use of new media in class is often expected to lead to better, faster and independently organized learning (Graf, 2005).

The new media offer a broad variety of different programs. Some examples are exercise programs, tutorial programs, simulation programs, and databases or hypermedia working environments. All learning programs offer support during the learning process, but the learning aims of the respective software differ significantly. They range from simply repeating and practicing technical terms in exercise programs, to investigative learning processes in simulations (Blömeke, 2003).

Among the various multimedia learning environments, computer simulations hold a special place, as they offer a high degree of interactive learning and control over the learning matter. This is considered an important learning motivation not offered by other multimedia learning environments (Urhahne & Harms, 2006). A computer simulation is a model of a process, a phenomenon, or a natural or artificial system. It simulates determining parameters and thus offers the learner the opportunity to safely experiment with this model (de Jong & van Joolingen, 1998). Literature offers further arguments for the use of simulations in science class, e.g.:

- Conducting experiments is an essential method of science education. Some experiments cannot be conducted in the classroom, due to high costs, ethic reasons, time requirements, safety, health risks, complexity etc. In such a case, simulations can provide access to and even replace these real-life experiments (Graf, 2005; Breuer & Kummer, 1990).

- When using computer simulations, learners have the opportunity to apply the laws, parameters and concepts of the subject matter in a realistic learning environ-

ment. This enhances the applicability of the acquired knowledge and the transfer of knowledge to other areas (Breuer & Kummer, 1990).

- Science education is especially rich in complex and dynamic processes and phenomena, which must be taught at school. It is assumed that such complex and dynamic subjects are conveyed more easily using simulations instead of static pictures. This is because simulations offer the learner a chance to manipulate the system parameters and thus influence both course and final state of the simulated process. By changing the system parameters, the learners have the opportunity to interfere with the simulated process and independently investigate causal relationships within the process. When using this classroom medium, content can be chosen independently and dealt with in an individually desired order. Thus, simulations offer students a lot of freedom concerning their learning process, and encourage investigative learning (Schnotz, Böckheler, Grzondziel, Gärtner & Wächter, 1998). Due to the combination of high graphic quality and autonomy, computer simulations are expected to support the learner both cognitively and motivationally (Urhahne & Harms, 2006).

In order to convey a complex biological subject matter, this study used a computer simulation and evaluated its effects with regard to cognitive and motivational learning characteristics. The focus was on knowledge gain as a cognitive learning characteristic, and on interest as a motivational learning characteristic.

The Interest Concept

Interest is a central motivational component of the learning process (Krapp, 1998). Both the quality of the cognitive learning result and the emotional quality of the learning process are positively influenced by interest (Prenzel & Lankes 1995). Therefore, science education aims at promoting the students' interest in particular topics as well as natural sciences as a whole.

The Munich Conception describes interest as a person-object-theory. (Prenzel, Krap, & Schiefele 1986; Krapp, 1992; Krapp, 2001). According to this theory, interest signifies the relationship between a person and an object of interest. Objects of interest might be certain contents, topics, subjects or objects. Interest is subdivided into a person's individual, long-term interest and situational, short-term interest resulting from the interestingness of a certain situation. The term "interestingness" is solely determined by those situation characteristics sparking off the person's interest (Prenzel et al., 1986; Krapp 1992). Individual interest is described as a personality feature expressed as a long-term preference for a certain topic (Krapp, 1999). In contrast, situational interest is not person-related; it is caused by characteristic situational incentives. Presumingly, situational interest is sparked by the interestingness of the learning material, which in the short run leads to heightened attention, and thus to an improvement in knowledge gain and understanding (Krapp, 1992).

Specific characteristics of interest are its cognitive, emotional and value-related components. All objects of interest are represented cognitively. Persons interested in an object show a tendency to extend their knowledge and acquire complex and differentiated knowledge about the object of interest. This is also termed the epistemic interest component (Prenzel, 1988), and contains the emotional relation towards the object (Prenzel, 1988). An act based on interest evokes feelings such as joy, excitement or the notion of being completely absorbed in the subject matter (flow experi-

ence) (Krapp, 2002). Value-relation means that under identical circumstances, concerning oneself with the object of interest is preferred to other occupations.

According to Urhahne, Prenzel, von Davier, Senkbeil, & Bleschke (2000), learning psychology and motivational psychology provide good arguments for using simulation programs in science class. The learners' intrinsic motivation is expected to be enhanced by the high degree of freedom regarding self-direction of the learning process. During the learning process, the learners can set themselves independent learning targets, choose among various learning paths and satisfy their curiosity; thus, chances are that the students work with the simulation program intensively over a longer period of time.

Research Questions

Studies about learning with new media usually focus on the analysis of cognitive-psychological learning characteristics. Those characteristics are usually evaluated using quantitative methods of analysis. This study focuses on the cognitive-psychological and motivational-psychological perspective simultaneously. The high school students went through a computer-based lesson on the respiratory chain. The first study objective was to characterize student types according to their interests and their knowledge. Using a classifying test analysis (latent class analysis), the students were tested on whether or not they showed qualitative personal differences in their item answer profile concerning their knowledge and interests. The second study objective was to analyze the changes in cognitive learning success (knowledge gains) and motivational experience (changes of interest) induced by a computer-based simulation. The precise research questions were:

1. Are there particular student types distinguished by knowledge and interests?

2. To what extent do computer simulations change the students' knowledge and interests in complex biological topics?

Method

Participants

The data was collected at four schools in Schleswig-Holstein. The sample consisted of 167 high-school students (grade 11 – 13). 52.3 % of the group were female, 46.7 % were male. 40% of the students attended grade 11, 35 % attended grade 12 and 25 % attended grade 13. The students' average age was 17.

Method of Collecting Data

The data was collected in a pre-test/ post-test design with intermediate, computer-based intervention. Before working with the learning program, the pupils being tested had to fill out a questionnaire regarding knowledge and interests in the topic (pre-test). After working with the learning program, knowledge and interests induced by the learning program were tested (post-test). The method of collecting data will now be explained in further detail.

Pre-test. Subject-related interest: In order to evaluate subject-specific interest, a four-point scale (1: very low; 4: very high) with 14 items war used. (Cronbachs alpha:

.87). The items asked for the students' interest in learning something about the different aspects of the respiratory chain. Questions on subject-related interest were divided into two domains: questions in aspects of human biology (Abbrev.: HBA) and questions on biochemical aspects (Abbrev.: BCA).

Knowledge test: The knowledge test consisted of 10 questions and was designed to determine knowledge about the respiratory chain. Four of these questions asked for general knowledge about the respiratory chain, which is usually acquired at school (This group of knowledge questions is referred to as Know1). Three questions tested knowledge about cellular respiration on a general process description level, and the question wording contained technical terms (This group of questions will be referred to as Know2). The remaining three questions asked for knowledge on the structure, processes and function of the respiratory chain on a molecular level (Know3). There were four response options for each question, from which the right answer had to be chosen.

Post-test. Subject-related interest: For the post-test, the items concerning subject-related interest were the same as in the pre-test; however, they were worded differently. Now, the students were asked to mark how interesting they found different aspects of the subject. Again, a four-point scale (1: not interesting at all; 4: very interesting) was used (Cronbachs alpha : .88).

Knowledge Test: The questions on knowledge about the respiratory chain were the same as in the pre-test.

Test Procedure

The learning environment was tested during biology class. However, the students worked independently with notebooks; no communication or cooperation took place among the students. The computer-based learning session took two periods (90 min.) A short introduction was given, and the students were informed that the data would be analyzed anonymously. After that, the pre-test was handed out. The students were given 15 minutes to answer these items. After collection of the pre-tests, the tests persons started working with the simulation program. After 50 minutes, the program was closed and the post-test was handed out. Again, the students were given 15 minutes to answer the items. The remaining 10 minutes were used for organizational issues, e.g. the introduction, handing out and collecting the questionnaires.

Simulation Program

The learning environment was shaped by a computer program. The scientific content of the learning environment can be summarized as follows: In animal and plant cells, energy is mainly generated by the oxidative degradation of high-energy organic molecules such as sugars and fats. Under consumption of oxygen, the reactants (e.g. glucose) are converted to low-energy compounds such as carbon dioxide and water. This is called cellular respiration. Cellular respiration is a functional complex consisting of gycolysis, a citric acid cycle and a respiratory chain. The respiratory chain stores the energy derived from organic molecules as ATP, a compound crucial for the cell's energy supply. The respiratory chain is located in the mitochondria. Scientific focus of the simulation program is the respiratory chain. Glycolysis

and the citric acid cycle are defined only in the program introduction. The main part of the program deals with the mechanisms of the respiratory chain at the inner mitochondrial membrane.

The program starts with an introduction explaining the topic of the learning session. It consists of two pages of informative text and two flash movies on oxyhydrogen reactions and the successive steps of the electron transport chain. The introduction closes with a multiple choice question on the scientific content of the introduction. If a wrong answer is given, the learner goes back to the beginning of the introduction. If the question is answered correctly, the learner goes to the selection page, which contains three categories: Tasks, Adding Substances, and Solutions. The button "Adding substances" starts the actual simulation. The learner can arbitrarily spread a maximum of two substances on the intermembrane space and /or the mitochondrial membrane. When the test person clicks the button "Start Simulation" on the selection page, the respective process at the inner mitochondrial membrane is shown, depending on the choice made beforehand.

Evaluation Method

In order to identify student types according to interests and emerging knowledge structures, a latent class analysis was conducted for the knowledge questions and the items on subject-specific interest. This method will now be discussed in detail.

Classifying test evaluation: Latent class analysis. The Latent Class Analysis (LCA) is a probabilistic test model for latent variables or classes. Using this method, the test persons' answering patterns are analyzed, and the persons are classified accordingly. The method is therefore designed to detect qualitative person differences based on the item answer profile. The LCA aims to determine the probability with which a person belongs to a certain class when displaying a certain answering pattern. The item answers display maximal differences between the groups and minimal differences within one group. The resulting classes differ in their conditional probabilities to agree with or solve the items (Senkbeil, 2004).

The number of latent classes substantiated during the modeling process is based on theoretic considerations and is not estimated as a parameter. During the evaluation process, the first step during test evaluation is to calculate various models with different plausible class numbers. Then, after model validity evaluation and further theoretic consideration, the best-fitting model is chosen for further analyses (Rost 2004).

Evaluating model validity. During test evaluation, statements about the test persons are made based on a test model. Whether a calculated model fits the collected data, and thus generates valid statements, is tested using different methods of model validity evaluation. According to Rost (2004), model validity is tested on two levels, described by the BIC (Best Information Criterion) index and the CAIC (Consistent Akaikes Information Criterion) index. Using these indices, different models are compared regarding their conformance with the data. The smaller the index values, the better fitting the model. After statistical validation of the model conformance, content criteria should be the decisive factor for choosing a model. For further information, see von Davier (1997).

Results

In order to decide whether the total sample contained qualitative person differences concerning knowledge and interest, a latent class analysis was conducted. For this analysis to be effective, all items were encoded in a dichotomic answering format. The application of latent class analysis requires theoretic consideration to determine the number of classes, as well as evaluation of the respective model validities. The item content (knowledge and interest) suggested that test models with two to five classes be plausible.

During analysis, a the pupil's item answers from pre- and post-test were treated as independent answers. The data from pre- and post-test were combined in a shared matrix (n = 334). Calculating a model with this data matrix ensures the appearance of identical classes and the comparability of the test persons' item answer profiles in pre-test and post-test. Changes in the answering pattern are modeled by switching from one class to another. Such changes in the answering pattern are described by cross tabulation. Using the Winmira 2001 software (von Davier, 2001), two to five class models were calculated for this set of data, and their validity was evaluated. The modeling indices BIC and CAIC for each of the four calculated classifying test models are listed in table 1.

According the model validity indices, a four class model would be best-suited for grouping the pupils. Besides model validity indices, content also plays a role in choosing the final model. Therefore, the item profiles were also taken into account. The four class model shows more highly differentiated item profiles than the other models and was thus chosen for further analyses.

Table I

Evaluation of Model Validity for the Calculated Models with Latent Classes

	BIC	CAIC
Two latent classes	2112.05	2123.05
Three latent classes	2129.91	2152.91
Four latent classes	2103.83	2120.83
Five latent classes	2159.76	2188.76

Identification of Student Types

The item profile of the four latent classes (student types) is depicted in Figure 1. These types will now be described in further detail.

Class 1. This class contains 45.3 % of all test persons; therefore, it is the biggest class. For knowledge items, it displays solution probabilities which are close to guessing. The guessing probability is 25 %, as only one in four given answers was correct.

Test persons from class 1 answered only questions on Know1 with a probability higher than 35%. Questions on Know2 were solved correctly with a probability of 25

%. Questions on Know3 are not answered. Furthermore, test persons allocated to class 1 show a very high interest in HBA. The solution probability for these items is approx. 100 %. Persons in this class are also interested in BCA of the topic, but with 55%, the solution probability for this topic is considerably lower. As the interest in HBA is highly developed, the characteristics of this class can be summarized as "clueless – interested in human-related issues"

Class 2. This class contains 21.8 % of all test persons. These persons answered more than 75 % of all Know2 knowledge items correctly. Approx 50 % of the Know1 and 45 % of the Know3 questions are answered correctly. The subject-related interest is high for both HBA and BCA (100%). This group may be characterized as "experts – highly interested".

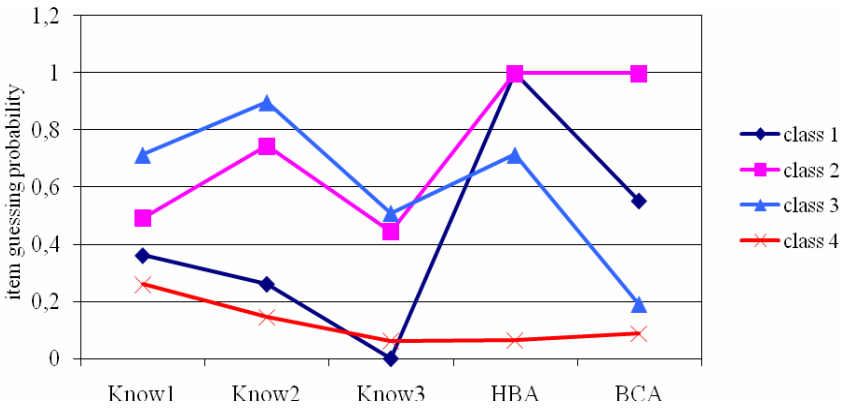

Fig. 1: Student types regarding interest and emerging knowledge structures

Class 3. This class contains 17.4 % of all test persons. The solution probability is approx. 90% for Know2 questions and approx. 70% for Know1 questions. More than 50% of the Know3 questions are answered correctly. Persons belonging to this group are highly interested in HBA. In contrast, their interest in BCA is low. The solution probability for items belonging to this subdomain was 20%. This group may be characterized as "experts – interested in human-related issues".

Class 4. This class contains 15 % of all test persons. Persons belonging to this group answered only 5 to 25% of all knowledge questions correctly. Furthermore, the solution probability for interest items (both HBA and BCA) was below 10 %. This group may be characterized as "clueless – not interested".

