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Investigating the effects of gender and school type on students' learning orientations

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Abstract

This study investigated differences in leaning orientations among male and female students attending three different school types in Turkey. A total of 565 secondary school students participated in the study. The learning approach questionnaire (LAQ) was used to measure students' orientations to learning ranging from meaningful to rote. Two-way multivariate analysis of variance conducted to determine the effect of gender and school type on students' learning orientations. Findings indicated that gender has a significant effect on students' meaningful learning orientation and school type has a significant effect on students' rote learning orientation.

Keywords: Learning orientations; meaningful learning; rote learning; gender; school type.

1. Introduction

In learning science some students perform better than others. This may be due to differences in the way students learn -whether it is meaningful or rote learning (Ausubel, 1968, as cited in Chin and Brown, 2000). Meaningful learning requires relevant prior knowledge, meaningful learning tasks, and a meaningful learning set (Novak, 1988). In contrast, rote learning is arbitrary, verbatim, and not related to experience with events or objects, and lacks affective commitment on the part of the learner to relate new and prior knowledge (Chin and Brown, 2000). The way of students' learning -that is, meaningful or rote- is related to the "orientations to learning". Learning orientation refers to the type of learning that students prefer. Two major types of learning orientation are meaningful learning orientation and rote learning orientation (BouJaoude et al., 2004).

Some students -meaningful learners- using a deep approach, attempt to make connections between concepts, tend to re-organize new content by relating it to prior knowledge, while others -rote learners- using a surface approach, memorize new concepts without making connections to existing frameworks (BouJaoude et al., 2004; Entwistle and Ramsden, 1983). Meaningful learners who "relate new knowledge to relevant concepts and propositions they already know" (Novak and Gowin, 1984) integrate new information into larger and more organized accumulation of information; consequently they reduce their memory overload, increase their processing capacity, and decrease the

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possibility of acquiring new misunderstanding during instruction. While on the contrary, rote learners save their information separately in smaller and numerous knowledge accumulations with this they can be confused and thus their performance decrease (Boujaude, 1992). The studies on students' learning in science suggest that orientations to learning are associated with learning outcomes (Ramsden et al., 1989; Ramsden, 1992). Moreover the related literature reveals that a student's orientation to learning is a considerable factor in determining both the quantity and the quality of their learning (Byrne et al., 2002; Chin and Brown, 2000; Newble and Entwistle, 1986). By means of meaningful learning orientation the learning outcomes are more efficient and consistent, whereas by rote learning orientation is unlikely to obtain high-quality learning outcomes (She, 2005).

As a general result of the related studies, meaningful learners performed significantly better than rote learners and, developed more coherent conceptual understanding. Furthermore, it is stated that relatively meaningful learners were better able to use the information they acquired to correct their misunderstandings (Boujaude, 1992). Williams and Cavallo (1995) implied that students' meaningful learning orientation is associated with conceptual understanding while rote learning orientation leads to obtaining more misunderstandings. In this sense it could be expected that meaningful learning orientation plays a role in predicting achievement (Boujaude et al., 2004). Since achievement is a major learning outcome, there is a need for investigating the factors that affect students' learning orientations.

Besides the students' orientation to learning depends on individual characteristics, it is profoundly affected by both the teaching and school characteristics. The characteristics of a school that have an impact on student learning include the curriculum content, the assessment procedures, the learning materials and teaching aids (Newble and Entwistle, 1986). These factors influence the development of mental capacity and affect students' orientation to learning. Beside the school type, another considerable variable is gender because of its assumed relationship with learning orientation. Considering gender differences in learning orientations some stated no significant different between males and females (Wilson et al., 1996), while others reported significant gender differences (Cavallo, 1994; Cavallo et al., 2004; Watkins and Hattie, 1981). Due to gender and school type are significant differentiating variables in learning orientations, this study aimed to find out answers to the following questions:

1. Is there a difference between mean scores of females and males on learning orientations?
2. Is there a difference between mean scores of students attending Anatolian high schools, vocational and technical high schools, and high schools with an intensive foreign language programme on learning orientations?

