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The comparison of prospective preschool teachers' thinking styles and intelligence types

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Abstract

The study aimed to designate the thinking styles and the intelligence types of the prospective preschool teachers and investigated the relationship between these thinking styles and intelligence types. A sample of 75 prospective teachers studying at the first grade of Preschool Education Department at Marmara University participated in the study. The results concluded that the most preferable thinking style among the subscales of Thinking Style Inventory was Legislation whereas the least preferable one was Oligarchic. The dominant intelligence among the prospective teachers was the verbal-linguistic intelligence. It was also ascertained that there was a statistically significant relationship between the prospective teachers' thinking styles and intelligence types.

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1. Introduction

Recent studies have been based on the functions of brain hemispheres in order to explain human learning and human behaviours. Hermann (1998) applies the research results on mental activities of the brain to the field of education and describes the usage of the one hemisphere more frequent than the other as brain dominance. Herman defines brain dominance as favoured thinking style or cognition model. An individual can use the dominant hemisphere of his/her brain if he/she needs to learn something new or to solve a problem. Human beings are born with certain cognitive natural talents. However, they learn to reach responses which have high success ratio and solve problems through experience by using their skills.

Howard Gardner and Robert Sternberg are the most important innovative researchers in the field of intelligence. The theories that they propose about the talents of human beings and the preference of these talents in action are Multiple Intelligence Theory (Gardner 1999) and Theory of Mental Self-Government (Sternberg, 2005). According to Gardner (1999), intelligence is the skill that one can utilize in producing effective and productive solutions to the daily and occupational problems. It is a capacity to produce valued new ideas in a single or multicultural environment and it is also an ability to discover the complex problems that need to be unravelled. On the other hand, Sternberg (2002) defines successful intelligence as the use of environment by people to achieve their goals by

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adapting the environment, to change the environment and to get their needs from the environment. From the point of these two definitions, Gardner and Sternberg have a consensus that intelligence is a way of adapting the environment

Gardner's theory argues that the functions of the brain hemispheres are complex and multidimensional skills which can not be easily explained only by IQ. The level of these skills can cause divergences in people's orientation, problem solving and production processes. Each individual masters in some of the intelligence types, has some progress in some of them and do unwell in others (Ekici, 2003: 34; Aşçı and Demircioğlu, 2004). Gardner (1999) proposes that human beings have a profile of intelligence types rather than having these intelligences one by one and these intelligences can be differed regarding the culture of the individuals and they can also be developed.

Cognitive styles point out individual differences in the mental processes such as perception, recall, thinking and problem solving (Zhang, 2003). The most important characteristic of thinking styles is that they are alterable in socialisation process (Zhang and Sternberg, 2005). Zhang and Sternberg (2005) assert that mental style is the preference of the individual in processing the data or performing the actions. Mental style is cognitive, affective, physical, psychological and sociological at variable stages. It is cognitive for the reason that data processing requires at least some mental activity no matter procedure is preferred. It is affective because emotions related with the activity are the most powerful factors in data processing and implementation. One should choose legislative thinking style if he is interested in tasks requiring creativity, implementation and action in depth. Thinking styles are partially psychological since they can be affected by senses which provide us information about sight, hearing, and touch. They are somewhat physical as the features of the environment in which the individual has an interaction affect the thinking style of the individual. They are also social due to the fact that the characteristics of society are influential on one's thinking styles. Theory of Mental Self-Government proposed by Sternberg propounds that people develop various approaches and tendencies to the problems, events, and variables that they encounter by using their mental processes and he defines these processes as thinking styles.

Multiple Intelligence Theory and Theory of Mental Self-Government which attract attention to individual differences aim individuals effectively adapt the environment by using their skills not only in a particular field but also in all fields while doing something. Once the related literature is reviewed, it can be observed that there are studies examining the relationship between the Multiple Intelligence Theory and individual differences such as success, creativity, learning and etc. However, a study investigating the relationship between the multiple intelligences theory and thinking styles has not been conducted yet.

The purpose of the study is to investigate the relationship between the multiple intelligences that individuals use in order to adapt the environment and the thinking styles.

2. Methodology

2.1. Participants

The descriptive survey model was employed in the study (Karasar, 2003). A sample of 75 prospective teachers studying at the first grade of Preschool Education Department at Marmara University Atatürk Education Faculty participated in the study.