Switching Classes Between Pre- and Post-test

In order to detect changes in interest and knowledge structures, the number of students that switched classes was evaluated in the post-test. Data measuring knowledge and interest were collected before and after working with the learning software. The items concerning knowledge and interest were identical in pre- and post-test. As mentioned in paragraph 3, the first step was to generate a data matrix containing the pre- and post-test data. Changes in the answering profile of pre- and post-test were

illustrated using cross-tabulation. If persons are allocated to the same group in both tests, this means no change in knowledge or interest has taken place during the learning session. If a person switches classes, this means knowledge and/or interest were modified during the learning session. Table 2 shows changes in class allocation from pre- to post-test. The numbers in the table elements refer to the number of students.

Table II

Cross Tabulation of Class Allocation in Pre- and Post-test

		Post-test				
		Class 1	Class 2	Class 3	Class 4	Total
Pre-test	Class 1	28	59	21	1	109
	Class 2	1	12	4	-	17
	Class 3	2	-	6	-	8
	Class 4	2	4	12	15	33
	Total	33	75	43	16	167

Table 2 shows that 28 out of 109 persons in class 1 did not switch classes; 12 out of 17 persons in class 2 switch classes; 6 out of 8 in class 3; in class 4, 15 out of 33 persons did not switch classes between pre- and post-test. The greatest numbers of students switch from class 1 to another class, with class 4 as the runner-up. Next, the class shifts with the highest number of students will be discussed in further detail.

Switching from class 1 to class 2. According to their answering pattern, persons allocated to class 1 after the pretest have little knowledge about the respiratory chain. They show little interest in BCA, but high interest in HBA. The answer profiles of classes 1 and 2 differ in respect of the answers to the knowledge questions as well as the interest in BCA. If a person switches from class 1 to class 2, he or she likely answers the knowledge questions correctly and is also interested in HBA and BCA of the subject matter. 59 out of 109 persons (54.1 %) switched from class 1 to class 2.

Switching from class 1 to class 3. Both class 1 and class 3 consist of persons interested in HBA. Those test persons switching from class 1 to class 3 experienced substantial knowledge gains, but their interest in HBA slightly decreased in the post-test. 21 out of 109 persons (19.2%) switched from class 1 to class 3.

Switching from class 4 to class 3. Those persons belonging to class 4 and class 3 show very little interest in BCA. Class 3 shows wide knowledge in all fields, as well as high interest in HBA of the subject matter. Class 4, on the contrary, shows almost no knowledge of the subject matter and is not interested in it either. Switching from class 4 to class 3 signifies that those switching have acquired substantial knowledge during the learning session. At the same time, interest was sparked in human-related aspects. 12 out of 33 persons (36.3 %) switched from class 4 to class 3.

Recapitulation and Discussion of Results

The study objective was to identify different student types (classes) according to their knowledge and interests, and to analyze class shifts induced by a computer-based learning session. The authors are not aware of any other studies identifying student types with regard to knowledge and interest alike. Thus, the following discussion will be limited to the results obtained in this study. Following the order of the research questions, the results will now be summarized and discussed in detail.

Research question 1. Are there particular student types distinguished by knowledge and interests?

Using the probabilistic method of latent class analysis, four different student types were established. Comparing these four types with each other, the following similarities and differences become obvious:

Regarding knowledge items, class 3 and class 4 show a similar profile. For both classes, the solution probability for Know2 is higher than for Know1 and Know3. However, class 3 shows a higher overall solution probability than class 4. The answering formats of class 1 and 2 display similarities as well. Solution probabilities for Know3 items are low in both classes (0 to 5 %). The solution probability for Know2 items is slightly higher, but still below guessing probability (15 to 25 %).

Greater differences are displayed for interest items. Class 4 (not interested) and class 2 (highly interested) are antipoles. The item profile for class 1 and class 3 is similar; however, there is a difference in the solution probability of the items. The interest in HBA is answered with a probability exceeding 65 % for all classes, with exception of class 4. Looking at the interest in BCA, the picture is a different one: For class 4 and 2, the solution probability is almost zero; for class 1, it is 55%. The only group that is, besides HBA, highly interested in the biochemical aspects is class 2. Considering these results, one can say that this study reveals high interest in the human-biological aspects, but little interest in the biochemical aspects of this topic. This coincides with the results of various studies from the literature, although the evaluation procedure and the method of data collection were different for those studies. For example, Todt & Götz (1998) found that students show higher interest in "self-related", i.e. human-related applications. Finke (1998) found high interest in human-biological aspects as well. Other studies in different countries showed that interest in science classes, especially chemistry and physics, starts to decrease from grade 5 on (Hoffmann, Häußler & Lehrke 1998; Baumert & Köller, 1998; Hoffmann, 2002). The topic 'respiratory chain' is a metabolic/physiological subject, in which chemical and physical aspects play a key role. This might be the reason for the low interest in biochemical aspects found in this study.

Research question 2. To what extent do computer simulations change the students' knowledge and interest in complex biological topics?

In the probabilistic test model of latent class analysis, learning gains and increased interest are defined as switching to a latent class with higher knowledge and/or higher interest. In a similar fashion, regressive learning and decreasing interest can be detected. A third group, the stagnators, remain in their class from one

measuring time to the next. When applying these concepts to the class shifts, the results are the following:

Stagnators: Overall, 36.5 % (n= 61) of all test persons are classified as stagnators. These persons did not experience a change in knowledge or interest after the learning session. Taking a closer look at the classes, the following can be observed:

Persons in class 1 and 4 have one trait in common: they are 'clueless'. After the learning session, 28 persons from class 1 and 15 persons from class 4 did not switch classes, meaning these persons did not experience learning gains. After the learning session, a total of 43 persons were still considered clueless. An exception is 3 persons who basically cannot be allocated to the stagnators. Classes 4 and 1 do not display a noteworthy difference in knowledge levels and are therefore both considered clueless. As these 3 persons switched from class 4 to class 1, they are still considered clueless. Thus, 27 % (n = 46) of the test persons remain clueless after the learning session. The 18 stagnators from class 2 and 3 need to be treated differently, as they are already considered experts.

The interests of 15 persons (9 %) in class 4 did not change after the learning session. This means that after the learning session, they remained not interested in both aspects (HBA and BCA) of the subject matter. Looking at the stagnators from the remaining classes, 34 stagnators from class 1 and 3 remain interested in HBA after the learning session. 12 stagnators from class 2 remain highly interested in HBA and BCA after the learning session.

Learning gains and increase in interest: In this study, learning gains are only significant if class shifts in the following directions have taken place: from class 1 to class 2 or 3; from class 2 to class 3; from class 4 to class 2 or 3. 59.9 % (n = 100) of all participants have switched classes in the mentioned directions (n = 100).

One particular group displays a negative relation between knowledge and interest. 15 % of the test persons did gain knowledge, but their interest in the biochemical aspects and the human-related aspects of the topic decreased (class shift from class 1 and 2 to class 3). One explanation for this decrease in interest might be the conditions of the learning environment. The learning session was not interrupted by any breaks. In some cases, the students had already spent 4 – 5 hours in class before starting the learning session. These factors might have played a role in the decrease of interest. Another explanation might be that it is necessary for the learner to look into the chemical aspects of the topic. In this group, a low interest in chemistry might have been transferred to the biological aspects.

In this study, an increase in interest is only significant if class shifts in the following directions have taken place

a) From class 1, 3, or 4 to class 2; or

b) From class 4 to class 1, 2 or 3

(It should be noted that the test persons in both class 1 and class 3 are interested in HBA. Thus, switching between these two classes is not considered an increase in interest).

If a) applies, this means that after the learning session, the test persons showed high interest in both aspects of the topic. This applied to 37.7 % (n = 63) of all test persons. Thus, it was possible to increase the interest in BCA, although it was initially low.

If b) applies, this means that only the interest in the human-related issues of the topic could be sparked in the respective students. 18 persons from class 4, formerly considered 'not interested', were interested in HBA after the learning session. As the interest in human-related aspects was already present in all classes during the pretest (with the exception of class 4), these results are not considered disappointing.

Regressive learning and decrease in interest. As far as knowledge items are concerned, 3 persons displayed regressive learning: 1 person switched from class 1 to class 4, 2 persons switched from class 3 to class 1.

5 persons who were highly interested in BCA at the beginning, showed less interest at the end of the learning session (Class shift from class 2 to class 3 and 1). Furthermore, one person interested in HBA lost this interest at the end of the learning session (class shift from class 1 to class 4). In total, 6 persons experienced a decrease in interest. One possible explanation is that the test persons felt overchallenged or could not relate to the computer and the simulation program. The level of difficulty of this topic might play a role as well. The decrease in interest also suggests that the students have lost interest because of the complexity of this topic. It remains to be determined what caused these students to lose interest.

Summary

The results can be summarized as follows:

- After the learning session, 35.3 % of the group displayed improved knowledge structures as well as higher interest in BCA.

- Prior to the learning session, 10.1 % of the students already showed interest in BCA. After the learning session, another 37.7 % showed interest in BCA.

- Prior to the learning session, 80.2 % of the students showed interest in HBA. After the learning session, another 10.7 % showed interest in HBA.

- 59.9 % of the students improved their knowledge structures.

- 1.7 % of the students displayed regressive learning, 3 % displayed a decrease in interest.

As this study was based on a one-time intervention, the effects of computer-simulations designed for repeated use remain to be studied. To what extent the students' interest and knowledge changes with the repeated use of computer simulations on various topics might be subject to further inquiry. Another study objective would be to find whether other factors such as computer skills and competence, or the level of difficulty inherent to the subject, must also be taken into consideration.

References

Baumert, J., & Köller, O. (1998). Interest research in secondary level I: An overview. In L. Hoffmann, A. Krapp and K. A. Renninger (Eds.) *Interest and Learning. Proceedings of the Seeon Conference on Interest and Gender* (pp. 241-256). Kiel: IPN.

Blömeke, S. (2003). Lehren und Lernen mit neuen Medien Forschungsstand und Forschungsperspektiven. *Unterrichtswissenschaft, 31*(1), 57-82.

Breuer, K., & Kummer, R. (1990). Cognitive effects from process learning with computer-based simulations. *Computers in Human Behavior*, 6(1), 69 - 81.

de Jong, T., & van Joolingen, W.R. (1998). Scientific discovery learning with computer simulations of conceptual domains. *Review of Educational Research*, *68*(2), 179-201.

Finke, E. (1998): *Interesse an Humanbiologie und Umweltschutz in der Sekundarstufe I. Empirische Untersuchung zu altersbezogenen Veränderungen und Anregungsfaktoren*. Hamburg: Dr.Kovac.

Graf, D. (2005). Computer-multimedia. In. K.-H. Berck, *Biologiedidaktik Grundlagen und Methoden* (3nd ed.) (pp: 166-174). Wiebelsheim: Quelle und Meyer.

Hoffmann, L. (2002): Promoting girls' interest and achievment in physics classes for beginners. *Learning and Instruction*, 12 (4), 447-465.

Hoffmann, L., Häußler, P., & Lehrke, M. (1998). *Die IPN- Interessenstudie*. Kiel: IPN.

Krapp, A. (2002): Structural and dynamic aspects of interest development: theoretical considerations from an ontogenetic perspective. *Learning and Instruction*, 12 (4), 383-409.

Krapp, A. (1992). Das Interessenkonstrukt - Bestimmungsmerkmale der Interessenhandlung und des individuellen Interesses aus der Sicht einer Person-Gegenstands-Konzeption. In A. Krapp & M. Prenzel (Eds.). *Interesse, Lernen, Leistung. Neue Ansätze einer pädagogisch-pschologischen Interessenforschung* (pp. 297-329). Münster: Aschendorffsche Verlagsbuchhandlung GmbH & Co.

Krapp, A. (1998). Entwicklung und förderung von interessen im unterricht. *Psychologie in Erziehung und Unterricht*, *44*, 185-201.

Krapp, A. (1999). Interest, motivation and learning: An educational psychological perspective. *European Journal of Psychology of Education,* 14(1), 23-40.

Krapp, A. (2001). Interesse. In D. H. Rost (Eds.), *Handwörterbuch der pädagogische psychologie*. (2nd ed.), (pp. 286-294). Weinheim: Psychologie Verlagsunion, Verlagsgruppe Beltz.

Prechtl, H., Schenzer, M., Urhahne, D., & von Davier, M. (2000). Gestaltung und wirkung einer computergestützten lernumgebung zur neurobiologie. In H. Bayrhuber & Unterbruner, U. (Eds.). *Lehren & Lernen im Biologieunterricht* (pp. 238-249). Innsbruck: Studienverlag.

Prenzel, M., & Lankes, E. M. (1995). Anregungen aus der pädagogischen Interessenforschung. *Grundschule*, *27*(6), 12-13.

Prenzel, M. (1988). *Die wirkungsweise von interesse*. Opladen: Westdeutscher Verlag GmbH.

Prenzel, M., Krapp, A., & Schiefele, H. (1986). Grundzüge einer pädagogischen Interessentheorie. *Zeitschrift für Pädagogik*, *32*(2), 163-173.

Rost, J. (2004): *Lehrbuch Testtheorie, Testkonstruktion*. (2. Auflage) Bern: Huber

Schnotz, W., Böckheler, J., Grzondziel, H., Gärtner, I., & Wächter, M. (1998). Individuelles und kooperatives Lernen mit interaktiven animierten Bildern. *Zeitschrift für Pädagogische Psychologie, 12*(2/3), 135-145.

Senkbeil, M. (2004). *Typen der computernutzung*. Studienverlag: Innsbruck, Wien, München, Bozen.

Stähler, P. (2001). *Geschäftsmodelle in der digitalen Ökonomie: Merkmale,Strategien und Auswirkungen.* Josef Eule Verlag, Köln-Lohmar

Todt, E., & Götz, C. (1998): Interesse von Jugendlichen an der Gentechnologie. *Zeitschrift für Didaktik der Naturwissenschaften*, 4 (1), 3-11.

Urhahne; D. & Harms, U. (2006). Instruktionale unterstützung beim lernen mit computersimulationen. *Unterrichtswissenschaft*, *34*(4), 358-377.

Urhahne, D., Prenzel, M., von Davier, M., Senkbeil, M., & Bleschke, M. G. (2000). Computereinsatz im naturwissenschaftlichen Unterricht – Ein Überblick über die pädagogisch-psychologischen Grundlagen und ihre Anwendung. *Zeitschrift für die Didaktik der Naturwissenschaften, 6,* 157-186.

von Davier, M. (1997). Methoden zur prüfung probabilistischer Testmodelle. Kiel: IPN Schriftenreihe.

von Davier, M. (2001): *Winmira 2001*. Kiel: CD-ROM.

