Educational Sciences: Theory & Practice - 13(1) • Winter • 337-347

www.edam.com.tr/estp

Contributions of Teachers' Thinking Styles to Critical Thinking Dispositions (Istanbul-Fatih Sample)

Serap EMİR[a]
İstanbul University

Abstract

The main purpose of the research was to determine the contributions of the teachers' thinking styles to critical thinking dispositions. Hence, it is aimed to determine whether thinking styles are related to critical thinking dispositions and thinking styles measure critical thinking dispositions or not. The research was designed in relational survey pattern. The research was carried out with 430 teachers, including 202 males and 228 females. The findings of the research were obtained through California Critical Thinking Disposition Inventory and Thinking Styles Inventory. In the analysis of the findings, arithmetic average, standard deviations, and the correlations between variables were calculated.Afterwards, the stepwise regression analyses were conducted to determine the teachers' critical thinking dispositions to thinking styles. A significant relationship was found between the teachers' critical thinking dispositions and thinking styles. It was demonstrated that critical thinking dispositions were measured by thinking styles. The findings and the results were discussed from the point of view of teaching, learning, and evaluation in the survey.

Key Words

Cognitive Styles, Theory of Mental Self-Government, Thinking Styles, Critical Thinking, Critical Thinking Dispositions.

An academic programme depends on many important factors. A good academic programme supports critical thinking and it takes into consideration different cognitive styles (Zhang, 2003). Cognitive styles are the disposition(s) or the preference(s) of the individiual's inclination to use his/her abilities and skills while taking the new information (Fan & Ye 2007; Zhang, 2006). Many theories of mental styles have been conceptualized in order to explain the differences of the learning performances for long years (Dunn & Griggs, 2007; Grigorenko & Sternberg, 1995; Kolb, 1984; Miller 1987; Perry, 1988; Riding & Cheema 1991). Different individuals use different thinking styles in order to gain new information, be famliar to and internalize a learning task. While doing this, they choose the most comfortable style that they are at ease (Zhang & Sternberg, 2000).

a **Serap EMİR**, Ph.D., is an assistant professor at the Curriculum and Instruction. She has been working in the Gifted Education Department at İstanbul University. Her academic work focuses mainly curriculum and instruction, gifted education curriculum development and differentiation. *Correspondence*: Istanbul University, Hasan Ali Yucel Faculty of Education, Special Education, Gifted Education Department, Beyazıt Campus, Fatih, İstanbul/Turkey. E-mail: emirserap@gmail.com Phone: +90 212 440 0330 Fax: +90 212 513 0561.

Thinking Styles

Sternberg (1997) defines thinking style mostly as a preference in the usage of the talent that the individual has rather than preferred kind of something or an ability (Sternberg & Zhang, 2001, p. 198)."Theory of mental self-government" that is put forth by Sternberg (1988, 1990, 1994, 1997) states people's thinking styles. These thinking styles

can be used at home, in school, at work, in society in many situations. This theory asserts that all people manage the whole daily activities like managing a society. The individuals have their own thinking styles and everybody has his or her own way that he/she feels at ease when dealing with the events happening. Thinking styles can be shaped by the conditions that people are in and change depending on the necessities of the situation. This change is closely in relation to social environment depending on culture, time and situation (Zabukovec & Kobal-Grum, 2004). Depending on these hypotheses, the styles can be developed and changed (Sternberg, 1988, 1994, 1997; Zhang, 2004).

Theory of Mental Self-Government defines 13(thirteen) thinking styles in 5(five) dimensions. The dimensions are classified as (the) Functions, Forms, Levels, Scopes and Learnings.

Functions: Three basic thinking styles take place in human beings' Mental Autonomy in this dimension. These are Legislative, Executive and Judicial thinking styles. In Legislative thinking style the individual takes pleasure in taking place the works requiring for creative strategy. This thinking style is focused on creativity, planning, designing and shaping. In Executive thinking style the individual is interested in mostly taking place in the works requiring for some guide principles in good order and directions. In Judicial thinking style the individual takes into consideration other individuals' actions results, focuses on evaluating, judging, and comparing them.

Forms: Four basic thinking styles take part in human beings' Mental Autonomy in this dimension. These can be handled as Monarchic, Hierarchic, Oligarchic and Anarchic. In Monarchic thinking style the individual takes pleasure in participation to the works exactly on which he/she focuses at a certain time, shows a perfectionist behaviour. In Hierarchic thinking style the individual gives attention to many studies and studies by determining the priorities. In Oligarchic thinking style the individual studies for many purposes simultaneously. The individual does not like taking out the priorities by focusing on all of them. In Anarchic thinking style the individual likes concentrating on not causing anxiety, the works providing comfort, flexibility(place,time,the thing,how etc.).

Levels: Two basic thinking styles take part in human beings' Mental Autonomy in this dimension. These are Local and Global thinking. In Local thinking style, the individual takes pleasure for participation to the works requiring for concentrating the details. On the other hand, the individual who has Holistic (?) thinking style is more inclined to give attention to theoretical ideas and the entire of an idea.

Scopes: Two basic thinking styles exist in this dimension.These are Internal and External thinking styles. The individual who demonstrates Internal thinking style takes pleasure from the works which can be worked as being independent. In External thinking style, the individual takes pleasure for joining in the works providing opportunities to develop the interpersonal relations.

Learnings: Liberal and Conservative thinking styles are in this dimension. The person who has Conservative thinking style prefers to be attached to the available rules. The individual who has Liberal thinking style is open-minded, does not avoid the works which lead to the ambiguities, but takes pleasure.