2. Method

2.1. Sample

The research was conducted with 565 secondary school students attending Anatolian high schools, vocational and technical high schools, and high schools with an intensive foreign language programme. The age range of the research group students was between 16 and 20. Of the group, 258 (45.7%) were females and 307 (54.3%) were males.

2.2. Instrument

In this study, a version of the learning approach questionnaire adapted by Cavallo and Schafer (1994) was used. The Learning Approach Questionnaire (LAQ) is a Likert-type instrument designed to measure students' orientations to learning ranging from meaningful to rote (Entwistle and Ramsden, 1983). This version of the instrument consists of 22 items and these items represented the meaningful orientation and the surface orientation subscales in the Entwistle and Ramsden (1983) Approaches to Studying Inventory. LAQ uses a four-point Likert-type scale ranging from "Never True" to "Always True" and consists of two subscales: Meaningful Learning Approach Questionnaire (LAQ-M) and Rote Learning Approach Questionnaire (LAQ-R). On the meaningful scale, a high score indicates students have a high meaningful learning approach; on the rote scale, a high score indicates students have a high rote learning approach (Cavallo et al., 2004). Both LAQ-M and LAQ-R scales have possible ranges of 11 - 44. Cavallo et al. (2004) reported the Cronbach alpha reliability for the meaningful scale as 0.81 and 0.76 for the rote scale. For this study, the Cronbach alpha internal consistency is 0.78 for the meaningful scale, and 0.70 for the rote scale. The

LAQ was used to collect data on students' orientations to learning and also students' were asked for obtaining information on gender and school type.

2.3. Data analysis

To determine the effect of gender and school type on students' learning orientations two-way multivariate analysis of variance (MANOVA) was conducted. The independent variables were gender and school type whereas the learning orientations (meaningful and rote) were considered as the dependent variables of the study. The MANOVA was followed by simple main effects tests to investigate gender differences within each school type, a series of univariate analysis of variance, and post hoc comparisons. Prior to examining multivariate effects, multivariate normality, equality of variances and homogeneity of variance-covariance matrices of MANOVA were checked.

3. Results

Descriptive statistics including means and standard deviations for gender and school type with respect to learning orientations is summarized in Table 1. Table 1 indicates that females have higher scores than males on meaningful learning subscale, while males have higher on rote learning subscale. When mean scores of students were compared according to school type, it can be seen that students attending high schools with an intensive foreign language programme appeared to be more successful in meaningful learning with a mean score of 30.15. Students attending vocational and technical high schools have lowest mean score (M=27.79) on meaningful learning subscale, while on rote learning subscale they have highest score (M=31.30) compared to students attending other two school types.

Table 1. Descriptive statistics for the gender and school type with respect to learning orientations.

	Anatolian high schools		High schools with intensive foreign language programme		Vocational and technical high schools		Total	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Meaningful Learning Orientation								
Male	29.27	5.60	29.53	5.40	26.75	5.09	28.71	5.51
Female	30.60	4.22	30.79	5.12	30.85	5.33	30.71	4.73
Total	29.95	4.98	30.15	5.29	27.79	5.43	29.62	5.26
Rote Learning Orientation								
Male	28.38	4.91	28.13	4.79	30.81	5.87	28.92	5.24
Female	27.47	4.87	28.46	5.11	32.74	5.06	28.45	5.21
Total	27.92	4.90	28.29	4.94	31.30	5.71	28.70	5.23

In order to determine that these differences between mean scores are statistically significant, two-way MANOVA was conducted. Summary of two-way MANOVA results comparing mean scores regarding gender and school type with respect to the learning orientations is presented in Table 2.

Table 2. MANOVA summary for comparing learning orientations with respect to gender and school type.

Source	**Wilks' Lambda**	***F***	***p***	η^2
Gender	0.952	13.93	0.000[a]	0.05
School type	0.937	9.16	0.000[a]	0.03
Gender x School type	0.973	3.77	0.005[a]	0.01

[a]Analysis has been performed with the significance level of $\alpha = 0.05$.