Simulasyonla Ögrenmede Bilgileri ve Konuya İlgilerine Göre Öğrenci Tiplerinin Belirlenmesi (Özet)

Problem Durumu: Bilgisayar ve bilgisayara dayalı teknolojilerin (yeni teknolojiler) yaşantımızdaki öneminin artışına paralel olarak, bu teknolojilerin çeşitli öğretim etkinliklerinde kullanılması da yaygınlaşmıştır. Yeni teknolojiler resim, grafik, ses, animasyon, benzetim gibi çeşitli ögelerle birden çok duyu organına hitap etme, etkileşimli öğrenme imkanı, farklı öğrenci özelliklerine uygun öğretim materyalleri tasarlanması gibi çeşitli olanaklar sunmaktadır. Özellikle çok sayıda karmaşık fenomen ve sürecin aktarılmasının gerekli olduğu fen derslerinde yeni teknolojilerin kullanılması artık kaçınılmaz olmuştur. Yeni teknolojilerin eğitim- öğretim sürecinde kullanılmasının yaygınlaşması ile birlikte bu teknolojilerin kullanma şartları, etkililiği, öğrenci özellikleri ile etkileşimi, öğretmen ve öğrencilerin yeterlik, bilgi ve tutumu gibi konuları araştıran çok sayıda proje yapılmış ve yapılmaya devam etmektedir. Literatür incelendiğinde yapılan araştırmalarda daha çok bilgi kazanma, bilgi transferi, öğrenme stilleri gibi bilişsel boyutların incelendiği; tutum, ilgi, motivasyon gibi duyuşsal boyutları konu alan araştırmaların ise daha az yapıldığı dikkati çekmektedir. Bu nedenle bu araştırmada bilişsel ve duyuşsal özellikler bir arada ele alınarak incelenmiştir. Bilişsel özellik olarak bilgi kazanımı ve duyuşsal özellik olarak konuya ilgi incelenmiştir.

Amaç: Araştırmanın birinci amacı bilgilerine ve konuya ilgilerine göre birbirinden anlamlı farklılık gösteren öğrenci tiplerini ve bu tiplerin özelliklerini tespit etmektir. İkinci amacı ise karmaşık ve dinamik bir biyoloji konusunun bilgisayar simulasyonu ile aktarılmasının öğrencilerin bilgi düzeylerine ve konuya ilgilerine etkisini yani öğrenci tiplerindeki değişimi incelemektir.

Yöntem: Araştırma ön test, son test deseninde deneysel bir çalışmadır. Araştırmanın verileri Almanya'nın Schleswig Holstein eyaletinde tesadüfi olarak seçilen dört farklı liseden 167 öğrenciden toplanmıştır. Verilerin toplanmasında hem ön test hem de son testte uygulanmak üzere geliştirilen 10 soruluk bilgi testi ve 14 soruluk ilgi ölçeği kullanılmıştır.

Bilgi testi zorluk derecesine göre üç grup sorudan oluşmaktadır. Cevaplar çoktan seçmeli dört seçenekten oluşmaktadır. İlgi testi ise konunun insan biyolojisi ve biyokimyasal boyutları olmak üzere iki alt gruptan ve 4'lü likert tipinde maddelerden oluşmaktadır.

Her iki test arasındaki oturumda, öğrenciler konuyu simulasyon programı ile bireysel olarak öğrenmişlerdir. Kullanılan program, solunum konusu hakkında genel bilgiler verildikten sonra mitokondri iç membranında oksidatif fosforilizasyon olayını detaylı olarak anlatmaktadır. Konu hakkındaki bilgiler metin, resim ve animasyonlar yardımıyla verildikten sonra öğrenciler sürecin işleyişini ve neden sonuç ilişkilerini simulasyonlar yardımıyla irdeleme ve gözleme imkanı bulmuşlardır.

Bilgi ve konuya ilgileri bakımından birbirinden niteliksel olarak anlamlı farklılık gösteren grupların olup olmadığı Winmira 2001 programı ile gizli sınıf analizi (LCA= latent class analysis) yapılarak tespit edilmişir. Bu yöntemde bireyler cevap verme davranışlarına göre ayrılır ve her bireyin cevap profiline göre hangi olasılıkla hangi sınıfa dahil olduğu tespit edilir. Analizin yapılabilmesi için öncelikle teorik olarak kaç farklı tip (sınıf) olabileceginin belirlenmesi gerekir. Ancak analiz sadece teorik olarak tespit edilen sınıf sayısı için yapılmamalıdır. 2'li sınıftan başlayarak (en az) teorik olarak tespit edilen aralık için modeller oluşturulur. LCA test edilen her bir modelin verilerle uyum iyiliği indislerini verdiğinden, en uygun modelin seçiminde hem uyum iyiliği değerleri hem de sınıfların yorumlanabilir olması göz önünde bulundurulur.

Verilerin analizinde tiplerin tespiti için, ön test ve son testten elde edilen tüm veriler - sanki farklı deneklerden toplanmış gibi - tek bir veri matrisinde birleştirilmiştir (n=334). Böylelikle hem ön hem de son testte aynı tiplerin elde edilmesi ve ön test ve son test arasında öğrencilerin tiplerindeki değişimin belirlenmesi sağlanmıştır.

Bulgular: Yapılan analiz sonucunda 4 sınıftan oluşan modelin hem uyum iyiliği hem de yorumlanabilir olması bakımından en uygun model olduğu görülmüştür. Yani bilgi ve konuya ilgi bakımından dört farklı öğrenci tipi tespit edilmiştir. Tiplerin özellikleri şöyle özetlenebilir:

I. Tip, örneklemin % 45,3'ünü oluşturmaktadır. Bu gruba giren öğrenciler zorluk derecesine göre üç gruba ayrılan bilgi testinin her üç grubunu da ya şans başarısına yakın veya şans başarısı altında bir olasılıkla doğru cevaplandırabilmiştir. Bu öğrenciler insan biyolojisi ile ilgili konulara çok fazla ilgi duymalarına karşın konunun biyokimyasal boyutlarına daha az ilgi duymaktadır.

II. Tip, örneklemin 21,8'ini oluşturmaktadır. Bu öğrenciler, üç farklı grupta toplanan bilgi sorularını % 75, % 50 ve % 45 olasılıkla doğru cevaplandırabilmiştir. Bunlar ayrıca konunun hem insan biyolojisi hem de biyokimyasal boyutlarına karşı çok fazla ilgi duymaktadır.

III. Tip, örneklemin 17,4'ünü oluşturmaktadır. Bu öğrenciler, bilgi sorularını % 90, % 70 ve 50 olasılıkla doğru cevaplandırabilmişlerdir. Bunlar konunun insan biyolojisi ile il-

gili yönlerine çok fazla ilgi duymalarına rağmen biyokimyasal yönlerine daha az ilgi duymaktadır.

IV. Tip, örneklemin % 15'ini oluşturmaktadır. Bu sınıfta yer alan öğrenciler bilgi testininin her üç grupta yer alan sorularını şans başarısının altında bir olasılıkla doğru cevaplandırabilmişlerdir. Bunlar ayrıca konunun her iki boyutuna da ilgi duymamaktadır.

Simulasyon programı ile öğrenme oturumu sonrasında öğrencilerin bilgi ve konuya ilgilerindeki değişme her bir öğrencinin ön testte ve son testte hangi sınıfa ait olduğu incelenerek yani oturum sonrasındaki sınıf değişimi ile tespit edilmiştir. Öğrencilerin % 59,9'u simulasyonla öğrenme oturumu sonunda daha çok bilgiye sahip olan bir sınıfa geçmiştir. Ön testte öğrencilerin sadece % 10,1'inde tespit edilen biyokimyasal konulara ilgi oturum sonrasinda % 47,8'lik bir grupta tespit edilmiştir. Oturum öncesinde öğrencilerin % 80'inde tespit edilen insan biyolojisine ilgi ise oturum sonrasında % 90,7'ye yükselmiştir.

Tartışma: Kullanılan simulasyon programı öğrencilerin bilgilerinde ve konuya ilgilerinde olumlu değişikliklere sebep olmuştur. Ancak bu durum yorumlanırken sonuçların bir defalık bir oturum sonrasında elde edilmiş olması göz ardı edilmemelidir. Bu nedenle farklı konuların anlatıldığı simulasyon programlarının geliştirilmesi ve uygulanması, tespit edilen tiplerin ve tip değişimlerinin uzun vadede ne şekilde gerçekleşeceğinin açıklanması gerekmektedir.

Anahtar sözcükler: Öğrenci tipleri, simulasyon, solunum, bilgi kazanımı, ilgi, gizli sınıf analizi

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An Investigation of the Components Affecting Knowledge Construction Processes of Students with Differing Mathematical Power

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Abstract

Problem Statement: The acquisition of certain mathematical skills is part of many curricula around the world. These skills involve problem-solving, effective use of mathematics in daily life, thinking logically and systematically, taking risks and making decisions. The US National Council of Teachers of Mathematics ([NCTM], 1991) relates these skills to mathematical power. Knowledge construction and abstraction might have an impact on mathematical power. In this paper, the primary concern is with the construction of new knowledge structures rather than with consolidation or abstraction for that matter. Recognizing, Building-with, and Constructing (RBC hereafter) theory of abstraction provides a particularly useful framework in achieving a detailed examination of the new mathematical constructions through epistemic actions. Therefore, this paper, with reference to the RBC epistemic actions, examines the knowledge construction process of students with different mathematical power.

Purpose of Study: The purpose of the study is to explain the similarities and differences between the knowledge construction processes of 6th grade students with different mathematical power.

Methods: A case study was used as the main research approach. The mathematical power scale was applied to 282 students. The case study was conducted with four students who were chosen purposefully among them. The RBC theory of abstraction was used as an analytical tool. The patterns noticed in the case study were determined and interpreted.

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Findings and Results: According to findings, it was seen that the students with low mathematical power, whose knowledge constructing processes were examined, could recognize structures while they could not building-with and constructing. When observing that the students with low mathematical power have low communication, connection and reasoning skills, in general, it can be said that for building-with and constructing, it is important to have these three skills. The students who reflected themselves and used the feedback to continue had high mathematical power. They also were able to construct mathematical knowledge more quickly.

Conclusions and Recommendations: The RBC theory of abstraction can be useful in explaining the relationship between the components of mathematical power and other mental activities. For this purpose, the usage of the RBC theory of abstraction in the mathematical knowledge construction process in the classroom can be proposed as a new study.

Keywords: Knowledge construction, mathematical thinking, mathematical power, abstraction

The acquisition of certain mathematical skills is part of many curricula around the world; these skills involve problem-solving, effective use of mathematics in daily life, thinking logically and systematically, taking risks and making decisions. The US National Council of Teachers of Mathematics ([NCTM], 1991) relates these skills to mathematical power, which is described as follows:

Mathematical power includes the ability to explore, conjecture, and reason logically; to solve non-routine problems; to communicate about and through mathematics; and to connect ideas within mathematics and between mathematics and other intellectual activity. Mathematical power also involves the development of personal self-confidence and a disposition to seek, valuate, and make decisions. Students' flexibility, perseverance, interest, curiosity, and inventiveness also affect the realization of mathematical power. (p. 1)

Mathematical power is a process for which students themselves are responsible for the formation of their own understandings in mathematics (Sid, 1998). One dimension of mathematical power is related to students' abilities to achieve mathematical thinking and produce solutions independent of teachers (Greenwood, 1993). On the basis of these views, mathematically powerful students are expected to have acquired certain cognitive and affective skills as well as use these skills when needed without depending on the teachers. Reasoning, communication, and connection, which are some components of mathematical power, take place in the mathematics curriculum in Turkey (Ministry of Education [MEB], 2005, 2006). Because of this, there have appeared several research attempts in Turkey on mathematical power and its importance (Bukova & Alkan, 2003; Yeşildere, 2006). By examining the educational policies of various nations, it has been pointed out that one of the main aims in mathematics education is developing mathematical power (Işık, Albayrak, & İpek, 2005).

Knowledge construction and abstraction might have an impact on mathematical power. Abstraction is an important issue attended to by many including figures ranging from Aristotle to Russell. Today, there are various theories that interpret abstraction from different perspectives (i.e. Sfard, 1991; Tall, 1991). One of these theories comes from Hershkowitz, Schwarz and Dreyfus (2001), who propose a model to investigate the formation of mathematical abstraction through nested epistemic actions, namely, Recognizing, Building-with, and Constructing (RBC). The RBC theory of abstraction has departed from certain socio-cultural and epistemological principles. These principles are based on Davydov's (1990) philosophy of knowledge construction and Leont'ev's (1981) activity theory. By adopting the activity theory, Hershkowitz et al. (ibid) draws attention to the effects of physical, symbolic, and semiotic tools on the construction of mathematical knowledge. The authors argue and exemplify that the abstraction process is dependent on the students' personal histories as learners of mathematics as well as on the socio-cultural and physical conditions of the environment in which the activity takes place (see also Ozmantar and Monaghan, 2007, 2008). These authors describe abstraction as an activity of vertically reorganizing previously constructed mathematical structures into new ones.

According to the RBC theory, abstraction is composed of three epistemic actions. Epistemic actions are the actions that are related to the construction and use of knowledge. These actions are recognizing, building-with, and constructing. Recognizing occurs when a learner realizes a structure, which is previously abstracted, inherent in a given mathematical situation. Familiarity of mathematical construction increases when this construction is realized in an area where an encountered mathematical construction is realized (Hershkowitz et al., 2001). The term "construction" is used in a generic sense and could mean the concepts, methods and/or strategies which come into being as a result of a mathematical activity (Tsamir & Dreyfus, 2005; Ozmantar & Monaghan, 2007). Recognizing can occur in a mathematical activity when students need to explain the results of previous activities and notice (Schwarz, Dreyfus, Hadas, & Hershkowitz, 2004). The moment of recognition is not the first time that a structure enters the mind of a student and the act of recognition is often related to empirical thought (Hershkowitz et al., 2001).

Building-with actions occur when the formerly constructed mathematical structures are used to fulfill a goal (Schwarz et al., 2004); it also means combining knowledge artifacts in producing new ones (Bikner-Ahsbahs, 2004). Building-with actions do not enrich one with new and more complex structural knowledge; he/she uses his/her existing structural knowledge to achieve a solution. Building-with generally occurs during problem-solving while giving explanations, making reflections and carrying out procedures to handle the mathematical problem. In order to fulfill the aim, students can benefit from the help of strategies, rules or theorems. Students use previous constructions that they have noticed to achieve the goal.

Constructing contains "processes of restructuring and reorganizing what is recognized, and known to construct new meanings" (Bikner-Ahsbahs, 2004, p. 120). Constructing actions are at the core of the RBC abstraction theory. So, abstraction cannot be claimed to take place if this epistemic action does not occur. The three epistemic actions are not linearly ordered; on the contrary, they are dynamically nested:

constructing includes the building-with and recognizing actions and building-with includes recognizing actions. In other words, while recognizing is nested within the other two epistemic actions, building-with is nested within constructing actions. The constructing and building-with actions might occur alternately when students are solving a mathematical problem.

Constructing, building-with, and recognizing epistemic actions have a significant role in the occurrence of the abstraction process. During the abstraction process, the student recognizes the mathematical construction of his/her past learning and he/she rearranges these to achieve a new construction in order to fulfill the need that has arisen during the activity. Abstraction can only occur if students achieve the construction of a new mathematical structure unknown to the student (Dreyfus, Hershkowitz & Schwarz, 2001).