Theory of mental self-government demonstrates a profile of thinking styles for each individual rather than only being defined of one thinking style. Finally thinking styles cannot be thought as good or bad among each of them. However, some thinking styles can be thought as much more being effective than the other ones in students' learning. Although thinking styles are not evaluated as good or bad, the researches which are made by Zhang (2000a, 2000b, 2001a, 2001c, 2001d, 2001e), Zhang and Sternberg (2000), Zhang and Huang (2001) **dem**onstrate that thinking styles can be classified as two kinds. According to this, first group is composed of legislative, judicial, holistic, hierarchic and liberal. These thinking styles generally require to work complex information and mostly focused on creativity. Second types of thinking styles includes data processing such as executive, local, monarchic and conservative styles which require less cognitive effort, norm adaptive(settled, according to the known criteria and the rules). The other four thinking styles (anarchih, oligarchic, internal and external) can show the properties of both two group thinking styles depending on the subject that will be realized on the necessity of the work.

The researches based upon the theory of mental self-government present remarkable results regarding validity of the theory and teaching, learning and assessment in school settings. In these researches, the relationships between the thinking styles and class, department, socio-economic level,birth sequence (Buluş, 2006; Emir, 2011; Sternberg & Grigorenko, 1995), age , gender, work or journey experience (Buluş, 2006; Emir, 2011;

Zhang, 1999; Zhang & Sachs, 1997), the learning strategies (Emir, 2007; Zhang, 2000b; Zhang & Sternberg, 2000), the learning styles (Cano-Garcia & Hewit Hughes, 2000), the types of personality (Balkıs & Işıker, 2005; Zhang, 2000a, 2001a), the teaching methods (Zhang, 2001b) , self-respect and the life style outside of education (Zhang, 2001c), the academic success (Bernardo, Zhang, & Callueng, 2002; Buluş, 2006; Emir, 2011; Grigorenko & Sternberg, 1997; Zhang, 2001d; Zhang & Sternberg, 1998) , self-respect and socio-economic level (Zhang & Postiglione, 2001), the qualities of personality (Zhang 2001a), the cognitive development levels (Zhang, 2001b), the ways of thinking (Zhang, 2001c), the teacher qualities (Buluş, 2005, 2006; Zhang & Sternberg, 2002) and critical thinking dispositions (Zhang, 2003) were examined and the significant relationships were found between the ranked variables and the thinking styles.

Critical Thinking and Critical Thinking Disposition

Paul (1995) who is known for his studies on critical thinking defines critical thinking as the thinking about it when the person is achieving the act of thinking in order to develop the person's self-thinking and by demonstrating that the two things are vital in this definition and explains these things like this (Foundation for Critical Thinking, 1992)

- Critical thinking is not only thinking, but it is also thinking of which things are effective for self-development.
- The self-development is related to the ability of the individual that he/she will use the standards when he/she is thinking. In other words; it is the development of the individual's own way of thinking via the standards.

According to Facione and Facione (1996), critical thinking disposition is a circular process not a linear one providing people to decide on that they will do in which they believe. The researches demonstrate that there is a positive relationship between critical thinking skills and critical thinking dispositions (Profetto-McGrath, 2003; Shin, Jung, Shin, & Kim, 2006). Facione et al. (1995) has defined critical thinking disposition as consistent internal motivation which provides to decide by thinking and to solve the problem. Kökdemir (2003) explains these dispositions as:

- Truth seeking: The person shows the tendency of objective behaviour even if it is against for his/her own thought, truth seeking and sking question skill in this dimension which includes the options or the evaluation of the different thinking dispositions.
- Open-mindedness: It states that the person's toleration for different approaches and the person's vulnerable to his/her own mistakes. The individual takes into consideration the others' decisions when he/she is deciding on anything in this dimension.
- Analyticity: The person shows the tendency of being careful about the problems that can be arised and of reasoning even if there are difficult problems and of using objective proves.
- Systematicity: It is the tendency of the organized, planned, and careful searching.
- Self-confidence: It states that the person's trust for his/her own self-reasoning processes.
- Inquisitiveness: It reflects the tendency of the person's gaining knowledge and learning new things without any benefit or expectation.
- Maturity: It states mental maturity and cognitive development.

According to Ennis (1991), the most vital factor is "the teacher" in the teaching of critical thinking abilities (Ennis, 1991 as cited in Dam & Volman, 2004). "The teacher's most basic mission is to guide for learning and to make easy the learning. The teacher knows how the students learn and develop in order to do effective teaching. The teacher organizes the events that will support their (the students') intellectual, social and personal developments and provides the possibilities. The teacher applies for different teaching methods in order to encourage their critical thinking, solving problem and performance developments."(MEB, 2002; Öztürk, 2004). Therefore the well-educated teachers have a special place in the teaching of thinking abilities. Ashton (1988) states that the teachers' deprivation of the knowledge and skills is the biggest obstacle for the schools' purpose for educating the individuals thinking critically (cited in Akbey, 2007). The teaching programmes must support this besides the teachers. It draws attention that there are a few experimental researches in the related field of education programmes and critical thinking. Akınoğlu (2001) achieves the conclusion that science lessons which are based upon critical thinking is more effective for the students' attitude towards the lessons than the traditional approach. Şahinel (2001) achieves the conclusion that the approach of

the development of integrated language skills with critical thinking abilities is much more effective on the students' total reachings and their attitudes towards Turkish lessons than the traditional methods. Similarly, according to Wilks (1995) in order to educate the students who are asking well, much more attending , much more open to discussions ,determining predictions and priorities,searching for alternatives, inferring meanings from various approaches, it is necessary to educate the teachers who will give the lectures in a way that will gain those qualities (cited in Akbey, 2007).