2.2. Data Collection Instruments

The Thinking Style Inventory developed by Sternberg and Wagner (1992) and adapted into Turkish by Bulu (2006) and MIDAS (Multiple Intelligences Developmental Assessment Scales) were used as data collection instruments. The Sternberg-Wagner Thinking Styles Inventory (1992) was based on the Theory of Mental Self-Government, developed by Robert Sternberg and his associates. It consisted of 13 subscales including 8 items for each subscale with a 7 point Likert scale (104 items total). The inventory was adapted into Turkish by Bulu (2006) and the number of items was reduced to 65. In his study, it was revealed that the item-test correlation coefficient varied .31 to .84 and correlation coefficient alpha values regarding the subscales diverged .66 (anarchic) to .93 (monarchic). In the present study, the alpha values of the scale varied .64 (monarchic) to .90 (conservative).

Multiple Intelligences Development Assessment Scales (MIDAS) (Shearer, 1994) was used to determine each participant's intelligences profile in this study. The scale consisted of 70 items. The items were questions related with daily activities requiring participants to associate and judge in order to test their cognitive skills. Many researches have been conducted to test the validity and reliability of MIDAS. The reliability coefficient was found

between 0.85 and 0.90 in the studies conducted by Wiswell et al. (2001), Yoong (2001), Pizarro (2003) and Kim (1999). The scale was adapted into Turkish by Kaya (2002) and the Cronbach's alpha reliability coefficient of the adapted version was found 0.79.

2.3. Data Analysis Procedure

The obtained data was analyzed by employing some statistical techniques such as descriptive statistics and Pearson Correlation Coefficient technique.

3. Results (Findings)

In this section of the study, the findings obtained by the results of the statistical analysis about the variables are described.

Table 1. The N , \bar{x} and SS values for the subscale scores of The Thinking Style Inventory

Dimensions	N	\bar{x}	SS
Legislative	75	27,34	5,78
Executive	75	25,24	5,89
Judicial	75	24,86	6,09
Monarchic	75	22,81	5,32
Hierarchic	75	24,02	5,75
Oligarchic	75	21,92	6,08
Anarchic	75	22,84	5,78
Global	75	22,13	5,96
Local	75	22,10	6,06
Internal	75	23,26	6,08
External	75	23,12	5,81
Liberal	75	23,65	5,70
Conservative	75	26,88	7,22

The scores of the participants obtained from the subscales of the Thinking Styles Inventory are demonstrated in table 1. As can be seen in the table, the first three highest scores are achieved at legislative ($\bar{x} = 27,34$), conservative ($\bar{x} = 26,88$) and executive ($\bar{x} = 25,24$) subscales whereas the least preferred thinking style is oligarchic ($\bar{x} = 21,92$)

Table 2. The N , \bar{x} and SS values for the subscale scores of Multiple Intelligence Inventory

Dimensions	N	\bar{x}	SS
Verbal-Linguistic Intelligence	75	17,00	3,62
Logical-Mathematical Intelligence	75	16,29	3,54
Visual-Spatial Intelligence	75	15,05	3,72
Musical Intelligence	75	12,68	3,19
Bodily-Kinesthetic Intelligence	75	15,94	3,79
Intrapersonal Intelligence	75	15,90	4,32
Interpersonal Intelligence	75	14,17	3,26

In Table 2, the distribution of the intelligence types preferred by the prospective teachers are shown. The table illustrates that the prospective teachers had the tendency of using Verbal-Linguistic Intelligence in the first rank ($\bar{x}=17,00$), Logical-Mathematical Intelligence in the second rank ($\bar{x}=16,29$) and Bodily-Kinesthetic Intelligence in the third rank ($\bar{x}=15,94$). They had the least tendency of using the musical intelligence ($\bar{x}=12,68$)

Tablo 3. The correlation of the subscale scores of the Thinking Style Inventory and Multiple Intelligence Inventory

Variables	N	R	p
Conservative	75	0,361	.000
Verbal-Linguistic Intelligence			
Monarchic	75	0,286	.013
Logical-Mathematical Intelligence			
Oligarchic	75	0,234	.044
Logical-Mathematical Intelligence			
Local	75	0,237	.041
Logical-Mathematical Intelligence			
Liberal	75	0,303	.008
Logical-Mathematical Intelligence			
Conservative	75	0,230	.047
Musical Intelligence			
Oligarchic	75	0,286	.026
Interpersonal Intelligence			
External	75	0,270	.019
Interpersonal Intelligence			
Liberal	75	0,257	.026
Interpersonal Intelligence			