Monaghan and Ozmantar (2006), on the basis of empirical evidence, refined the RBC theory and their findings effectively suggest that abstraction involves the construction and consolidation of mathematical structures. Monaghan and Ozmantar argue that newly constructed structures are fragile entities and in need of consolidation. Both of the studies of Monaghan and Ozmantar (2006) and Tsamir and Dreyfus (2005) provide evidence that during the consolidation process, there occurs an increase in students' familiarity with the new constructions which are also used flexibly and confidently by the students. Hence, the process of consolidation is particularly important for a newly constructed knowledge structure to be used in further activities.

In this paper, the primary concern is with the construction of new knowledge structures rather than with consolidation or abstraction. The RBC theory of abstraction provides a particularly useful framework to achieve a detailed examination of the new mathematical constructions through epistemic actions. These epistemic actions also provide an analytical tool in making the knowledge construction process observable. Hence, this paper, with reference to RBC epistemic actions, aims to examine the knowledge construction process of students with different mathematical power.

Purpose of the Study

The purpose of the study is to explain the similarities and differences between the knowledge construction processes of 6th grade students who have different mathematical power. The aim of the research is not to reach a generalization related to the thought process of the students. Rather, its aim is to deeply investigate and interpret the components constructed during the process.

Methods

Research Design

Since the aim is to understand students' knowledge construction processes in their context, a case study is used as the main research approach. The use of theory in

performing case studies is an immense aid in defining the appropriate research design and data collection (Yin, 1994). In the research, the RBC theory is used as an analytical tool to interpret data.

Sample

Participants of mathematical power scale. The population of mathematical power scale is 200 elementary schools which are located at the center of İzmir. Twenty elementary schools have been chosen with probability-based sampling methods. The sample is composed of 282 sixth grade students.

Participants in the case study. In the case study, a multiple-case design is used. "Any use of multiple-case designs should follow a replication; not a sampling, logic, and an investigator must choose each case carefully" (Yin, 1994, p.51). Therefore, participants of the case study have been chosen purposefully from the sample of mathematical power scale. Extreme case sampling, which is situated in purposeful sampling, is used while choosing. According to Yıldırım and Şimşek (2000), extreme cases can bring up more data compared to other cases and can help in understanding research problems deeply and from multiple dimensions. For this reason, the case study is carried out with four students, two of whose mathematical power is high and two of whose mathematical power is low in the population.

Research Instruments

Mathematical power scale. One of the most important studies on the measurement of mathematical power is the project that was carried out by the National Center for Educational Statistics (National Center for Educational Statistics [NCES], 2003). In order to determine students' mathematical power, this framework is used. The mathematical power scale is composed of 25 multiple choice questions and 10 open ended problems (for the scale see Yeşildere, 2006).

The problem of case study. In the case study, data is collected by using the following problem: "Is it possible to find a point inside a triangle which supplies the condition that the sum of the distance from the point to the corners is longer than the perimeter of the triangle?"

Students' problem-solving and knowledge construction processes are investigated with this problem. Students are not expected to make mathematical proof. They are expected to investigate whether there is a point that provides the condition in the problem or not, by reasoning, interpreting, and conjecturing. Students are familiar with the mathematical knowledge needed to construct a new structure.

Validity and Reliability

The validity and reliability of research instruments. The reliability of the multiple choice questions in the mathematical power scale is found as .91 (Cronbach α) as a result of a pilot study carried with 482 students. The validity and the reliability of open-ended problems in the mathematical power scale are provided with peer debriefing and pilot study. The pilot study was conducted to see whether problems were appropriate to the aim of the study or not. The method was that first, students were asked to solve problems in two hours. Later, an interview was conducted with each student in which they were requested to interpret the problem in their own

words, asked whether there were obstacles which meant they did not understand the problem, and then asked how they solved the problem. Of the 15 problems utilized, according to the findings of pilot study, five problems which were not able to at least come to a realization of one of the abilities of reasoning, connection and communication were removed.

The validity and the reliability of the case study problems were established with peer debriefing and a pilot study. According to debriefing, the problem was considered suitable to investigate students' knowledge construction process. The pilot study was conducted with six students. The pilot study consisted of two dimensions; firstly to determine whether the students had difficulty understanding the problem. The other dimension was to determine whether the problems achieved the aim of revealing students' knowledge construction process. The findings of the pilot study showed that the problem was effective for the observation.

The validity and the reliability of the analyses of case study. In order to increase construct validity of case studies, multiple sources of evidence could be used (Yin, 1994). Campbell and Fiske (1959) have stated that triangulation is a strong way to provide reliability in qualitative researches (cited in Cohen, Manion, & Morrison, 2002). Therefore, in the case studies, method triangulation is used by using participant observation and interviews.

Yin (1994) states that using multiple-case analyzes in case studies increases the external validity. In the research, multiple-case analysis is used by observing students' knowledge construction process with the students, two of whose mathematical power is low and two of whose mathematical power is high.

The coherence of the case study can be proved with the databases which are composed of reports written with consideration of the research data (Yin, 1994). Four students' cases were analyzed with crosscase analysis and case study notes were used to compose the database. Different reports are prepared for each. The database is composed from the original of each discussion and researcher's reports. Students' knowledge construction processes can be followed with interview transcripts in this paper.

Conformability in the case study can be provided with the construction of a "chain of evidence" (Yin, 1994). In the research, some patterns are brought up by investigating the process of knowledge construction of students who have different mathematical power. During investigations, interview and participant observation notes are used as evidence. Depending upon these patterns, the idea that is reached institutionally is supported by referring to interview transcripts; therefore, an evidence chain is composed. As the restrictions of this article prevent a presentation of all four cases, two of the events which have been randomly chosen are presented with cross-case analysis. Negative case analysis has been practiced for the other two cases. It has been determined that the obtained findings are also valid for these cases.

Procedure

The mathematical power scale has been applied to 282 students. The case study was conducted with four students who were chosen purposefully among them. At the case studies, the researcher played impartial role.

Data Analyses

Concerning the research, the written report of multiple case studies was used. The students' knowledge construction processes were investigated with recognizing, building-with, and constructing epistemic actions. The patterns which were noticed from the case study are determined and interpreted.

Findings and Results

Students' mathematical power, according to their performance in open-ended problems and multiple choice questions, are showed in Table 1. Low is shortened to L; mediocre is shortened to M, and high is shortened to H. The first letter in the table shows the performance in open ended problems; the second letter shows the performance in multiple choice questions.

Table I

Students' Mathematical Power

	High (H)			Mediocre (M)			Low (L)			
	H-H	H-M	M-H	M-M	L-H	H-L	L-L	L-M	M-L	Total
f	7	3	15	7	92	0	108	49	1	282
%	3	1	5	3	33	0	38	17	0	100

It can be seen that 9% of students' mathematical power is high, 36% of them is mediocre, and 55% of them is low.

The case study was conducted with four students. Two of the cases that the researcher (R) conducted with four 6th grade class students are presented in this paper. Şule (Ş) is one of these students who had high performance and Cihan (C) is another that had low performance in the mathematical power scale. Students' knowledge construction processes are investigated with the titles *recognizing, building-with* and *constructing*.

Recognizing

Şule had been able to explain the knowledge that was needed to solve the problem and she had been able to visualize the problem (1-19).

19R: Can you estimate the answer to the problem?

20Ş: I think the sum of the distances from point to corners isn't bigger than perimeter.

21R: Why not?

22Ş: Because… the sum of the distances… Because triangle's perimeter is bigger. (*asks to herself*) How can I explain?

23R: Maybe you could find such a point that the total distance of points to corners is bigger than perimeter?

24Ş: I guess, no. Because even if we start at the bottom, there is a distance as long as edge of triangle.

Şule was asked to estimate the answer of the problem (19R) because her use of prior knowledge was investigated. Also, there was an attempt to observe whether her estimate was based on any existing knowledge structure or not. While Şule was asked to explain and visualize the problem at the beginning of the interview, she tried to find such a point on her drawing. During this process, Şule might come upon an idea about the answer in her mind. She explained her guess about the question on the basis of a reason (24Ş). The triangle constructed by Şule is shown in Figure 1.

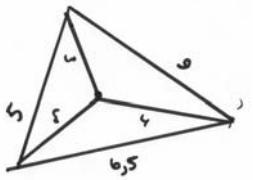

Figure 1. Triangle constructed by Şule

Şule started to solve the problem with drawing a triangle.

34Ş: I'll draw scalene triangle.

35R: Why?

36Ş: Because it has different lengths of edges. It might be…Let me construct a very big one.

37R: Why "a big one"?

38Ş: I don't know; maybe it would be true.

Şule showed that she was aware of the stages she went through; she understood the problem and recognized some of the fundamental knowledge that she needed in order solve the problem (18Ş). Her explanation of the knowledge needed to solve the problem (18) and her explanation of the features of the scalene triangle were proof that Şule recognized knowledge structures which would help her solve the problem. Şule, during the process, realized that she should recognize other knowledge such as finding the perimeter of the triangle and the location of the inside of the triangle.

Cihan, another student who solved the problem started in a different way. The way that Cihan considered the problem is as follows:

1C: Firstly, let me draw it. It says 'inside of a triangle.' *(repeats)* Inside of a triangle… (*draws a triangle; marks the angles as corner).* (*reads the question loudly*) No.

2R: What is needed in the problem?

3C: We draw a triangle. Inside of a triangle… these are the corners of the triangle (*shows the angles of the triangle*).

4R: Can you choose a point in your triangle and show me again?

5C: For example let's take this point (*chooses a point on the angle*). The distance of one another… *(shows the distances of two angles).*

6R: Can you construct the distance?

7C: (*draws*) like this?

8R: I want you to draw what is requested.

9C: The distance of this corner to this corner is that. It says the sum of the distances... The distance of this to this, and the distance of this to this (*takes each point on all angles and combines them; a small triangle is constructed*). Now a new triangle is constructed; the problem asks if this triangle is bigger than the one outside. It is not bigger; as it is inside of the triangle.

In Cihan's case, it was observed that angle and corner had been incorrectly constructed before (1C, 3C). Cihan couldn't show the corner on the triangle correctly. Moreover; he confused it with the angle (3C, 9C). The triangle constructed by Cihan is given in Figure 2.

Figure 2. Triangle constructed by Cihan

10R: Did you draw correctly?

11C: Yes.

12R: Can you show me the corners of the triangle?

13C: Upper corner, right bottom corner *(again shows the angles as corners)*

14R: You are asked the sum of the distances to the corners in the problem.

15C: Yes, here the total of distances is not bigger than outside triangle. In other words, he says inside of the triangle, he says the sum of the distances of the triangle to its corners. We can go corners through the inner area of the triangle.

16R: Is your construct correct?

17C: Yes.

18R: Could you take another point?

19C: Yes.

20R: For example?

21C: From inside of the triangle.

22R: Yes…

23C: Where is its location when it is stated 'inside of the triangle?'... *(seems confused)* It can go from inside of the triangle to the corners. Its sum is asked; but I cannot understand, is it going to through the middle of the triangle?

It was observed that one of the facts that Cihan couldn't be sure of its correctness is the inside of the triangle. He thought that he merely could choose a point on the corner (21C). Cihan was talking about the inside of the triangle as the area remaining in the triangle. But; he was undecided whether he could choose a point in any place in the inner area (23C). Since the prior knowledge structures were incorrectly constructed, he might not be able to recognize it; instead, he might recognize the constructions that are wrongly constructed. The reason why Cihan was not able to recognize the needed knowledge structures might be because the knowledge had been constructed incorrectly; but also it might be because of unobserved other factors. But it was seen that incorrectly constructed knowledge also takes a role in the process of constructing the new knowledge.

Building-with

Şule recognized some of the fundamental knowledge that she needed in order solve the problem (18Ş). She visualized the problem and estimated the solution (16Ş). It was observed that during this process she, in her mind, had constructed the triangle which would take her to the solution (34Ş). Although it is not known what it is yet, Şule's choose of triangles depending on a mathematical idea supports this point of view (34Ş, 36Ş).

38Ş: *(constructs a triangle).* Let me take a point on this side *(chooses a point close to one of the corners).*

39R: Why did you choose that point?

40Ş: I'm trying to make the sum bigger than the perimeter of the triangle. *(draws the lines from point to corners)* Its perimeter is 30. The sum of the distances is not bigger again.

41R: What if you had chosen another point?

42Ş: I would have chosen close to the center.

Şule chose different points inside of the triangle. She chose the first point, which was far away from two corners, and close to a corner. She had the other which distance was nearly equal to the corners. Şule's choice of points is seen in Figure 3.

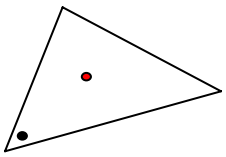

Figure 3. Şule's choices of points

Şule estimated the solution of the problem and she was questioning the accuracy of her estimation. She was choosing the points thinking the place where the sum of the distance to the corners was the most. Şule kept on her studying by calculating the sum of the distances from the point where she chose from the middle to the corners, and perimeter of the triangle.

46Ş: (*Calculates*) …Again the sum of the distances is less than the perimeter.

47A: Is it bigger or smaller than your previous trial?

48Ş: Smaller because I have chosen it from the corner.

49A: Which point you should choose to find bigger value?

50Ş: …Points closer to the corners.

51A: Will you try?

52Ş: (*chooses a point closer to the corner*) … we get 20, which is still less than 30-perimeter-.

53A: Is it possible to find out another result if you study with a different triangle?

54Ş: I don't think so. .

Şule seemed to be sure about her estimation, but suddenly she wanted to draw another triangle.

55Ş: Let me draw a smaller triangle

56A: Why?

57Ş: In my previous trials, I drew a bigger one and the sum was less than its perimeter. The result may change if I study with a small triangle. But I'd like to draw equilateral triangle this time *(drawing)*

58A: Why?

59Ş: Due to its being equilateral, the sum can be bigger.

60A: Do you expect it?

61Ş: Actually not…but I'll do. (*only cares about the distances to the far edges.)* It is smaller again.

Şule's construction of a triangle (38Ş) and her trials to compute its perimeter (40Ş) showed that she was reorganizing the available information so she effectively dealt with the problem at hand. Building-with epistemic action occured when she compared the measurements she did and interpreted from where to get a point to have a bigger length than perimeter (46Ş–54Ş).

Constructing

Although Şule thought that the accuracy of her estimation in the new triangle wouldn't change, she was willing to study on new trials with new points. During these trials, construction was figured out in her mind:

71Ş: My decision: the sum of the points to the corners cannot be bigger than the perimeter.

Şule re-told her steps of the solution of the problem she had (72Ş–83Ş). After that, her conclusion was questioned to understand her thoughts on its validity.

84A: Would the result be changed if the triangle was isosceles, scalene or equilateral?

85Ş: I don't think so.

86A: Why?

87Ş: Since no matter where to choose the point, the sum of the distance from the point to the corners is never been longer than the perimeter of the triangle. In one case, I chose from the farthest point in case it will change due to the distance gets bigger, but then there is one edge left, which keeps the outcome same.

88A: What if the triangle was obtuse or acute?

89Ş: It wouldn't change

90A: Why?

91Ş: Because whatever I choose will give the same results. Let me do one more *(draws one obtuse angled triangle)*

It was observed that Şule constructed similar triangles and worked on it, not to be surer of her answer, but to convince others (92Ş–104Ş).

104A: Why did you need to construct a new triangle when I asked the question if the result will be changed due to the type of the triangle?