The Relationship between Thinking Style and Critical Thinking Disposition

There are two important similarities between thinking style and critical thinking disposition. First, as it is defined before, thinking style states the preffered way of the usage of the abilities. Similarly, critical thinking disposition states to the tendency of critical thinking. Therefore, both of the structures underline the person's thinking habit (habits of the mind).

Secondly, both of the structures are wide in their each own ways. While thinking style structure includes the style qualities of the three traditions in mental style studies, critical thinking disposition structure includes "the definitions of objective disciplined claim, ideal critical thinker, generalization in the different environment and situations" (Facione, Facione, & Giancarlo, 1998, p. 2).

In literature, each of these structures has been intensely examined seperately or different variables. However, the number of the researches which examines the relationship between those two structures is less. Zhang (2003) searches for the contributions of thinking styles to critical thinking dispositions as directly related to this search's variables. The main purpose of the study is to investigate whether thinking styles contributes to critical thinking dispositions or not. The sample of the study is composed of two student groups coming from Peking and Nanjing and attending the University of China. The attendants are applied Thinking Styles Inventory (Sternberg & Wagner, 1992) and critical thinking disposition measure (Facione & Facione, 1998). In the result of the research, it is observed that both of the samples thinking styles contributes to critical thinking dispositions. It affects not only class teaching but also the evaluation of academic and non-academic programme. Using the keyword combinations (such as critical thinking, critical thinking disposition, learning styles, cognitive styles and thinking styles) from the different databases, it is observed that the research done is less (Zang, 2003). Most of these are experimental investigations. For instance, the significant relationship is found between intuitive learning style and curiosity, truth seeking tendency and total critical thinking disposition points in the researches that are carried out with health field students by McDade (2000) (Bostic, 1989; Gadzella & Mas Ten, 1998). Any of significant relationship is found between Watson-Glaser Critical Thinking Evaluation Invantory and Kolb's Learning Style Inventory in the study which is conducted with the nursery students by Nathan (1997) (Krank, 1994; McCrink, 1999). The studies that have significant relationships between cognitive styles and critical thinking support the argument that mental style plays an important role in critical thinking. In addition, according to the results of the studies which are not experimental Feldhusen and Goh (1995) defend that the critical thinking is an integrated part of the concept of the creativity and the programmes that are directed to develop the critical thinking must absolutely focus on cognitive style among other factors.

The purpose of the research is to expect to educate the students who are asking well, are open to discussions, seeking for alternative solutions for problems,creating different opinions from various approaches, having the ability to managing the daily activities. In order to cultivate these types of students primarily, it is necessary for the teachers to have those qualities. Taking into consideration all of these factors and considering that will contribute to the field it is aimed to determine the power of the measure of the teachers' thinking styles to their critical thinking dispositions. For this, it is required whether thinking styles are related to critical thinking dispositions and thinking styles measure critical thinking dispositions or not.

Method

The Model of the Research

The research was designed in relational survey pattern. The relational survey pattern is the research model which is aimed at determining the existence and the degree of the change between two or more numbers of variables (Gay 1987; Karasar 1991).

The survey pattern is an approach which aims at depicting a situation that exists now or was in the past (Karasar, 1999). The subject of the research is

tried to define with the situation that is available. The scientific studies which are performed in relation to the subject are included.

Participants

The research is composed of the teachers working in the primary schools of the city of Istanbul and the district of Fatih. The sample of the study was composed of teachers chosen through convenience sampling technique 430 (four hundred thirty) 202 (two hundred two) men, 228 (two hundred twenty two) women. Convenience Sampling consists of taking the sampling elements that the researcher can achieve easily. This sampling is the sampling which is used when the sampling designing and in the non-achievable situations sometimes is used for when determining the matter elements is impossible. Convenience Sampling is preferable due to being the practical and economic (Monetle, Sullivan, & De Jong, 1990).

Instruments

In the research , Thinking Styles Inventory (TSI) which was developed Turkish adaptation security and validity by Fer (2005) with the aim of determinating teachers' thinking styles (Sternberg & Wagner, 1992) , California Critical Thinking Disposition Inventory (CCTDI) which was developed originally by Facione, Facione, and Giancarlo (1998) with the aim of measuring the teachers' critical thinking dispositions and whose Turkish adaptation validity-security study was made by Kökdemir (2003) were used.

Thinking Styles Inventory (TSI): Has been developed by Sternberg and Wagner (1992) through the foresights of theory of mental of self-government .This inventory has been chosen since it has been acceptable in measuring thinking styles in literature and the cause for it has been tried in different cultures. The inventory aims at emerging from 5 (five) basic factors out of 13 (thirteen) thinking styles of the individual's dominant sides. There is not any total point which is taken from the whole of the inventory because one basic dimension measures freely from the other dimensions of the thinking style which is dominant in the individual. The analysis of the points is being made in relation to the sub-measurement. The inventory is composed of 104 elements totally written in affirmative sentence form. These elements are organized in order to measure 13 (thirteen) thinking styles under the 5 (five) basic dimensions with the 8 (eight) measured elements. The inventory consists of sub-measurements of Legislative, Executive, Judicial, Monarchic, Oligarchic, Hierarchic, Anarchic, Holistic, Local, Internal, External, Liberal and Conservative. In Fer's (2005) study Cronbach alpha coeffecient of the measure has come out 0.90 in the whole 104 (one hundred four) substances. Cronbach alpha coefficient of the sub measures values are between 0.62 and 0.90. Sünbül (2004) calculated Cronbach alpha reliability coefficients of the sub measures between 0, 709 and 0,854. In this research the measure's total Cronbach Alpha reliable coefficent 92 and the sub dimensions of the measure's Cronbach Alpha reliability changes between .61-91. It can be said that the measure is a reliable measure means by looking at these results.