According to Table 2, there was a statistically significant gender difference with respect to learning orientations; Wilks' Lambda = 0.952, F (2,558) = 13.93, p = 0.000. The multivariate η^2 of 0.05 implied that 5% of multivariate variance of the dependent variables was associated with gender. Since the significant MANOVA F was obtained for the dependent variables, univariate ANOVAs were conducted to further understand how females and males differed

with respect to learning orientations. The ANOVA results for meaningful learning orientation (F (1,559) = 20.33, p = 0.000) was significant with respect to gender, while the univariate ANOVA for rote learning orientation (F (1,559) = 0.85, p = 0.358) was not significant. On the basis of these findings, it was concluded that females prefer meaningful learning orientation more than males.

The two-way MANOVA results also indicated a statistically significant difference in students' learning orientation by school type; Wilks' Lambda = 0.937, F (4,1116) = 9.16, p = 0.000. The univariate ANOVAs for meaningful learning orientation was not significant (F (2,559) = 2.14, p = 0.119), while univariate ANOVAs for rote learning orientation was significant with respect to school type (F (2,559) = 18.30, p = 0.000). The follow-up Bonferroni test was carried out to determine which pairs cause the significant school type difference with respect to rote learning orientations. The results were indicated that there was a significant difference between students attending vocational and technical high schools and students attending other two school types (p<0.05), while there was no significant mean difference between students attending Anatolian high schools and students attending high schools with an intensive foreign language programme (p>0.05) with respect to rote learning orientations.

The MANOVA results also revealed that there was an interaction between gender and school type (Wilks' Lambda = 0.973, F (4,1116) = 3.77, p = 0.005), but the univariate ANOVAs results indicated that the interaction effect was not statistically significant for both meaningful and rote learning orientations. According to this result the school type does not depend on gender and vice versa with respect to learning orientations.

4. Discussion and Recommendation

In this study, the effects of gender and school type on students' learning orientations were investigated. The results revealed that gender has a significant influence on students' meaningful learning orientation and school type has a significant influence on students' rote learning orientation. The results also revealed that there is no significant interaction between gender and school type differences with respect to learning orientations.

Regarding gender difference, it was found that females performed significantly better than males on meaningful learning approach questionnaire. This result may be related to differences between males' and females' preferences in the areas of motivation, authority orientation, and responsibility. Cavallo (1996) stated that students tend toward using either meaningful or rote approaches in learning concepts and the literature reports mixed results on possible gender differences in the use of orientations. Watkins and Hattie (1981) reported that females were more likely than males to adopt meaningful learning orientation to their work and males were more likely to adopt rote learning orientation which would allow them to scrape through their examinations. Although several studies reported similar gender differences in meaningful learning, there are some contradictory findings that females are less likely than males to prefer meaningful learning orientation. Cavallo et al. (2004) revealed that females used less meaningful learning by the end of a physics course compared to males. Also some researchers reported no gender differences with respect to learning orientations (Cavallo, 1994; Wilson et al., 1996). An explanation of these results may be based on cultural background, therefore additional cross-cultural researches are needed to examine that males and females differ in their use of meaningful and rote learning orientations.

The results of the current study also showed that there is a significant mean difference between students attending different school types with respect to rote learning orientations. The learning context and academic tasks in school environment may influence students' orientations to learning. Similarly, Newble and Entwistle (1986) indicated that characteristics of a school include the curriculum content, the assessment procedures, the learning material and teaching aids as well have an impact on student learning orientation. School environments offering supportive teaching, emphasis on autonomy and moderate stress on achievement are associated with avoidance of superficial learning orientations. Schools characterised by extreme emphasis on formal academic achievement, in which teaching is narrowly focused on examination success, are associated with a tendency towards rote learning orientation (Ramsden et al., 1989). Besides, it is argued that students' learning orientation depend on the context, the content, and the demands of the learning task. It may be useful to design instructional strategies that attempt to use more meaningful learning orientation by all students.

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