105Ş: I wanted to explain it certainly.

It could be said that the research became more critical after some time (55Ş) as the construction epistemic action becomes more significant. Şule questioned the correctness of her estimation by choosing various triangles and points and constructed a structure about the solution of the problem (71Ş).

Cihan constructed a new incorrect structure, since he recognized his previously wrong constructed knowledge. Recognizing is crucial for building-with and constructing. For this reason, Cihan continued to solve the problem in an incorrect manner and he didn't manage to construct accurate construction.

One of the important situations confronted during constructing was the construction of unexpected structures. Şule's case could be an example for it:

8Ş: (*calculates*) When I add the length of distances, it's not bigger than its perimeter.

9A: Could you draw a conclusion with one trial?

10Ş: (*thinking*) I cannot. Let me draw more.

Şule investigated whether there was a point inside of a triangle which supplies the condition that the sum of the distance from the point to the corners is longer than

the perimeter of the triangle (6Ş). However, she constructed a new structure which was one sample and was not enough to draw a conclusion (10Ş). Even though it wasn't aimed to construct such a structure, it was a structure constructed during the problem-solving process. This could be interpreted as a construction that could emerge in unexpected ways.

Conclusions and Recommendations

In this part, the data obtained from the investigation of students' knowledge construction processes is discussed. Here, the aim is not to arrive at a conclusion concerning the relationship between mathematical power and knowledge construction, but to interpret the data obtained from the research.

There are three crucial skills in mathematical power: connecting, reasoning and communication. Students were insufficient at the open-ended problems in the mathematical power scale in which connections between ideas were needed. It was also seen that in the case studies, the students whose mathematical power were low had problems in connecting ideas (23C). Being able to use existing mathematical knowledge to construct new mathematical structure is one of the expectations from mathematically powerful students. But, in order to realize this, prior knowledge structures must be well-constructed before. As in the case of Cihan, his inaccurate construction of angles and corners hindered him in solving the problem. It should be realized that how existing constructed knowledge could contribute to the further acquisition of knowledge and the appropriate knowledge construction should be *recognized*. In order to construct the connections between knowledge, they should be *built-with*. As a result of building-with appropriate knowledge in connections, the occurrence of a new knowledge structure would be achieved.

In solving the open-ended problems in the mathematical power scale, the explanations of a great majority of the students were found to be inaccurate. One of the reasons for this deficiency is likely to be due to their incorrect understanding of the problem resulting in the use of incorrect reasoning. Similar situations existed in the case studies. From the mathematical power perspective, reasoning necessitates logical deduction with the evaluation of the data in hand. In the reasoning process, the students are required to make their thinking valid. At this point, whether the reasoning plays an important role or not in the realization of the building-with action is a question that emerges. Reasoning is not only useful for building-with but also for purposefully building-with. Because one more important point is that the building-with needs not necessarily be accurate and voluntary. The student may notice his/her misunderstanding and change this process. For this reason, building-with, which includes reasoning, gives rise to the occurrence of those leading to construction. In the case studies, it was observed that, after recognizing the structures leading to solve the problem, the students utilized reasoning to seek the truth of their hypothesis to connect to structures they already knew. When the properties of the reasoning and building-with epistemic action are compared, it can be said that there is reasoning in building-with and building-with in reasoning.

In terms of mathematical perspectives, mathematical communication constitutes an expression of the ideas in the usage of the mathematical language and communi-

cating with peers, teachers and others. Those students who did not have difficulty in reflecting themselves and who used the feedback they received to continue, had high mathematical power and they also were able to construct mathematical knowledge more quickly. Since communicating necessitates a knowledge construction to talk about on, however, even though students have such a construction, they may still have problems in expressing themselves. Thus, although talkative students may have high mathematical power, it is not necessarily true that quiet students have low mathematical power.

The basis of the mathematical power and epistemic actions of the RBC theory of abstraction may act together to construct knowledge structure. This is defined in Figure 4.

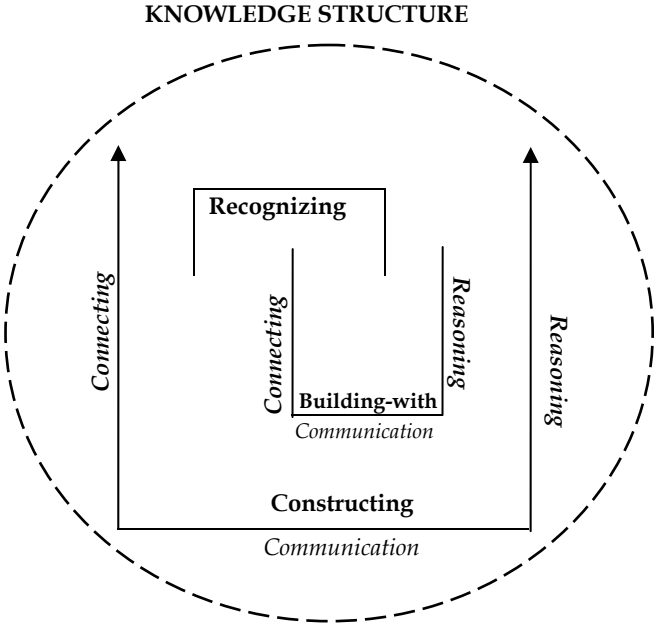

Figure 4. The settlement of mathematical power components in the formation of knowledge construction

This figure shows that it is necessary to understand to what extent the three important skills concerning mathematical power accompany the process of the realization of epistemic actions. Regarding the relationship stemming from interrelated epistemic actions, it can be said that epistemic actions are surrounded by the components of mathematical power.

The students with low mathematical power whose knowledge constructing processes were examined could recognize structures while they could not building-with and constructing. When observing that the students with low mathematical power have low communication, connection and reasoning skills, in general, it can be said that for building-with and constructing it is important to have these three skills.

In the case of Cihan, he was unable to recognize angles and corners of the triangle; thus he used the wrong constructions and obtained the wrong knowledge. However, he used this knowledge in the solution he was constructing, although it was wrong. In other words, although the student was building-with the wrong knowledge structure, the constructing process still exists because he/she used that knowledge to attempt to solve the problem.

Reasoning, connection and communication skills have an important role in constructing mathematical knowledge. Therefore, it can be useful if mathematics classes are designed in a way that supports the acquisition of these skills. Though recognizing epistemic action is regarded as a stage that can be observed very often with every student, the results of this research indicate that recognizing is the first step in constructing knowledge. Therefore, this stage, although simple, is a core skill and should be dealt with carefully.

Besides the studies that critically discuss the place of the RBC theory of abstraction (Ozmantar, 2005), there are also researchers who accept that this theory is a valid means in observing knowledge construction and who believe that describing the abstraction process is useful (Hershkowitz, Hadas & Dreyfus, 2006). In conclusion, the RBC theory can be useful in explaining the relationship between the components of mathematical power and other mental activities. For this purpose, the usage of the RBC theory of abstraction in mathematical knowledge construction processes in the classroom can be proposed as a new study. Furthermore, studying the relationship between realizing abstraction and consolidation processes and having mathematical power could be recommended for future research.

References

Bikner-Ahsbahs, A. (2004, July). Towards the emergence of constructing mathematical meanings, In M. J. Høines & A. B. Fuglestad (Eds.), *Proceedings of the 28th annual conference of the International Group for the Psychology of Mathematics Education:* Vol. 2. (pp. 119-126). Bergen, Norway: Program Committee.

Bukova, E., & Alkan, H. (2003, Ekim), *Matematik öğretiminde öğrencilerin matematiksel gücünün gelişimine yönelme.* XII. Eğitim Bilimleri Kongresinde sunulan bildiri, Gazi Üniversitesi, Ankara

Cohen, L., Manion, L., & Morrison, K. (2002). *Research methods in education*, London: Routledge.

Davydov, V. V. (1990). *Soviet Studies in Mathematics Education: Vol.2. Types of Generalization in Instruction: Logical and Psychological Problems in the Structuring of School Curricula*, J. Kilpatrick (Ed.) and J. Teller(Trans.), NCTM, Reston, VA.

Dreyfus, T., Hershkowitz R., & Schwarz, B., (2001, July). The construction of abstract knowledge in interaction. In M. van den Heuvel-Panhuizen (Ed.), *Proceedings of the 25th Annual Conference for the Psychology of Mathematics Education*, Vol. 2. (pp. 377-384), Utrecht, The Netherlands: Freudenthal Institute.

Greenwood, J. J. (1993). On the nature of teaching and assessing mathematical power and mathematical thinking. *Arithmetic Teacher*, 41 (3), 144-152.

Hershkowitz, R., Hadas, H., & Dreyfus, T. (2006, July). Diversity in the construction of a group's shared knowledge.In Novotna, J., Moraova, M., Stehlikova, N. (Eds). *Proceedings of the 30th Conference of the International Group for the Psychology of Mathematics Education*, Vol. 2. (pp.297-304), Prague, Czech Republic: Charles University.

Hershkowitz, R., Schwarz, B., & Dreyfus, T. (2001). Abstraction in context: Epistemic actions. *Journal for Research in Mathematics Education*, 32 (2), 195-222.

Işık, C., Albayrak, M., & İpek, S. (2005). Matematik öğretiminde kendini gerçekleştirme. *Kastamonu Eğitim Dergisi*, 13(1), 129-138.

Leont'ev, A. N. (1981). *The problem of activity in psychology*, in J.V. Wertsch (ed. and Trans.), *The Concept of Activity in Soviet Psychology*, M. E. Sharpe, Armonk, NY, 37-71.

Milli Eğitim Bakanlığı ([MEB], 2005). İlköğretim matematik dersi 1-5. sınıflar öğretim programı, Ankara: MEB.

Milli Eğitim Bakanlığı ([MEB], 2006). İlköğretim matematik dersi 6-8. sınıflar öğretim programı, Ankara: MEB.

Monaghan, J. & Ozmantar, M. F. (2006). Abstraction and consolidation. *Educational Studies in Mathematics*, 62 (3), 233-258.

National Center for Educational Statistics. ([NCES], 2003). *Mathematics framework for the 2003 National Assessment of Educational Progress. Retrieved* April 8 2004 from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1a/8e/51.pdf

National Council of Teachers of Mathematics. (1991). *Professional standards for teaching mathematics*. Reston, VA: Author.

Ozmantar, M. F. (2005). A*n investigation of the formation of mathematical abstractions through scaffolding*, Unpublished doctoral dissertation, University of Leeds, England.

Ozmantar, M. F., Monoghan, J. (2007). A dialectical approach to the formation of mathematical abstractions, *Mathematics Education Research Journal,* 19 (2), 89-112.

Ozmantar, M.F. and Monaghan, J. (2008). Are mathematical abstractions situated? In A. Watson and P. Winbourne (Eds.) *New directions for situated cognition in mathematics education* (pp.103-128). Springer: New York.

Schwarz, B., Dreyfus, T., Hadas, N., & Hershkowitz, R. (2004, July). Teacher guidance of knowledge construction, In M. J. Høines & A. B. Fuglestad (Eds.), *Proceedings of the 28th annual conference of the International Group for the Psychology of Mathematics Education:* Vol. 4. (pp. 169-176). Bergen, Norway: Program Committee.

Sfard, A. (1991). On the dual nature of mathematical conceptions: Reflections on processes and objects as different sides of the same coin, *Educational Studies in Mathematics,* 22 (1), 1-36.

Sid, R. (1998). Learning to see the wind. *Mathematics Teaching in the Middle School*, 3 (7), 470-473.

Tall, D. (1991). *Advanced mathematical thinking*, Netherlands: Kluwer.

Tsamir, P. & Dreyfus, T. (2005). How fragile is consolidated knowledge? Ben's comparisons of infinite sets, *Journal of Mathematical Behavior*, 24 (1), 15-38.

Yeşildere, S. (2006). Farklı matematiksel güce sahip ilköğretim 6, 7 ve 8. sınıf öğrencilerinin matematiksel düşünme ve bilgiyi oluşturma süreçlerinin incelenmesi. Yayınlanmamış Doktora Tezi. Dokuz Eylül Üniversitesi, Eğitim Bilimleri Enstitüsü, İzmir.

Yıldırım, A. & Şimşek, H. (2000). *Sosyal bilimlerde nitel araştırma yöntemleri*, Ankara: Seçkin Yayıncılık.

Yin, R. (1994). *Case study research: Design and methods,* USA: Sage.

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Farklı Matematiksel Güce Sahip Öğrencilerin Bilgi Oluşturma Süreçlerini Etkileyen Bileşenlerin İncelenmesi

Özet

Problem Durumu: Matematiksel güce sahip olmada bilgilerin doğru oluşturulması ve soyutlama önem taşıyabilir. 1000 yıldan fazla süredir üzerinde çalışılmaya devam edilen soyutlama, Aristotle'dan Russell'a kadar çeşitli filozoflar tarafından ele alınmış bir konudur. Günümüzde soyutlama fikrini çeşitli bakış açılarıyla yorumlayan teoriler bulunmaktadır(örn. Sfard, 1991; Tall, 1991). Bu teorilerden biri Hershkowitz, Schwarz ve Dreyfus (2001) tarafından ortaya atılan (Recognizing, Building-with, Constructing [RBC]) soyutlama teorisidir. RBC teorisine göre soyutlama, daha önce oluşturulmuş matematiksel bilgilerin dikey olarak yeniden düzenlenerek yeni bir matematiksel yapı oluşturulması aktivitesidir. Araştırmada öğrencilerin bilgi oluşturma süreçleri, RBC soyutlama teorisi analitik araç olarak kullanılarak incelenmiştir. Farklı matematiksel güce sahip öğrencilerin, soyutlamanın içerisinde yer alan bilgi oluşturma süreçlerini bilgi oluşturma felsefelerine uygun olarak incelemek ve bilgi oluşturma sürecinin matematiksel güce göre nasıl farklılık gösterdiğini araştırmak, matematiksel güç fikrine teorik alt yapı sağlayacaktır. Bunun yanında öğrencilerin düşünsel süreçlerini oluşturan bileşenleri derinlemesine incelemek, bu süreci etkileyen ilişkiler ağını belirli bir yaklaşımla yorumlamak matematik öğrenmenin doğası hakkında bilgi sahibi olunmasını sağlayacaktır.

Araştırmanın Amacı: Bu araştırmanın amacı, farklı matematiksel güce sahip ilköğretim 6. sınıf öğrencilerinin bilgi oluşturma süreçlerini incelemektir. Matematiksel gücü yüksek ve düşük olan öğrencilerin bilgi oluşturma süreçleri birbirleriyle karşılaştırılmakta ve öğrencileri matematiksel olarak güçlü yapan yönler tartışılmaktadır. Çalışmada öğrencilerin düşünsel süreçlerine ilişkin bir genellemeye varmak değil, bu süreci oluşturan bileşenleri derinlemesine incelemek, öğrencilerin düşünsel süreçlerini etkileyen ilişkiler ağını belirli bir sistematik yaklaşımla açıklamak ve yorumlamak amaçlanmaktadır.