California Critical Thinking Disposition Inventory (CCTDI): CCTDI's being different from similar critical thinking inventories (for instance, Watson – Glaser Critical Thinking Skills Inventory) is not for measuring a skill, it is being used in order to evaluate the level of the person's critical thinking disposition or to evaluate critical thinking level extensively (Kökdemir, 2003, p. 71). This inventory has emerged as a result of Delphi project which was organized by American Philosophy Association in 1990 (Facione, Facione, & Giancarlo, 1998) . The inventory has 7 (seven) sub measures and 75 (seventy five) substances which are determined theoretically and also are tested psychometrically. However the grade system composed of these measures' total is being used in order to determinate critical thinking disposition. It can be said that when the inventory is evaluated as a whole the people whose grades less than 240 (two hundred forty) general critical thinking dispositions are low and on the other hand whose grades more than 300 (three hundred) these dispositions are higher. These sub measures are Analyticity, Open-mindedness, Inquisitiveness, Self-confidence, Truth Seeking, Systematicity and Inquisitiveness sub inventories. While Original California Critical Thinking Disposition Inventory's sub inventories Cronbach Alpha reliable coefficients change between .60 and .78, the inventory's Cronbach Alpha reliable coefficient .90 has been found for total grade (Kökdemir). While in Kökdemir's research the sub dimensions of the inventory of Cronbach Alfa reliable coefficients change between .61 and .78, the total of the inventory's Cronbach Alpha reliable coefficient has been found .88. In this research the inventory's total Cronbach Alpha reliable coefficient has been found .84. The inventory's sub dimensions' Cronbach alpha reli-

able coefficients change between .62 - .76. It can be said that the inventory is a reliable inventory depending basis upon these results.

Procedures

The research datas were collected by the researcher by giving together both of the measurements from the teachers working on the primary schools in the city of Istanbul and the district of Fatih which are bound to National Education Ministry.

Data Analysis

In the research arithmetic average, standard deviation and the correlations between variables were calculated. Later, the stepwise regression analyses were conducted to determinate the teachers' critical thinking dispositions to thinking styles.

Findings

In this study the correlation calculations have been made with the aim of determining the relationship between the teachers' thinking styles and critical thinking dispositions in order to put forth the relationship between teachers' thinking styles and critical thinking dispositions first related to all the variables arithmetic average and standard deviation. It has been observed the significant relationship between the teachers' total critical thinking dispositions point and judicial (r = .156, $p < .01$), anarchic (r = .147, $p < .01$), holistic (r= .129, $p< .01$) and conservative(r= .111, $p <.05$) thinking styles) statistically. When the relationships between the sub dimensions have been examined it has been observed significantly positive relationships. Depending basis upon these findings it has been observed that there is statistically the significant relationship between teacher critical thinking disposition and thinking styles. The stepwise multiple regression analysis has been made in order to examine which thinking style can measure truth seeking critical thinking disposition. In the first step of the teachers' truth seeking critical thinking disposition in relation to measuring with thinking styles stepwise regression analysis of holistic thinking style variable in measuring truth seeking critical thinking disposition's standardization regression (Beta) coefficient has come out 110(one hundred ten). Holistic thinking style variable meaningfully (t = 2,296, $p<.05$) measures truth seeking critical thinking dispositions. It is observed that holistic thinking style variable alone can explain the %1 (one percent) (R^2 = ,012) of the level of teachers' truth seeking critical thinking disposition. Executive thinking style variable has entered to the model in the second step of stepwise regression analysis. It is observed that the power of measuring has risen with the addition of executive thinking style to measuring equation. With holistic and executive thinking style variables it shows that %2 (second percent) (R=110 ve R^2 = ,024) of the teachers' truth seeking critical thinking dispositions can explain. On the condition that the other variables are fixed, Holistic thinking style variable Beta coefficient 153; Executive Thinking style variable Beta coefficient -,118 have come out. The t values (in order t= 2,983, t= -2,289, $p<.001$) in relation to both Beta coefficient have been found significantly. When the regression coefficients in relation to the variables R^2 and t (* $p< .05$) values are examined, it is understood that the teachers measure significantly truth seeking critical thinking dispositions.

The teachers' open mindedness critical thinking disposition to thinking styles in the first step of regression analysis in relation to measuring examined holistic thinking style variable measuring the standardized regression coefficient (Beta) 0,113 has come out. Holistic thinking style variable measures open mindedness critical thinking dispositions meaningfully (t=2,357, $p<.05$).

When the other variables are fixed, it is observed that holistic thinking style variable alone can explain the level of %1 (one percent) (R=113 ve R^2 = ,013) teachers' open-mindedness critical thinking disposition. Judicial thinking style variable has entered to the model in the second step of stepwise regression analysis. It is seen that the power of measuring of Judicial thinking style has risen with the addition to measuring equation. Holistic and Judicial thinking style variables together show to explain %2 (two percent) (R= ,152 ve R^2 = ,023) of the teachers' open-mindedness critical thinking dispositions. On the condition that the other variables are fixed, Holistic thinking style variable Beta coefficient ,104; Judicial Thinking style variable Beta coefficient have come out ,102. The t values (in order t= 2,156, t= 2,118, $p< .05$) in relation to both Beta coefficient has been found meaningfully. When the regression coefficients in relation to the variables or R^2 and t (*$p< .05$) values are examined, it has been observed that the teachers' critical thinking measures truth seeking dispositions significantly.