Pearson Correlation coefficient analysis revealed that there was a statistically significant relationship between Conservative subscale scores and Verbal-Linguistic Intelligence ($r=0,361 p<0,01$). The analysis asserted that there was a statistically significant relationship between Monarchic subscale scores and Logical-Mathematical Intelligence ($r=0,286 p<0,05$). It was also attained that there was a statistically significant relationship between Oligarchic subscale score and Logical-Mathematical Intelligence ($r=0,234 p<0,05$). Another statistically significant relationship was found between the Local subscale scores and Logical-Mathematical Intelligence ($r=0,237 p<0,05$). Next, the correlation results divulged that there was a statistically significant relationship between Liberal subscale scores and Logical-Mathematical Intelligence ($r=0,303 p<0,01$). Another statistically significant relationship was attained between Conservative subscale scores and Musical Intelligence. ($r=0,230 p<0,05$). It was also asserted that there was a statistically significant relationship between Oligarchic subscale score and Interpersonal Intelligence ($r=0,286 p<0,05$). Moreover, a statistically significant relationship was attained between External subscale scores and Interpersonal Intelligence ($r=0,270 p<0,05$). The correlation results affirmed that there was also a statistically significant relationship between Liberal subscale scores and Interpersonal Intelligence ($r=0,257 p<0,05$).

4. Discussion

Prospective teachers have verbal-linguistic intelligence as the highest and musical intelligence as the lowest among other intelligence types. It is stated in different sources that verbal-linguistic intelligence and interpersonal intelligence are the most important and functional intelligence types for teachers (Zing, et al., 2004; Riggion, et al., 1999). Since teaching requires extensive interaction with other people especially with the students. Therefore, the

perception of the prospective teachers as competent in terms of verbal-linguistic intelligence is a positive outcome. On the other hand, why prospective teachers have the lowest preference for musical intelligence can be explained by the need of this intelligence type in teaching. The result can also be derived from the disregard of the musical intelligence in the matriculation of the departments in which the participants are studying. Thus, other studies conducted by Korkmaz et al. (2009) and Şahin and Çakar (2008) propound similar results.

The finding related with the relationship between External Thinking Style and Interpersonal Intelligence points out that the ability and the tendency to use this ability is consisted.

A study carried out in the University of Hong Kong reveal that the teachers and student in science and technology fields have higher levels of global thinking style than the teachers and students in the fields of social sciences. Researchers assert that problem solving is associated to universal truths in fields of sciences while the field of knowledge is employed for analysis cantered in field of social sciences (Zhang and Sachs, 1997; Zhang and Sternberg, 1998; cited in Zhang and Sternberg, 2002). Yang and Lin (2004) conducted a study with 1119 male senior high school students in Taiwan and the results point out that liberal, legislation, judicial, hierarchic, oligarchic, anarchic, global and external thinking styles are associated with creativity in a positive manner and conservative, oligarchic, internal thinking styles are negatively related with creativity.

Akbulut's (2006) study carried out with all graders studying at the Music Education Department of Pamukkale University reveal that prospective teachers have a high tendency to use executive thinking style whereas they have the least preference for using the conservative thinking style among the other 13 thinking styles.

A study conducted by Park et al. (2005) with 179 highly gifted science high school students and 176 high school student in Korea propound that highly gifted students prefer liberal, legislative, judicial global and external thinking styles while the ordinary high school students favour conservative, oligarchic and internal thinking styles.

Zhang and Sternberg (2002) conduct a research with 50 graduate level instructors, 143 undergraduate level instructors at Hong Kong University to investigate the relationship between thinking styles and features of teachers. The results conclude that female instructors use executive thinking style more often than male instructors and there is a positive relationship between experience and liberal thinking style and instructors who are eager to use new teaching materials use legislative thinking style more than the others.

The studies conducted to investigate the relationship between thinking styles or multiple intelligences and personality, learning, teaching or psychological factors conclude that there is a significant relationship between them. The results of these studies points out that the views of both theories have the potential to support education in progress dimension and in quality dimension as well.

5. Conclusion and Recommendation

The results of present study conclude that prospective teachers had the highest scores at the legislative, conservative, executive, judicial, hierarchic, liberal and internal subscales of the thinking style inventory. They had the lowest score at the oligarchic subsclae of the thinking style inventory. Results regarding the multiple intelligences state that prospective teachers prefer to use verbal-linguistic intelligence in the first rank, logical-mathematical intelligence in the second and Bodily-Kinesthetic Intelligence in the third rank. It is found the the least preferred intelligence type is musical intelligence. It is also ascertained that there is a statistically significant relationship between thinking styles and multiple intelligences. Depending on these results, following suggestions can be offered.

1. Further studies are necessary to investigate the applicability of the relationship between thinking styles and multiple intelligences revealed in this study by individuals and in which context they are more applicable.
2. Following studies with students from different disciplines can facilitate the assessment of the relationship between conservative thinking style and logical-mathematical intelligence found in this study.
3. It is essential to conduct researches investigating the students' performance in an education setting where both of the theories take place regarding the importance of the individual differences.
4. The designation of the intelligence types and thinking styles of the prospective teachers may enhance their decisions in a positive way in their future career.

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