Araştırmanın Yöntemi: Araştırmada örnek olay çalışması kullanılmıştır. 282 öğrenciye matematiksel güç ölçeği uygulanmıştır. İçlerinden amaçlı örnekleme ile seçilen iki matematiksel gücü düşük, iki matematiksel gücü yüksek toplam dört öğrenci ile örnek olay çalışmaları gerçekleştirilmiştir. Veriler raporlaştırılarak sunulmuştur. Araştırmada çoklu örnek olay çalışması yazılı raporu kullanılmıştır. Öğrencilerin bilgi oluşturma süreçleri tanıma, kullanma, oluşturma başlıkları altında görüşme metinleri verilerek incelenmiştir. Örnek olay çalışmalarında fark edilen örüntüler belirlenerek yorumlanmıştır.

Araştırmanın Bulguları: Bulgulara göre öğrencilerin %9'unun yüksek, %36'sının orta ve %55'inin düşük matematiksel güce sahip olduğu belirlenmiştir.

Örnek olay çalışmalarında matematiksel gücü düşük öğrencilerin ilişkilendirmede sıkıntı çektikleri gözlemlenmiştir. Oluşturulan bilginin farklı bir fikri ileri götürmede

kullanılabileceğinin farkına varılmalı, gerekli olan bilgi yapısı *tanınmalıdır.* Bilgiler arası ilişkilendirmenin kurulması için bilgilerin bir arada *kullanılması* gerekmektedir. Kullanılan bilgi yapıları arasında doğru ilişkilendirmelerin kurulması sonucunda yeni bir bilgi yapısının *oluşma*sı söz konusu olacaktır. İlişkilendirme sürecinin gerçekleşmesinde RBC teorisinde yer alan epistemik eylemlerin varlığı dikkat çekmektedir.

Matematiksel güç ölçeğindeki açık uçlu problemleri çözerken öğrencilerin büyük çoğunluğunun açıklamalarının yetersiz veya yanlış olduğu tespit edilmiştir. Bu yetersizliğin nedenlerinden biri problemleri yanlış şekilde akıl yürüterek çözmelerinden ötürü yanlış açıklamalarından kaynaklanıyor olabilir. Benzer duruma örnek olay çalışmalarında da rastlanmıştır.

Araştırmada kendini ifade etmekte zorlanmayan ve kendi kendine dönütler vererek ilerleyen öğrencilerin ki bu öğrenciler matematiksel güçleri yüksek olan öğrencilerdir, bilgi yapısını oluşturmada daha hızlı ilerledikleri tespit edilmiştir.

Bilgi oluşturma süreçleri incelenen öğrencilerden matematiksel gücü düşük olan öğrenciler kullanma ve oluşturma eylemlerini gerçekleştiremezken tanıma eylemini gerçekleştirebilmiştir.

Araştırmanın Sonuçları ve Önerileri: Araştırma sonuçları matematiksel bilgi oluşturmanın ne kadar hızlı ya da yavaş gerçekleşirse gerçekleşsin belli eylemlerden oluşan bir sisteme sahip olduğunu göstermektedir. Sistemi oluşturan eylemler üzerinde ne denli dikkatle durulursa bilginin oluşumu o denli sağlam olacaktır. Bu nedenle öğrenmenin gerçekleşmesi kadar nasıl gerçekleştiği de incelenmelidir. Buraya kadar tartışılanlardan hareketle matematiksel güç için önemli olan akıl yürütme, ilişkilendirme ve iletişim becerilerinin matematiğin öğrenilmesinde ve bilgi oluşturmada rol oynadığı söylenebilir. Bu nedenle matematik derslerinin öğrencilerin bu becerileri kazanmalarını destekleyecek şekilde yapılandırılmaları yararlı olabilir. Bilgi oluşturma eylemlerinden tanıma, her ne kadar hemen hemen her öğrencide sıkça gözlemlenebilir bir aşama olarak görülse de, araştırma bulguları tanımanın bilgi oluşturmada ilk adım olduğunu göstermektedir. Bu özelliğinden ötürü basit ancak temel olan bu aşama üzerinde de dikkatle durulması uygun olacaktır.

Matematiksel güçte ön plana çıkan becerilerden olan matematiksel fikirler ile diğer zihinsel etkinlikler arasında bağlantı kurma becerisini anlamlandırmada RBC teorisi yararlı olabilir. Bu amaçla sınıf ortamında matematiksel bilgi oluşturma sürecinde RBC teorisinin kullanımı yeni bir araştırma konusu olarak önerilebilir.

Anahtar Sözcükler: Bilgi oluşturma, matematiksel düşünme, matematiksel güç, soyutlama

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Family Variables Influencing Test Anxiety of Students Preparing for the University Entrance Examination

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Abstract

The Problem: Examinations constitute a significant source of stress in adolescent's lives (Peleg and Klingman, 2002). Exams are central to the Turkish educational system. The Student Selection Examination (SSE) causes a considerable degree of stress among young persons seeking access to undergraduate programs. Prevalence of test anxiety among these students is at an alarming 42% (Yıldırım, 2007). Alleviating these students'anxiety levels will only enhance their academic performance but also eliminate some of the debilitating influences anxiety has in their lives. There are studies reporting links between family environment and test anxiety (e.g., Ahlawat, 1989; Peleg, 2002; Zeidner, 1997). On the other hand, interventions are often designed merely for the students. Such interventions almost always neglect to include families.

Purpose: There are three main purposes of this study. First, it aimed at determining prevalence of test anxiety among SSE candidates. Second, it intended to investigate family variables associated with test anxiety levels of these students. Third, by so doing, it aspired to raise awareness about test anxiety and emphasized a systemic perspective to preventive efforts.

Methods: Participants of the study were 867 (479 females - 55%; 388 males - 45%) randomly selected senior year high school students attending eight private courses (dershane: private prepatory courses for the highly competitive national university entrance exam held once a year) in Ankara during the academic year of 2006-07. Test Anxiety Inventory (TAI), which was originally developed by Speilberger and adapted to Turkish by Öner (1990), was used for data collection. In addition, students were given a Personal Information Form to obtain information on independent variables. Öner's (1990) cut-off points for high school students were used in interpreting students' raw scores: 46 points or higher indicate high test anxiety; 35-45 points indicate moderate test anxiety; and, 34 or lower points indicate

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low test anxiety. ANOVA and Scheffe's test were used for data analysis which was run in SPSS.11.5 software program.

Findings: Distribution of test anxiety scores of the students preparing for the SSE was as follows: 19% were low; 42% were moderate; and, 39% were high. Independent variables of the mother's level of education, frequency of quarrels in the family, family projecting familial issues onto the student, family not trusting the student, family pressuring the students to study, and family not allowing the student to partake in social activities all significantly influenced students' levels of test anxiety. On the other hand, the number of persons in the family, father's level of education, family income, and family's level of religiosity did not have a significant impact on students' levels of test anxiety.

Recommendations: The alarming levels and prevalence of test anxiety among students preparing for the SSE can be further explored by incorporating cultural, familial, and educational system-related variables. For instance, different levels of mothers' education can be compared in relation to students' test anxiety. Intervention programs can be tailored to the needs of students with high test anxiety. Likewise, intervention programs targeting these students' families will also enhance families' support and thus eliminate students' excessive levels of anxiety. Moreover, school counseling services could offer individual and group counseling services for these students. Since test anxiety is often accompanied by other psychological issues (Lufi & Darliuk, 2005; Yıldırım, 2007), test anxiety should be further investigated in relation to trait and state anxiety, depressive symptoms, and other psychological issues.

Keywords: University Candidates, Test Anxiety, Family Factors

Test anxiety refers to cognitive, emotional, and physiological symptoms experienced in a stress inducing situation in which the individual is evaluated (Spielberger, 1980). Hall (2005, p.1) defines test anxiety as feelings of fear, worry, and apprehension experienced prior to or during an examination. Test anxiety is a form of state anxiety (Cassady & Johnson, 2002; Lufi & Darliuk, 2005; Spielberger, 1980). Some researchers identify worry and excessive emotionality as the two main dimensions of test anxiety (Hembree, 1988; Spielberger, 1980).

Test anxiety is experienced across all cultures and socioeconomic statues. However, it is often of higher prevalence among female students. Test anxiety is frequently accompanied by low academic performance (McDonald, 2001; Moutafi, Furnham & Tsaousis, 2006). According to findings by McDonald (2001), 25-30% of students experience test anxiety. Researchers repeatedly mention a host of other symptoms comorbid with test anxiety. For instance, Lufi and Darliuk (2005) observed that individuals with test anxiety reported symptoms associated with hypochondriasis, depression, hysteria, psychoparhic deviate, paranoia, psychasthenia, schizophrenia, and social introversion more so than those who did not have test anxiety.

Test Anxiety and Academic Performance: Exams are significant sources of stress in adolescents' lives (Peleg & Klingman, 2002). Individuals with test anxiety experience tension, restlessness, worry, and fear before or during examinations. These individuals' subjective experience is similar to that of persons whose existence is

threatened. Individuals often report low self-esteem, sleep problems, difficulty in understanding exam questions, reading questions repeatedly, and blanking out. They might hesitate to ask teachers questions or answer exam questions where they know the answers. Due to the tension they feel, these students often make errors they would not make otherwise and have difficulty with managing their time during test-taking. Some students report that they made foolish mistakes (Alfano, Beidel, & Turner, 2002; McDonald, 2001; Öner, 1990). In short, these students do not perform to their capacities due to excessive feelings prior to and/or during an examination.

Studies examining the relationship between test anxiety and academic achievement usually report that persons with high test anxiety have lower academic performance (Benjamin, McKeachie & Lin, 1981; Cassady & Johnson, 2002; Culler & Holahan, 1980; Hembree, 1988; Kirkland & Hollansworth, 1980; McDonald, 2001; Moutafi, Furnham, Tsaousis, 2006; Rocklin & Thompson, 1985; Yıldırım, 2003). Cassady (2004) found that "students with high-cognitive test anxiety reported lower study skills, rated tests as more threatening, and prepared less effective test notes; and the high-anxiety group performed worse on tests." Cassady and Johnson (2002) also reported significant correlations between "cognitive test anxiety, reactions to test, bodily symptoms, tension, worry, and test irrelevant thinking." These findings indicate the urgent need for psycho-educational programs geared toward alleviation of test anxiety (Ergene, 2003).

The Student Selection Examination (SSE): The Turkish educational system is highly exam-oriented. Students in 8th grade take the highly competitive Secondary Institutions Examination (SIE) to gain access to quality high schools in an effort to boost their chances for quality higher education. Then, they take the SSE during their last year of high school or after graduation. For those who wish to work in the public sector (which are the majority of university graduates), there is also the Public Personnel Selection Examination (PPSE) which is also extremely competitive. For these three national exams, majority of students attend private courses (dershane) to increase their chances of success on the exams. Parents and students make exceptional sacrifices for entry to universities and the job market.

Students often begin their work toward the university entrance exam starting from early years of elementary education. Students (and families) interested in quality undergraduate programs first attempt to ensure entry to quality high schools. Among the high schools in Turkey, science high schools and Anatolian high schools are preferred the most because of their quality of education. Graduates of these high schools are more likely to gain entry to quality higher educational programs. In order for individuals to get into university programs with reasonable employment prospects, they need to score within the first five percentile on the national university entrance exam (SSE) (ÖSYM, 2006, 2007). Obtaining a score within this range is extremely difficult. Along with their regular school work, high school students have to prepare for the exam in order to be able to compete with two million peers taking the exam annually. Those with the highest scores are often students who go to private courses (dershane) or pay for private teachers (YÖK, 2007, p. 82-84). Along with their heavy academic activities, students preparing for the SSE face considerable daily hassles. They have to deal with school work and do well in school in order to have a high Grade Point Average (GPA) which contributes to their scores on the SSE. They

also have to go to private courses and do the extensive homework assignments given to them from both school and private courses. The distance between school-home-private courses often require several trips with public transportation each day, almost every day of the week. Despite all these efforts, those who do not succeed in getting in an undergraduate program, continue repeating the same work year after year. Among those who succeed in the exam, 40% are senior year high school students, 40% are those who have graduated in previous years, and 20% are persons already placed in a higher educational degree program (ÖSYM, 2006, 2007; Toker, 1997). The extremely stressful preparation process for the SSE has an adverse impact on students' mental health (Ergene & Yıldırım, 2004; Yıldırım, 2007; Yıldırım, Ergene & Munir, 2007).

Interventions for Test Anxiety: Literature cites studies testing effectiveness of intervention programs for alleviating test anxiety (Ergene, 2003; Gregor, 2005; Orbach, Lindsay, & Grey, 2007). These studies report that eclectic/integrative and cognitive behavioral strategies have been effective in dealing with test anxiety. Almost all the interventions involve students and neglect to include families. Given that the family environment and students' levels of test anxiety are closely related, families' inclusion in the intervention process seems vital. For instance, Sarason, Davison, Lighthall, Waite, and Ruebush (1960) found an association between parent-child relational patterns and child's experience with test anxiety. Working with a Jordanian sample, Ahlawat (1989) found a significant relationship between students' levels of test anxiety and their social relationships. Pressuring, discouraging, punitive, and authoritarian family attitudes are among the most significant causes of test anxiety (Öner, 1990). There have been various studies reporting significant links between family environment and test anxiety (i.e., Peleg, 2002; Zeidner, 1997).

The Present Study: This study examined the relationship between some family variables and test anxiety levels of students preparing for the SSE. McDonald (2001) reports prevalence of test anxiety among Western samples as ranging between 25% and 30%. On the other hand, the proportion of Turkish students preparing for the university entrance exam is alarming (42%) (Yıldırım, 2007). Easing some of the high test anxiety experienced by these students will not only increase their academic performance but also eliminate the adverse consequences of the stress they experience. Preparing psycho-educational programs with families of these students could at least partially help by alleviating students' anxiety. However, in order to design any interventions, there has to be sufficient empirical insight into factors contributing to these students' test anxiety. Thus, the present study examined influence of some family variables on SSE candidates' test anxiety.

More specifically the study sought answers to the following two questions: (1) What is the prevalence of test anxiety among the SSE candidates? (2) What are the familial factors influencing students' experiences with test anxiety? In other words, do students' levels of test anxiety differ significantly according to (a) number of persons in the family, (b) father's level of education, (c) mother's level of education, (d) family's income, (e) quarrels in the family, (f) family projecting familial problems onto the student, (g) family's level of religiosity, (h) degree of family's trust/confidence in the student, (i) family pressuring the student to study, and (j) family's restriction on students' participation in social activities?

Method

Participants

Participants of the study were 867 (479 females - 55%; 388 males - 45%) randomly selected senior year high school students attending eight private courses (dershane) in the Ankara Metropolitan area during the academic year of 2006-2007. Participants' distribution to areas of the university entrance exam was as follows: 345 persons (40%) in mathematics-science (engineering, medical schools, physical sciences, etc.); 382 persons (44%) in Turkish-mathematics (economics, business, counseling, etc.); 140 persons (16%) social sciences. Four hundred sixteen students (48%) indicated that their families had adequate financial resources (income) while 449 of them (52%) viewed family income insufficient. Distribution of students' achievement levels after the first semester of the senior year in high school was as follows: 126 persons (15%) had a very high GPA; 358 persons (41%) had a high GPA; 325 persons (37%) had a moderate GPA; and 58 persons (7%) had barely passing grades.