The teachers' analyticity critical thinking dispositions in relation to measuring with thinking styles

in the stepwise regression analysis anarchic thinking style variable measuring analyticity critical thinking disposition regression coefficient (Beta) has come out .150. The teachers' anarchic thinking style variable measures significantly (t= 3,136 *p<.05*) analyticity critical thinking dispositions. It is understood that anarchic thinking style variable alone can explain the level of %2 (two percent) (R= ,150 ve R^2 = ,022) the teachers' analyticity critical thinking disposition and when t (**p< .05*) values are examined,it is understood that it has measured the teachers' analytic critical thinking disposition significantly. The teachers' systematicity critical thinking dispositions in relation to measuring with thinking styles in the stepwise regression analysis judicial thinking style variable measuring systematicity critical thinking disposition regression coefficient (Beta) has come out .102. The teachers' judicial thinking style variable measures significantly (t=2,122; *p<.05)* systematicity critical thinking dispositions. It is understood that judicial thinking style variable alone can explain the level of %1 (one percent) (R= ,102 and R^2 = ,010) the teachers' systematicity critical thinking disposition and when R^2 and t (**p< .05*) values are examined,it is seen that it has measured the teachers' systematicity critical thinking disposition significantly.

The teachers' inquisitive critical thinking dispositions in relation to measuring with thinking styles in the stepwise regression analysis judicial thinking style variable measuring inquisitive critical thinking disposition regression coefficient (Beta) has come out .154. The teachers' judicial thinking style variable measures significantly (t=3,224; *p<.05*) inquisitive critical thinking dispositions. It is observed that judicial thinking style variable alone can explain the level of %2 (two percent) (R= ,154 ve R^2 = ,023) the teachers' inquisitive critical thinking disposition and when t (**p< .05*) values are examined,it is understood that it has measured the teachers' inquisitive critical thinking disposition significantly.

The teachers' self-confidence critical thinking dispositions in relation to measuring with thinking styles in the first step of stepwise regression analysis judicial thinking style variable measuring self-confidence critical thinking disposition regression coefficient (Beta) has come out ,214 . The teachers' judicial thinking style variable measures significantly (t =4,522, *p<.05*) self-confidence critical thinking dispositions. It is observed that judicial thinking style variable alone can explain the level of %5 (five percent) (R^2 =,046) the teachers' self-confidence critical thinking disposition when the other variables are fixed. Anarchic thinking style variable has entered to the model in the second step of stepwise regression analysis. It is seen that the power of measuring of Anarchic thinking style has risen with the addition to measuring equation.

Judicial and anarchic thinking style variables together show %6 (six percent) R^2=,056) of the teachers' self-confidence critical thinking dispositions can explain. When the other variables are fixed, it is found that judicial thinking style variable Beta coefficient ,167; and anarchic thinking style variable Beta coefficient have come out, 114. The t values (in order t= 3,250, t= 2,212, *p<.001*) in relation to both Beta coefficient has been found meaningfully. When the regression coefficients in relation to the variables or R^2 and t (**p< .05*) values are examined, it is seen that the teachers' critical thinking measures self-confidence dispositions significantly.

The teachers' maturity critical thinking dispositions in relation to measuring with thinking styles in the first step of stepwise regression analysis hierarchic thinking style variable measuring maturity critical thinking disposition regression coefficient (Beta) has come out , - 111. It is observed that hierarchic thinking style variable alone can explain the level of %1 (one percent) (*R*=,111; R^2 =,012) the teachers' maturity critical thinking disposition when the other variables are fixed. Oligarchic thinking style has entered to the model in the second step of stepwise regression analysis. It is seen that the power of measuring of Oligarchic thinking style has risen with the addition to measuring equation. Hierarchic and oligarchic thinking style variables together show the level of %3 (three percent) (R=,168 ve R^2 = ,028) can explain the teachers' maturity critical thinking dispositions.On the condition that the other variables are fixed, Hierarchic thinking style variable Beta coefficient, -130; and Oligarchic Thinking style Beta coefficient have come out , 128. The t values (in order t= -2,699, t= 2,645, *p<.001*) in relation to both Beta coefficient have been found meaningfully. When the regression coefficients in relation to the variables or R^2 and t values are examined, it can be said that the teachers measure maturity critical thinking dispositions significantly.

The teachers' general critical thinking dispositions in relation to measuring with thinking styles in the first step of stepwise regression analysis judicial thinking style variable measuring general critical thinking disposition regression coefficient (Beta) has come out .156. The teachers' judicial think-

ing style variable measures significantly (t=3,290; *p<,01*) general critical thinking dispositions. It is observed that judicial thinking style variable alone can explain the level of %3 (three percent) (R= ,025 ve R^2 =,025) the teachers' general critical thinking disposition when the other variables are fixed. Holistic thinking style variable has entered to the model in the second step of stepwise regression analysis. . It is seen that the power of measuring of Holistic thinking style has risen with the addition to measuring equation. Judicial and holistic thinking style variables together show the level of %4 (four percent) (R=,194 ve R^2=,038) can explain the teachers' general critical thinking dispositions. On the condition that the other variables are fixed, Judicial thinking style variable Beta coefficient, 146; and Holistic Thinking style Beta coefficient have come out , 114. The t values (in order t= 3,067; t= 2,396, *p<.05*) in relation to both Beta coefficient have been found meaningfully.

Hierarchic thinking style variable has entered to the model in the third step of stepwise regression analysis. It is seen that the power of measuring of Hierarchic thinking style has risen with the addition to measuring equation. Judicial, holistic and hierarchic thinking style variables together show the level of %5 (five percent) (R= ,217 ve R^2=,047) can explain the teachers' general critical thinking dispositions. On the condition that the other variables are fixed, Judicial thinking style variable Beta coefficient, 146; Holistic Thinking style Beta coefficient , 114; and Hierarchic thinking style Beta coefficient -,102 have come out. The t values (in order t= 3,067; t= 2,396; t= -2,081; *p<.05*) in relation to each three of Beta coefficient have been found meaningfully. When the regression coefficients in relation to the variables or R^2 and t values are examined, it is understood that the teachers measure general critical thinking dispositions significantly.

Discussion and Conclusion

At the results of the correlation calculations in order to determinate the relationship between teachers' critical thinking dispositions and thinking styles the positive relationships have been found largely between the variables in order to determine the relationship betweenteachers' critical thinking dispositions and thinking styles. In the research which was made by Zhang (2003) there has been found the positive relationship between critical thinking dispositions and thinking styles. It has been observed that critical thinking dispositions and self-confidence have the relationship mostly. Reflecting the self-confidence for reasoning (Facione & Facione, 1998; Facione, Sánchez, Giancarlo, Facione, & Gainen, 1995; Kökdemir, 2003) the self-confidence demonstrates positive relationships with critical thinking disposition, legislative executive, judicial, anarchic, local, internal and liberal thinking styles. According to this result, the individuals make plans when using correctly the ways of reasoning in relation to a subject, the individual applies the plans and he/she can evaluate the results of application. While doing all of these, the individual can present a good performance by using his/her own creativity. It is necessary for teachers to have all these qualities mentioned. The less relationship has been observed between organized, planned and searching for carefully individuals' systematic critical thinking disposition and thinking styles. The positive relationship has been found between systematic critical thinking disposition and just judicial thinking styles. It has been observed that Truth seeking critical thinking disposition measure holistic and executive styles. The individuals who have Truth seeking critical thinking disposition have the disposition of the evaluation of alternatives or various different thoughts. Those people have the disposition of objective behaviour even if in truth seeking, asking questions and the situations which are against for the person's own thought (Facione & Facione, 1998; Facione, Sánchez, Giancarlo, Facione, & Gainen, 1995; Kökdemir, 2003). The individuals who have Executive thinking style like following the rules and the things that will be done and they prefer the problems which are constructed before. This individual prefers to do his/her best. They avoid the works requiring for working independently (Buluş, 2005; Grigorenko & Sternberg, 1997; Sternberg, 1997). According to those findings, we can say that teachers who have truth seeking critical thinking disposition achieve the reality by applying the rules with a holistic approach.

Holistic and judicial thinking style measures open-mindedness critical thinking disposition. The individuals who have open-mindedness critical thinking disposition when deciding gives the importance to not only their thoughts but also to the other peole. They show the tolerance for different thought and views (Facione & Facione, 1998; Facione, Sánchez, Giancarlo, Facione, & Gainen, 1995; Kökdemir, 2003). Holistic thinking style and judicial thinking style which prefers to evaluate the present situations and thoughts contributes to open-mindedness critical thinking disposition. Judicial thinking style measures systematicity critical thinking

disposition. The individuals who have systematicity critical thinking disposition have the tendency of organized, planned and searching carefully. At the same time these individuals show the tendency of using the strategy of deciding based on knowledge and follows a certain procedure. The teachers using systematic thinking style while they seeking for an event or situation can take the contribution from judicial thinking style. The findings of the research also supports this thought.Judicial thinking style measures inquisitiveness critical thinking disposition. Zhang's (2003) research supports this result. Inquisitiveness reflects the tendency of the person's gaining knowledge and learning new things without any benefit or expectation (Kökdemir). The evaluation of the knowledge that is obtained by the result of judicial thinking style and inquisitiveness can affect to contribute whether the knowledge that is wished for or not. Teachers can benefit the dimensions while researching the subjects that they themselves and their students wished to gain. Judicial and anarchic thinking styles measure the self-confidence critical thinking disposition.

The self-confidence, as it is understood by its name, reflects the trust that the person's self-reasoning processes. If teachers use their self-reasoning processes with comfort and flexibility and without any worry by being self-confidence and if they can evaluate this correctly they can achieve a more healthy result. Hierarchic and oligarchic thinking styles measure maturity critical thinking dispositon. Maturity is defined as metal maturity and cogntive development (Facione & Facione, 1998; Facione, Sánchez, Giancarlo, Facione, & Gainen, 1995; Kökdemir, 2003). In hierarchic thinking style the individuals doing lots of works simultaneously by determining the priority. On the other hand oligarchic doing lots of works without determining the priorities (Fer, 2005). In this case the contradiction is in question but the individuals achieving cognitive and developmental maturity generally can do the works that they plan sometimes by determining priority sometimes without determining priority.

Judicial, holistic and hierarchic thinking styles measure general critical thinking. Critical thinking disposition was defined by Facione et al. (1995) as the internal motivation that provides to decide by thinking and to solve the problem. The result of the findings is also consistent in this definition.It is observed that thinking styles have made a positive contribution to the seven dimensions of critical thinking dispositions. Those results support the findings of Zhang's (2003) research that is made before.

In conclusion, the importance of the findings in relation to the relationship between Thinking styles and critical thinking dispositions not only contributing to the field, but also it is vital for education-teaching and evaluation and the development programme. If the teacher candidates are given the opportunities to use their own thinking styles especially in the programmes of the cultivation of the teacher in order to develop teachers' critical thinking abilities, after graduation teachers can provide the environments for their own students. Teachers should let the students use their own dominant thinking styles in order to develop students' critical thinking abilities and they should give the education which is not used in general providing them to use new styles and they should evaluate. If the teachers use many various teaching methods and techniques in the students' education and if they evaluate the students' success from different point of views the students who have different thinking styles can benefit from this teaching much more.

References/Kaynakça

Akbey, B. (2007). Eleştirel düşünmenin öğretiminde öğretmenin rolü. *Bilim, Eğitim ve Düşünce Dergisi, 7* (2). Retrieved October 09, 2011 from http://www.universite-toplum.org/text.php3?id=322.