Instruments

In addition to the TAI, the Personal Information Form, which was developed by the researcher to obtain information on independent variables, was used for data collection.

Test Anxiety Inventory (TAI): The TAI was developed by Spielberger and its adaptation to Turkish was done by Öner (1990) who reports a KR-20 alpha coefficient of .87 and test re-test reliability coefficients ranging between .70 and .90. The TAI is a Likert-type scale with 20 items. Scores on the TAI can range between 20 and 80, higher scores indicating higher levels of test anxiety. In this study the Cronbach's alpha coefficient was .86.

In placing students into categorical levels of test anxiety, Öner's (1990) cut-off points for high school students were used: 46 points or higher indicate high test anxiety; 35-45 points indicate moderate test anxiety; and, 34 or lower points indicate low test anxiety.

Procedures

After random selection of eight prepatory courses,whose administrators were contacted during the spring semester of 2005-2006. Permission of administrators was obtained. Teachers were informed about the study by the administrators prior to the researcher's visits to each class. Upon arrival at each classroom at the beginning of class sessions, students were informed about the study. They were also told that their participation was voluntary. Following, survey packets were distributed to students who were present during the class session. In groups, students completed the questionnaires in approximately 15 minutes. Students were told that they did not have to indicate their names or gender on the questionnaires.

Data Analysis

Following data collection, students' total scores on the TAI and their responses to the Personal Information Form were entered into the computer. Students' scores on the TAI were placed into the categories (high, moderate, and low) according to Öner's (1990) cut-off points. Then, homogeneity of the variance test was run for the independent variables.

After ensuring the homogeneity, univariate analysis of variance (ANOVA) was conducted. Then, descriptive statistics were calculated. Scheffe's test was used as the post-hoc procedure. The study assumed .05 as the significance level.

Results

The results are presented below in the same order with the research questions. First, frequencies for each category of test anxiety (high, moderate, and low) are presented. Then, results concerning the second research question are introduced.

Nineteen percent of the participants reported low, 42% reported moderate, and 39% reported high levels of test anxiety. Table 1 illustrates ANOVA results on family variables' influence on students' levels of test anxiety.

Table I

ANOVA Results of Family Variables Influence on Students' Levels of Test Anxiety

Source	Sum of Suq.	df	Mean Suq.	F
Number of persons in the family	284.021	2	142.010	1.031
Father's Education	933.510	3	311.170	2.194
Mother's Education	2126.648	3	708.883	5.145**
Family Income	14.343	1	14.343	.104
Quarrels in family	1423.295	2	711.648	5.165**
Project. Fam. Prob.	1906.701	2	953.350	6.919***
Religiosity	8.562	2	4.281	.031
Confid. In Student	1239.593	2	619.796	4.498*
Press. Study	3375.830	2	1687.915	12.250***
Perm. Soc. Act.	4467.912	4	1116.978	8.106***
Error	113264.175	822	137.791	
Total	1810438.000	846		
Adjusted Total	138971.314	845		

* p< .05 ** p < .01 *** p < .000

As illustrated in Table I, F values for mother's level of education, quarrels in the family, family projecting familial issues onto the student, family's trust/confidence in the student, family pressuring the student to study and family's degree of permission for the student's social activities were all significant. On the other hand, the number of persons in the family, father's level of education, family's income and family's level of religiosity did not lead to significant F values.

Table II

Descriptive Statistic for Family Variables

Independent Variables	Groups	$\overline{X}$	n	s
Number of Persons in the Family	3 Persons	43.048	145	11.272
	4 Persons	45.264	500	13.496
	5 or more Persons	43.594	222	12.330
Father's Level of Education	Literate-elementary	42.056	71	10.611
	Middle School	45.250	96	12.892
	High school	44.104	278	11.481
	University or 2-year degree	44.737	419	13.884
Mother's Level of Education	Literate-elementary	43.535	168	10.669
	Middle School	47.858	134	12.403
	High school	43.574	301	13.417
	University or 2-year degree	44.361	263	13.558
Family Income	Sufficient	43.778	416	13.162
	Not Sufficient	45.080	449	12.588
Frequency of Quarrels in the Family	Often	52.681	88	17.608
	Seldom	44.127	567	12.119
	Never	42.042	210	11.111
Family Projecting Familial Problems	Never Projects	42.212	245	11.958
	Partially Projects	43.944	501	11.977
	Projects Considerably	51.120	116	16.168
Family's Level of Religiosity	Highly Religious	43.812	64	11.199
	Somewhat Religious	44.510	462	12.293
	Not Religious	44.817	334	13.921
Family's Trust/Confidence	Highly Confident	43.443	654	12.656
	Confident	45.387	155	12.167
	Somewhat Confident	53.563	55	14.001
	Not Confident			
Family Pressure for Studying/School Work	High Pressures	50.138	173	14.339
	Somewhat Pressures	43.341	433	12.580
	Does Not Pressure	42.633	259	11.242
Family Permitting Social Activities	Once a Week	41.449	178	13.626
	Once a Month	42.540	337	11.187
	Once in 3 Months	45.632	174	11.454
	Once in 6 Months	48.811	90	13.408
	Never Allows	51.193	88	15.599

Group means for variables in Table II were compared with Sheffe's test to examine group differences. Scheefe's test showed that students whose mothers had middle school education had significantly higher test anxiety ($\overline{X}_{middle}$= 47.858) than those whose mothers had other levels of education ($\overline{X}_{Elem}$= 43.535, $\overline{X}_{High\ school}$ =

43.574, $\overline{X}_{\text{Uni.}}$= 44.361). There were no significant differences between test anxiety scores of individuals whose mthers were literate-elementary school educated, high school educated, and with a university or two-year degree education.

Students whose families often had quarrels had higher mean scores on test anxiety ($\overline{X}_{\text{Often}}$ =52.681) than those whose families seldom or never had quarrels ($\overline{X}_{\text{seldom.}}$ = 44.127, $\overline{X}_{\text{Never}}$ = 42.042).

Students whose families projected familial issues on them considerably (highly projects) had significantly higher mean scores on test anxiety ($\overline{X}_{\text{Highly}}$ = 51.120) than those whose families did so somewhat or never ($\overline{X}_{\text{Somewhat.}}$= 43.944, $\overline{X}_{\text{Never}}$=42.212).

Results of Scheffe's test show that students whose family were highly confident of their efforts to prepare and ability to succeed on the SSE had significantly lower mean scores on test anxiety ($\overline{X}_{\text{Conf.}}$ = 43.443) than those whose families were somewhat confident or not confident ($\overline{X}_{\text{Somewhat.}}$= 45.387, $\overline{X}_{\text{Not Conf.}}$ = 53.563). Likewise, students whose families were somewhat confident had lower test anxiety than those whose family had no confidence in them.

Students who perceived their families as highly pressuring them for studying in preparation for the SSE had higher mean scores on test anxiety ($\overline{X}_{\text{Press.}}$ = 50.138) than their peers whose families somewhat pressured or did not pressure them for studying ($\overline{X}_{\text{Somewhat}}$ = 43.341, $\overline{X}_{\text{Never}}$ = 42.633).

Students whose families allowed their participation in social activities once a week had lowest mean scores ($\overline{X}_{\text{Week}}$ = 41.449) on test anxiety while those whose families never allowed them to partake in social activities had the highest mean scores ($\overline{X}_{\text{Never}}$ = 51.193).

Discussion

Below, results are discussed according to the order of the research questions. Then, implications of the results and recommendations for future research are presented.

Prevalence of test anxiety among students preparing for the SSE: How common each categorical level of test anxiety is among the participants was determined in an effort to answer the first research question. Nineteen percent of students reported low test anxiety, 42% reported moderate, and 39% reported high levels of test anxiety. In a previous study with similar students, Yıldırım (2007) found a prevalence rate of 42%. McDonald (2001) reports a rate ranging between 25% and 30% among Western samples. Thus, one could infer that students preparing for the SSE in Turkey have a considerably high occurrence of test anxiety. Some authors assert that test anxiety could be related to cultural characteristics (Guida & Ludlow, 1989; Peleg-Popka, Klingman, & Nahhas, 2003). Thus, culture's influences on test anxiety levels

among Turkish students preparing for the SSE are an issue worth exploration. This result could also be considered as alarming evidence for intervention efforts with this population. Below is a discussion of the results concerning the second research question of this study.

Number of persons in the family: Students' scores on test anxiety did not vary significantly according to the number of persons in their families. As illustrated in Table 2, mean scores of students with differing family sizes were moderate (Öner, 1990) and similar. Hence, qualitative features of families might more influential on students' levels of test anxiety than quantitative aspects such as size (number of family members).

Father's level of education: Students scores on test anxiety did not vary significantly according to their father's level of education. As shown in Table II, students' test anxiety scores were moderate (Öner, 1990) regardless of their father's level of education. One could interpret this as indicating that the father's education does not influence their children's levels of test anxiety. Parents are significant sources of support for children (Pearson, 1990; Robertson, 1988). Students preparing for the university entrance exam might be in need of their fathers' support. Future research could consider support from fathers with respect to students' test anxiety while in theprocess of preparing for an extremely important and competitive national exam.

***Mother's level of education*:** Students whose mothers had middle school education scored significantly higher on test anxiety than those whose mothers were elementary school, high school or university (including 2-year degrees) graduates. On the other hand, no significant differences were found in test anxiety scores of students whose mothers had these three levels of education. It is likely that those mothers who had middle school education but were not able to obtain higher levels of education were more understanding of their children's educational needs and thus perhaps were more supportive than other mothers. On the other hand, perhaps these mothers pressure their children to study more, thus may have been perceived as authoritarian (Ahlawat, 1989; Peleg-Popka, Klingman, & Nahhas, 2003). Perhaps mothers with middle school education are more invested in their children's education which might constitute pressure on the students toward succeeding on the exam. However, these inferences should be taken with caution. For any firm conclusions to be made, the relationship between the mother's level of education and the quality of mother-child relationship needs to be examined.

***Family income*:** Students' test anxiety scores did not differ significantly according to whether or not they considered their family income sufficient or insufficient. This could be interpreted as family income not having a significant impact on students' worries about the examination. In other words, students perceived their families' resources (income) as sufficient and those perceived their families' resources as insufficient appear to experience test anxiety to similar degrees. This finding is consistent

with those by McDonald (2001) who asserts that test anxiety is experienced across all socioeconomic levels alike.

***Quarrels in the Family*:** Students whose families often had quarrels had higher mean scores on test anxiety ($\overline{X}_{\text{Often}}$ =52.681) than those whose families seldom or never had quarrels. The later two groups had moderate levels of test anxiety. These two groups' means did not differ significantly. Perhaps families with frequent quarrels may not provide suitable conditions for students' effective studying, which in turn might raise students' worries about not succeeding on the exam. Another way of looking at this finding could be that these students might have more urgent needs to get out of chaotic family circumstances and might find a university as the gateway to doing so. Such perception could also contribute to their worries about the possibility of not succeeding on the exam. This finding is in line with those by Peleg (2002) and Ahlawat (1989). Ahlawat insists that test anxiety is closely related to the quality of relationships in the family.

Projecting familial issues onto students: Students whose families projected familial issues on them considerably (highly projects) had significantly higher mean scores on test anxiety ($\overline{X}_{\text{Highly}}$ = 51.120) than those whose families did so somewhat or never. The later two groups had moderate levels of test anxiety. These two groups' means did not differ significantly. Peleg (2002) and Ahlawat (1989) report similar findings. Working with a similar sample, Yıldırım (2006) found that 47 % of students reported that families involved them in or blamed them for important familial problems. Families stressing students over familial issues might add to the stress of students preparing for an extremely competitive exam. Considering that almost half of families in Turkey do so, family education about these student needs seems vital.

Family's level of religiosity: Students' test anxiety scores did not differ significantly according to their families' degree of religiosity. In other words, no significant differences were found between test anxiety scores of students who perceived their families highly religious, somewhat religious or not religious. One might expect religiosity to impact family life style and relationships, thus some degree of relevance to test anxiety could be anticipated. Findings of this study did not reveal such influence of religiosity. It could be worth exploring different family values, spirituality in the family along with religiosity.

***Family's confidence in the student*:** Students whose families were highly confident of their efforts to prepare and ability to succeed in the SSE had significantly lower mean scores on test anxiety ($\overline{X}_{\text{Conf.}}$ = 43.443) than those whose families were somewhat confident or not confident. Likewise, students whose families were somewhat confident had lower test anxiety than those whose family had no confidence in them. In other words, as families' confidence in students' efforts and ability to succeed on the exam increased, students' levels of test anxiety decreased. Families' distrust about students' efforts and their abilities might add to the high levels of stress they experience as they deal with the heavy work load necessary toward

preparation for the ÖSS (Yıldırım, Ergene & Munir, 2007; Ergene & Yıldırım, 2004). In line with studies indicating importance of support from family through the stressful process these students go through, a lack of confidence in them might be perceived analogous to a lack of support (Yıldırım, 2006).

***Family pressuring for school studying*:** Families are highly aware of the competitive nature of the SSE. Some families do not allow students to watch television, meet with friends, play in sports or do other activities due to their concern that such activities would take away from study times (Yıldırım, 2006). Some families therefore monitor students studying to differing degrees rigidity. Results of the current study showed that students who perceived their families as highly pressuring for studying in preparation for the exam had higher mean scores on test anxiety ($\overline{X}_{\text{Press.}}$ = 50.138) than their peers whose families somewhat pressured or did not pressure ($\overline{X}_{\text{Somewhat}}$ = 43.341, $\overline{X}_{\text{Never}}$ = 42.633). The later two groups had moderate levels of test anxiety. Pressure from family could not only add to students' worries (Peleg and Klingman, 2002) thus lead to decreased academic performance, but could also encourage external reinforcement through a stressful process requiring internal reinforcement for continual effort and resilience. In addition, such restrictive family attitude could cause negative attitudes and feelings toward the exam. Likewise, such family pressure could cause stress to build up by not allowing activities that could alleviate some of the distress. Parents' authoritarian and restrictive attitudes might be for the best of intentions but lead to outcomes undesirable to them as well as to the students (Yıldırım, 2006). This finding also points to the need for family education in an effort to enhance family members' understanding of the needs of these students and increasing their support through the challenging preparation process.

***Family's permission/restriction for participation in social activities*:** As indicated above, some families restrict students' activities in an effort to encourage studying. Some families' ways of disciplining students into studying appear to have an adverse impact on students. Results show that students whose family allowed their participation in social activities once a week had lowest means ($\overline{X}_{\text{Week}}$ = 41.449) on test anxiety while those whose families never allowed them to participate in social activities had the highest mean scores ($\overline{X}_{\text{Never}}$ = 51.193). Preparation for the SSE intensifies in the last year of high school; however, for majority of students in Turkey it is a stressful process that takes years. Therefore, young students' needs might be compromised due to the restrictions of the families. Considering the importance of peer relationships for adolescents, restrictions about their social relationships could add significant distress to their already stressful lives.

Given the above results, the following recommendations could be made:

1. Compared to findings of other researchers cited in the literature on test anxiety, it is safe to infer that Turkish students preparing for the SSE have higher levels and prevalence of test anxiety. This alarming degree of test anxiety necessitates

studies investigating a host of factors in relation to test anxiety (i.e., culture and educational system related variables).