Akınoğlu, O. (2001). *Eleştirel düşünme becerilerini temel alan fen bilgisi öğretiminin öğrenme ürünlerine etkisi.* Yayımlanmamış doktora tezi, HacettepeÜniversitesi, Ankara.

Balkıs, M., & Işıker, B. G. (2005). The relationship between thinking styles and personality types. *International Journal of Social Behavior and Personality, 33* (3), 283-294.

Bernardo, A. B. I., Zhang, L. F., & Callueng, C. M. (2002). Thinking styles and academic achievement among Filipino students. *The Journal of Genetic Psychology, 163* (2), 149-163.

Bostic. J. Q. (1989). Cognitive styles: Their consolidation and relationship, beyond cognitive developmental level and critical thinking ability, to understanding science. *Dissertation Abstracts International: Humanities and Social Sciences,* 4V (i I A). 3320.

Buluş, M. (2005). İlköğretim Bölümü Öğrencilerinin Düşünme Stilleri Profili Açısından İncelenmesi. *Ege Eğitim Dergisi 6* (1), 1–24

Buluş, M. (2006). Assessment of thinking styles in the theory of mental self-government, academic achievement and student teachers' characteristics. *Eğitim ve Bilim, 31* (139), 35-48.

Cano-Garcia, F., & Hewitt Hughes, E. (2000). Learning and thinking styles: An analysis of their interrelationship and influence on academic achievement. *Educational Psychology, 20* (4), 413-432.

Dam, G., & Volman, M (2004). Critical thinking as a citizenship competence: Teaching strategies. *Learning and Instruction*, *14*, 359–379.

Dunn, R., & Griggs, S. A. (2007). *Synthesis of Dunn & Dunn learning-style model: Research who, what, when, where and so what?* Jamaica, NY: St. Johns' University Press.

Emir, S. (2007, June). *Prediction power of thinking styles on learning strategies of teacher candidates.* Paper presented et the Fourth Balkan Congress: Education, The Balkans, Europe, Stara Zagora, Bulgaria.

Emir, S. (2011). Düşünme stillerinin farklı değişkenler açısından incelenmesi. *Hasan Ali Yücel Eğitim Fakültesi Dergisi, 15* (1), 77-93.

Facione, P. A., Sanchez, C. A., Facione, N. C., & Gainen, J. (1995). The disposition toward critical thinking. *The Journal of General Education, 44* (1), 1–25.

Facione, N., & Facione, P. (1996). Assessment design issues for evaluating critical thinking in nursing. *Holistic Nursing Practice*, *10*, 41–53.

Facione, N., & Facione, P. (1998). *Critical thinking assessment in nursing education programs: An aggregate data analysis*. Millbrae, CA: Academic Press.

Facione, P., Facione, N., & Giancarlo. C. (1998). *California critical thinking disposition inventory, -Inventory manual*. Millbrae. CA: The California Academic Press.

Fan, W., & Ye, S. (2007). Teaching styles among Shanghai teachers in primary and secondary schools. *Educational Psychology, 27* (2), 255–272.

Feldhusen, J. P., & Goh, B. E. (1995). Assessing and accessing creativity: An integrative review of theory, research, and development. *Creativity Research Journal*, *8*, 231-247.

Fer, S. (2005). Düşünme stilleri envanterinin geçerlik ve güvenirlik çalışması. *Kuram ve Uygulamada Eğitim Bilimleri, 5*, 433-461.

Foundation for Critical Thinking (FCT). (1992). *Critical thinking: Basic questions and answers*. Retrieved Junnuary 08, 2012 from http://www.criticalthinking.org/pages/critical-thinking-basic-questions-amp-answers/ 409

Gadzella, B. M., & Mas Ten, W. G. (1998). Relation between measures of critical thinking and learning styles. *Psychological Reports, 53* (3. Pt. 2). 1248-1250.

Gay, L. R. (1987). *Educational research compentencies for analysis and application*. New York: Macmillan Publishing Company.

Grigorenko, E. L., & Sternberg, R. J. (1995). Thinking styles. In D. Saklosfske & M. Zeidner (Eds.), *International handbook of personality and intelligence* (pp. 205–229). New York: Plenum.

Grigorenko, E. L., & Sternberg, R. J. (1997). Styles of thinking, abilities, and academic performance. *Exceptional Children, 63* (3), 295-312.

Karasar, N. (1991). *Bilimsel araştırma yöntemi*. Ankara: Sanem Matbaacılık.

Karasar, N. (1999). *Bilimsel araştırma yöntemi*. Ankara, Nobel Yayınları.

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall.

Kökdemir, D. (2003). *Belirsizlik durumlarında karar verme ve problem çözme*. Yayımlanmamış doktora tezi, Ankara Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Krank, H. M. (1994). Do cognitive styles and learning environment predict critical think ing performance for pre-service teachers? *Dissertation Abstracts International: Humanities and Social Sciences, 54* (9A). 3379.

Mccrink, C. L. S. (1999). The role of innovative teaching methodology and learning styles on critical thinking *Dissertation Abstracts International Humanities and Social Sciences, 59* (9A). 3420.

Mcdade, D. C. (2000). Relationships between learning styles and critical thinking ability among health professional students. *Dissertation Abstracts International: Humanities and Social Sciences, 61* (6A), 2212.

MEB. (2002). *Öğretmen yeterlilikleri. Öğretmen Yetiştirme ve Eğitimi Genel Müdürlüğü*. Ankara: Yazar.

Miller, A. (1987). Cognitive styles: An integrated model. *Educational Psychology, 7* (4), 251–268.