2. Another curious issue worth further examination has to do with how mothers with middle school education relate differently to their children preparing for the exam than those with other levels of education.

3. Counseling services of dershane as well as other agencies could design an intervention with families in order to alleviate adverse influences of family variables such as frequent quarrels in the family, family projecting family issues onto the student, family not trusting the student, family pressuring the students to study, and family not allowing the student to partake in social activities.

4. Intervention packages could be developed for students experiencing high levels of test anxiety. Likewise, school counseling services could take a more proactive stance in providing individual and group interventions for these students.

5. Psychological and psychosomatic issues could accompany test anxiety (Lufi & Darliuk, 2005; Yıldırım, 2007). Therefore, test anxiety can be further investigated in relation to trait and state anxiety, depressive symptoms and other psychological or somatic problems.

References

Ahlawat, K. (1989). Family environmental determinants of test anxiety in Jordanian high-school students. *Test Anxiety Research*, 6, 201-213.

Alfano, C. A., Beidel, D. C., & Turner, S. M. (2002). Cognition in childhood anxiety: Conceptual methodological, and developmental issues. *Clinical Psychology Review*, 22, 1209-1238.

Benjamin, M., mcKeachie, W. J., & Lin, J. G. (1981). Test anxiety: deficits in information processing. *Journal of Educational Psychology*, 73, 816-824.

Cassady, J. C. (2004). The influence of cognitive test anxiety across the learning-test cycle. *Learning and Insruction*, 14, 569-592.

Cassady, J. C., & Johnson, R. E. (2002). Cognitive test anxiety and academic performance. *Contemporary Educational Psychology*, 27, 270-295.

Culler, R. E., & Holahan, C. J. (1980). Test anxiety and academic performance: the affected study of related behaviors. *Journal of Educational Psychology*, 72, 16-20.

Ergene, T. (2003). Effective interventions on test anxiety reduction: A meta-analysis. *School Psychology International,* 24(3), 313-328.

Ergene, T., & Yıldırım, İ. (2004). Depression levels of students preparing for university entrance exams. *Journal of Psychiatry and Psychopharmacology,* 12(2), 91-100.

Gregor, A. (2005). Examination anxiety: Live with it, control it or make it work for you? *School Psychology International*, 26(5), 617-635.

Guida, F. V., & Ludlow, L. H. (1989). A cross-cultural study of test anxiety. *Journal of Cross-Cultural Psychology*, 20, 178-190.

Hall, T. S. (2005). *Is test anxiety a form of spesific social phobia?* Unpublised masters thesis. USA: University of Maryland.

Hembree, R. (1988). Correlates, causes, and treatment of test anxiety. *Review of Educational Research*, 58, 47-77.

Kirkland, K., & Hollansworth, J. G. (1980). Effective test taking: Skill acquisition versus anxiety reduction techniques. *Journal of Consulting and Clinical Psychology*, 48, 431-439.

Lufi, D., & Darliuk, L. (2005). The interactive effect of test anxiety and learning disabilities among adolescents. *International Journal of Educational Research*, 43, 236-249.

McDonald, A. S. (2001). The prevalence and effects of test anxiety in school children. *Educational Psychology*, 21(1), 89-101.

Moutafi, J., Furnham, A., & Tsaousis, I. (2006). Is the relationship between intellegence and trait neuroticism mediated by test anxiety. *Personality and Individual Differences*, 40, 587-597.

Orbach, G., Lindsay, S., & Grey, S. (2007). Arandomised placebo-controlled trail of a self-help Internet-based intervention for test anxiety. *Behaviour Research and Therapy*, 45, 483-496.

Öner, N. (1990). *Manual for the Test Anxiety Inventory*. İstanbul: YÖRET Yayınları.

ÖSYM, (2006). Number of applicants and placements in higher educational programs according to educational background and the kind of high school attended. Retrieved May 15, 2008, from http://www.osym.gov.tr

ÖSYM, (2007). Number of applicants and placements in higher educational programs according to educational background and the kind of high school attended. Retrieved May 15, 2008, from http://www.osym.gov.tr

Pearson, R. E. (1990). *Counseling and Social Support: Perspectives and Practice*. California: SAGE Publication, Inc.

Peleg, O. (2002). Children's test anxiety and family interaction patterns. *Anxiety, Stres, and Coping*, 15, 45-59.

Peleg, O., & Klingman, A. (2002). Family environment, discrepancies between perceived actual and desirable environment and children's test and trait anxiety. *British Journal of Guidance and Counseling*, 30, 451-466.

Peleg-Popka, O., Klingman, A., & Nahhas, I. A. H.(2003). Cross-cultural and familian differences between Arab and Jewish adolescents in test anxiety. *International Journal of Intercultural Relations*, 27, 525-541.

Robertson. S. E. (1988). Social support: Implication for counselling. *International Journal for the Advancement of Counselling*, 11, 313-321.

Rocklin, T., & Thompson, J. M. (1985). Interactive effects of test difficulty and feedback. *Journal of Educational Psychology*, 77, 368-372.

Sarason, S. B., Davison, H. S., Lighthall, F. E., Waite, R. P., & Ruebush, B. K. (1960). *Anxiety in elementary school children*. New York: Willy.

Spielberger, C. D. (1980). Preliminary professional manual for the Test Anxiety Inventory. *Consulting Psychologistic Pres:* Palo Alto. C.A.

Toker, F. (1997). *Entrance to higher education in Turkey*. ÖSYM Yayınları. Ankara: Meteksan Anonim Şirketi.

Yıldırım, İ. (2003). Social support, submissive acte, and test anxiety as predictors of academic achievement among high school students. *Hacettepe University Journal of Education*, 25, 224-234.

Yıldırım, İ. (2006). *Family support and academic achievement*. Ankara: Anı Yayıncılık.

Yıldırım, İ. (2007). Depression, test anxiety and social support among Turkish students preparing for the university entrance examination. *Eurasian Journal of Educational Research*, 29, 171-184.

Yıldırım, İ., Ergene, T., & Münir, K. (2007). High rates of depressive symptoms among senior high school students preparing for national university entrance examination in Turkey. *The International Journal on School Disaffection* , 4(2), 35-44.

YÖK, (2007). The Turkish higher educational strategy. Ankara: Meteksan A.Ş.

Zeidner, M. (1997). Cross-cultural and individual differences in test anxiety. *World Psychology*, 3, 143-175.

Üniversite Giriş Sınavına Hazırlanan Öğrencilerde Sınav Kaygısını Etkileyen Ailesel Değişkenler

(Özet)

Problem durumu: Türk eğitim sistemi ***sınav*** odaklıdır. Türkiye'de Öğrenci Seçme Sınavı (ÖSS), adayların ve anne babaların en önemli stres kaynaklarından biri haline gelmiştir. ÖSS'ye hazırlanan öğrencilerin gündelik yaşamı tam bir cefa içinde geçmektedir. Öğrenciler bir yandan okul derslerini başarmak için çalışırken öte yandan dershanelere devam etmekte; okulun ve dershanenin verdiği ödevleri yetiştirmek durumunda kalmaktadırlar. Hafta sonları dahil, adaylar, her gün toplu taşıma araçlarında veya okul servis araçlarında saatlerce yolculuk yapmakta, zaman ve enerji harcamaktadırlar. Sınavlar adolesanların yaşamında önemli bir stres kaynağıdır (Peleg and Klingman, 2002). Farklı kültürlerde öğrenciler arasında sınav kaygısının yaygınlığı % 25 ile % 30 arasındadır (McDonald, 2001). Buna karşın, Türkiye'de ÖSS, OKS sınavlarına hazırlanan öğrenciler arasında yüksek sınav kaygısının yaygınlığı % 42 kadardır (Yıldırım, 2007).

Sınav kaygısı, bir değerlendirilme durumunda yaşanan stresin yarattığı fizyolojik, bilişsel ve duygusal tepkiler olarak tanımlanabilir (Spielberger, 1980). Hall (2005, p:1) sınav kaygısını, sınav öncesinde ve sınav sırasında yaşanan korku, endişe ve heyecan olarak tanımlamaktadır. Sınav kaygısı, bilişsel sınav kaygısı olarak da değerlendirilebilir (Cassady ve Johnson, 2002; Lufi ve Darliuk, 2005; Spielberger, 1980). Sınav kaygısının kuruntu (worry) ve heyecansallık (emotionality) olmak üzere iki temel boyutu bulunmaktadır (Hembree, 1988; Spielberger, 1980).

Sınav kaygısı, tüm sosyo ekonomik gruplarda yaşanmaktadır. Kız öğrenciler arasında sınav kaygısı daha yaygındır. Sınav kaygısı, düşük performansa eşlik etmektedir (McDonald, 2001; Moutafi, Furnham, Tsaousis, 2006). Ayrıca, sınav kaygısı öğrencilerde bazı psikolojik semptomlara da eşlik etmektedir. Örneğin, Lufi ve Darliuk (2005), yüksek sınav kaygısı olan grubun hypochondriasis, depression, hysteria, psychoparhic deviate, masculinity-femininity, paranoia, psychasthenia, schizophrenia, social introversion boyutlarında sınav kaygısı olmayan gruptan daha fazla semptom gösterdiklerini saptamışlardır.

Yüksek sınav kaygısının azaltılması, hem adayların akademik performanslarının artması, hem de stresin olumsuz sonuçlarından korunabilmeleri için gerekli görünmektedir. Aile çevresi ile sınav kaygısı arasında anlamlı ilişkiler olduğunu gösteren araştırmalar bulunmaktadır (Ahlawat, 1989; Peleg, 2002; Zeidner, 1997). Ancak, sınav kaygısını azaltmaya yönelik müdahalelerin genellikle öğrencilere yönelik olarak yapıldığı görülmektedir. Oysa, sınav kaygısını azaltmak için öğrencinin yanı sıra öğrencinin ailesine de müdahale etmek gerekir.

Amaç: Bu çalışmanın birinci amacı, ÖSS adaylarında sınav kaygısının yaygınlığını belirlemektir. İkinci amacı, ÖSS adaylarının sınav kaygısını etkileyen ailesel faktörleri belirlemektir. Üçüncü amaç ise, adaylarla ilgi herkesin dikkatini sınav kaygısı ile ailesel faktörler arasındaki ilişkiye çekmektir.

Yöntem: Araştırma kapsamına 2006-2007 öğretim yılı bahar döneminde, lise son sınıfta okuyan ve Ankara merkezinde bulunan sekiz dershaneden seçkisiz olarak alınan 479 (% 55) kız, 388 (% 45) erkek olmak üzere toplam 867 ÖSS adayı alınmıştır. Araştırmada, Speilberger tarafından geliştirilen ve Türkçe uyarlaması Öner (1990) tarafından yapılan Sınav Kaygısı Envanteri (SKE) ile "Aday Kişisel bilgi Formu" kullanılmıştır. Adaylarının sınav kaygısı kesme puanlarını belirlemek için, Öner'in (1990) lise örneklem gruplarına ilişkin SKE tüm test standart puanları ve yüzdelik sıraları ölçüt olarak alınmıştır. Buna göre, SKE tüm testten 46 ve daha yüksek puan, adayın yüksek sınav kaygılı; 35-45 puan orta; 34 ve altı ise düşük sınav kaygılı olduğunu göstermektedir. Veriler, SPSS.11.5 programında ANOVA ve Scheffe Testi ile analiz edilmiştir.

Bulgular: ÖSS adaylarından % 19'u "düşük"; % 42'si "orta"; % 39'u "yüksek" sınav kaygılı bulunmuştur. Batı toplumlarındaki öğrencilerle kıyaslandığında Türkiye'de sınavlara hazırlanan öğrencilerin daha yaygın olarak yüksek sınav kaygısı yaşadıkları öne sürülebilir. Elde edilen bulgular şöyledir: Annesi "*orta okul*" mezun olan adaylar, annesi "*okuryazar- ilkokul*", "*lise*" ve "*üniversite-YO*" mezunu olan adaylara kıyasla daha yüksek sınav kaygılı bulunmuştur. Ailesinde "*sık*" sert tartışma yapılan adaylar yüksek sınav kaygılı; ailesinde "*seyrek*" tartışma yapılan veya "*hiç*" tartışma yapılmayan adaylar ise orta düzeyde sınav kaygılı bulunmuştur. Ailedeki sorunların kendisine "*oldukça*" yansıtıldığını belirten adaylar yüksek sınav kaygılı; "*kısmen*" yansıtıldığını ve "*hiç*" yansıtılmadığını belirten adaylar ise orta düzeyde sınav kaygılı çıkmıştır. Genel olarak ailenin adaya güveni arttıkça buna paralel olarak adayın sınav kaygısının manidar olarak düştüğü görülmüştür. Ders çalışması için kendisine ailesinin "*oldukça*" baskı yaptığını belirten adayların yüksek sınav kaygılı; "*kısmen*" baskı yaptığını ve "*hiç*" baskı yapmadığını belirten adayların ise orta düzeyde sınav kaygılı olduğu saptanmıştır. Ailesinin "*haftada bir*" sosyal etkinliklere katılmasına izin verdiğini belirten adaylar düşük sınav kaygılı; "*hiç*" izin vermediğini belirten adaylar ise yüksek sınav kaygılı bulunmuştur. Buna karşın, "ailedeki kişi sayısı, babanın öğrenim düzeyi, ailenin ekonomik durumu, ailenin dindarlık düzeyi" değişkenlerine göre ise adaylarının yaşadıkları sınav kaygısı manidar olarak farklı çıkmamıştır. Bu araştırmadan elde edilen bulgular, ÖSS adaylarındaki yüksek sınav kaygısını azaltmak için, öğrencilerin yanı sıra, öğrencilerin ailelerine de müdahale etmek gerektiğini ortaya koymaktadır.

Öneriler: Öğrencilerin yaşadığı yüksek sınav kaygısının eğitim sistemi ve kültürel özellikler ve daha başka değişkenler ile ilişkisi incelenebilir. "*Orta okul*" mezun olan anneler, diğer annelerden farklı olarak çocuklarıyla nasıl bir ilişki içindedirler? Bu konu, yapılacak başka araştırmalarda daha ayrıntılı olarak incelenebilir. Adayların sınav kaygısını azaltmak amacıyla, yüksek sınav kaygılı adaylara yönelik "sınav kaygısı ile başa çıkma" programları uygulanabilir. Okullarda bireysel veya grupla psikolojik danışma hizmetleri yaygınlaştırılabilir. Ayrıca, adayların anne babalarına yönelik olarak "sınav aşamasında anne babalar çocuklarına nasıl destek olabilirler?" isimli programların hazırlanıp uygulanması yararlı olabilir. Adayların yaşadığı stres ve yüksek sınav kaygısı bazı psikolojik belirtilere eşlik edebilir (Lufi ve Darliuk, 2005; Yıldırım, 2007). Bu nedenle, gelecekte sınav kaygısı ile durumluk ve sürekli kaygı, depresyon ve başka psikolojik nitelikler arasındaki ilişkiler incelenebilir.

Anahtar Sözcükler: Üniversite adayları, sınav kaygısı, ailesel faktörler