Monetle, D. R., Sullivan, T., & De Jong, C. R. (1990). *Applied social research.* New York: Harcourt Broce Jovanovich, Inc.

Nathan, Y. II. (1997). Critical thinking: Impact on two classes of nursing students in an academic year. *Dissertation Abstracts International: Humanities and Social Sciences, 58* (5A). 1614.

Öztürk, Ç. (2004). Ortaöğretim coğrafya öğretmenlerinin öğretim yöntem ve teknikleri kullanabilme yeterlilikleri. *Gazi Üniversitesi Kırşehir Eğitim Fakültesi*, *5* (2), 75-83.

Paul, W. R. (1993) *Critical thinking: How to prepare students for a rapidly changing world.* Santa Rosa, CA: Foundation for Critical Thinking.

Perry, W. G. (1999). *Forms of intellectual and ethical development in the college years: A scheme(3rd ed.).* San Francisco, CA: Jossey-Bass.

Profetto-McGrath, J. (2003). The relationship of critical thinking and critical thinking dispositions of baccalaureate nursing students. *Journal of Advanced Nursing*, *43*, 569–577.

Riding, R., & Cheema, I. (1991). Cognitive styles –An overview and integration. *Education Psychology, 11* (3–4), 193–215.

Shin, K., Jung, D., Shin, S., & Kim, M. (2006). Critical thinking dispositions and skills of senior nursing students in associate, baccalaureate, and RN-to-BSN programs. *Journal of Advanced Nursing*, *45*, 236–238.

Sternberg, R. J. (1988).Mental self-government: A theory of intellectual styles and their development. *Human Development*, *31*, 197–224.

Sternberg, R. J. (1990). Thinking styles: Keys to understanding student performance. *Phi Delta Kappan*, *71*, 366-371.

Sternberg, R. J., & Wagner, R. K. (1992). *Thinking styles inventory* (Unpublished test). Yale University, New Haven, CT.

Sternberg, R. J. (1994). Thinking styles: Theory and assessment at the interface between intelligence and personality. In R. J. Sternberg & P. Ruzgis (Eds.), *Intelligence and personality* (pp. 169-187). New York: Cambridge University Press.

Sternberg, R. J. (1997). *Thinking styles*. Cambridge: Cambridge University Press.

Sternberg, R. J., & Grigorenko, E. L. (1995). Styles of thinking in the school. *European Journal for High Ability, 6*, 201-219.

Sternberg, R. J., & Zhang, L. F. (2001). *Perspectives on thinking, learning, and cognitive styles*. London: Lawrence Erlbaum Associates, Publishers,.

Sünbül, A. M. (2004). Düşünme Stilleri Ölçeğinin geçerlik ve güvenirliği. *Eğitim ve Bilim Dergisi, 132*, 25-42.

Şahinel, S. (2001). *Eleştirel düşünme becerileri ile tümleşik dil becerilerinin geliştirilmesi yaklaşimini temel alan Türkçe öğretim programinin toplam erişi ve kaliciliğa etkisi.* Yayımlanmamış doktora tezi, Hacettepe Üniversitesi, Ankara.

Zabukovec, Z., & Kobal-Grum, D. (2004). Relationship between student thinking styles and social skills. *Psychology Science, 46*, 156-166.

Zhang, L. F., & Sachs, J. (1997). Assessing thinking styles in the theory of mental selfgovernment: A Hong Kong validity study. *Psychological Reports, 81*, 915-928.

Zhang, L. F., & Sternberg, R. J. (1998). Thinking styles, abilities, and academic achievement among Hong Kong university students. *Educational Research Journal, 13*, 41-62.

Zhang, L. F. (1999). Further cross-cultural validation of the theory of mental self- goverment. *The Journal of Psychology Interdisciplinary and Applied, 133* (2), 165-181.

Zhang, L. F. (2000a). Are thinking styles and personality types related? *Educational Psychology, 20* (3), 271-284.

Zhang, L. F. (2000b). Relationship between thinking styles inventory and study process questionnaire. *Personality and Individual Differences, 29*, 841-856.

Zhang, L. F. (2001a). Thinking styles and personality types revisited. *Personality and Individual Differences, 31* (6), 883-894.

Zhang, L. F. (2001b). Approaches and thinking styles in teaching. *The Journal of Psychology, 135* (5), 547-561.

Zhang, L. F. (2001c). Thinking styles, self-esteem, and extracurricular experiences. *International Journal of Psychology, 36* (2), 100-107.

Zhang, L. F. (2001d). Do thinking styles contribute to academic achievement beyond self- rated abilities. *The Journal of Psychology, 135* (6), 621-637.

Zhang, L. F., & Huang, J. (2001). Thinking styles and the Five FactorModel of personality. *European Journal of Personality*, *15*, 465–476.

Zhang, L. F. (2003). Contributions of thinking styles to critical thinking dispositions. *Journal of Psychology, 137* (6), 517–544.

Zhang, L. F. (2004). Thinking styles: University students' preferred teaching styles and their conceptions of effective teachers. *The Journal of Psychology*, *138* (3), 233–252.

Zhang, L. F. (2006). Does student-teacher thinking match/mismatch matter in students' achievement? *Educational Psychology, 26* (3), 395–409.

Zhang, L. F., & Postiglione, G. A. (2001). Thinking styles, self-esteem and socioeconomic status. *Personality and Individual Differences, 31*, 1333-1346.

Zhang, L. F., & Sternberg, R. J. (2000). Are learning approaches and thinking styles related? A study in two Chinese populations. *Journal of Psychology, 134* (5), 469–489.

Zhang, L. F., & Sternberg, R. J. (2002). Thinking styles and teachers' characteristics. *Internatıonal Journal of Psychology, 37* (1), 3–12.