Investigation into the Prediction Level of Professional Values of Prospective Teachers within the Context of Critical Thinking, Metacognition and Epistemological Beliefs in Turkey

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Abstract

The general aim of the present study is to identify to what extent the professional values of prospective teachers are predicted by the variables of critical thinking, metacognition, epistemological beliefs. The study also aims to determine which variables provide a better prediction of the professional values of prospective teachers than the others. The research study was configured in line with the predictive model through the correlational study methodology. The study sample consisted of 557 prospective teachers attending the relevant departments as identified through the non-probabilistic cluster sampling method. The multiple linear regression analysis was employed in the analysis of the collected data through the use of the "Professional Values Scale for Elementary School Teachers" (TPVS), "Metacognition Scale", "Critical Thinking Scale", "Epistemological Beliefs Scale". The research findings indicate that the totality of all variables explain 55% of the variance in the total score in TPVS, 51% of the variance in the score for respecting differences in TPVS, %39 of the variance in the score for personal, societal responsibility in TPVS, 24% of the variance in the score for opposing violence in TPVS to a significant extent. A review into the t-test scores pertaining to the significance of standardized coefficients leads to the observation that all variables except for the sub-scales of hypothesising, problem identification of the scales of assessing cognitive differences, critical thinking are able to predict the total scores for the professional values of teachers at a significant level.

Keywords: critical thinking, epistemological belief, metacognition, professional of teachers' value

1. Introduction

Teaching is a profession that is shaped in the process of learning and teaching and is, in fact, a learning process in itself. The teacher is also a learner who bears their own responsibility in learning. In this process, there are certain professional values which a learning teacher must possess. These values contribute to the teacher in both bearing their own responsibility of learning and providing cognitive coaching to teachers by extending the necessary guided learning support.

Values are defined as representing the importance attached by an individual to different factors or a stance settled and maintained in our self with respect to what is worth fighting for (Demirtaş & Güneş, 2002, p. 32). In this process, if the teacher acts as a role model who embraces the social and democratic values which they would like their students to learn, this will be followed by the shaping and maintenance of these values among the students. In fact, as stated by Upright (2002), provision of a model through the teacher and school is more beneficial in the development of values among learners than the direct teaching of values. The establishment of a culture based on the societal and democratic values of importance in a school will surely contribute to the formation of the desired values in all stakeholders and the impact of such an implicit program will be inevitably obvious in the professional values of teachers. According to Tom (1984), teaching is as much of a methodological effort as a moral ability. In these moral roles, teachers are expected not only to act in an exemplary capacity, but also to represent numerous virtues. They provide a guidance dimension to students in coping with values and norms (Tom, 1984; Cited by Veen, Theunissen, Sleegers, Bergen, Klaassen, & Hermans, 2003, p. 51).

The latest research studies on the moral dimension of teaching did not focus a lot on how teachers act in morally

sensitive situations or which principles guide such actions (Colnerud, 1997; Oser, 1991; Oser & Althof, 1993; Tirri, 1999; Cited by Veen, Theunissen, Sleegers, Bergen, Klaassen, & Hermans, 2003, p. 51). In such situations, the personal values, norms and beliefs of teachers can be considered to play an important role on their decisions (Clark, 1990; Cited by Veen, Theunissen, Sleegers, Bergen, Klaassen, & Hermans, 2003, p. 52).

The professional values of teachers are also influenced by the importance attached by the teachers themselves to their professional expertise. The perspective of a teacher to professional values emerges as a clear product of the reciprocal interaction among their past work experience, their personal biographies and their institutional structure of employment. On the basis of this interaction, teachers build subjective meanings which colour their working environment, their behaviours and their perspective to work. Therefore, the subjective perspectives of teachers must be paid great attention, because this will not only assist one in understanding and organising their daily tasks, but also affect their behaviours in the classroom and the professional values and behaviours assumed by them in response to morally sensitive events (Kelchtermans, 1993; Nias, 1989; Cited by Veen et al., 2003, p. 53).

In such a process, as teachers advance in becoming more aware of the thoughts and emotions of other individuals, they will start to naturally implement the professional values that will contribute to the students' awareness of their own selves in the global society (Richmond & Cummings, 2004). The current ethical environment surrounding the teacher is so multidimensional that not all "ideas on how we live" are uniform. Ideas on rights and obligations, on respect to virtues, on the quality of life or on adaptation are intrinsic in the process of values in the profession of teaching. The ethical framework of a profession contributes to the identification of the values that will be formed within that profession (Haydon, 2004). Teachers can respond positively to different perspectives voiced by the students by providing guided learning support to them in becoming aware of the richness of their ethical environment along with respect to different perspectives in such an ethical environment (Haydon, 2004). Consequently, the most probable route with respect to the awareness of a larger ethical environment from the pedagogical perspective will take root from the ethical environment at school.

In parallel, the domestic studies that address "teachers" and "values" together (Akbaş, 2004; Doğanay & Sarı, 2004; Baloğlu & Balgalmış, 2005; Tokdemir, 2007; Deveci & Dal, 2007; Şen, 2007; Koç, 2007; Akkiprik, 2007; Demir & Demirhan, 2007; Sarı, 2007; Tokdemir, 2007; Can, 2008; Özen, 2008; Akbaş, 2009; Kuş, 2009; Fidan, 2009; Yılmaz, 2009; Çengelci, 2010) considered the approaches utilised in teaching the students about values and the views of teachers regarding the values incorporated into the programs and the training on values; however, no study was identified in the domestic screening that aimed to predict the professional values in teaching with critical thinking, metacognition and matured epistemological beliefs.

The professional values to be embraced by teachers can be stated to have parallelism with the high-level thinking processes, skills and epistemological beliefs that also incorporate metacognition and critical thinking. Cognitive coaching, an approach to the provision of cognitive awareness skills in teacher training, emerges as an approach that includes the internalisation of positive professional values by teachers (learning planning, implementation and evaluation processes; unbiased attitudes in family relations; accurate, open and clear sharing with students; constant exchange of information; ability to act sensitively towards the problems of importance in the environment and to reflect the same onto the teaching process; preparing students for higher education, society and life; ability to identify and plan assessment and evaluation methods, techniques and strategies; guiding students to get to know themselves, develop positive behaviours and motivate themselves; ability to obtain specialised knowledge and practical skills and to monitor, assess and develop current changes). From the perspective of the professional values of teachers, such values as respecting differences, openness to cooperation, personal and societal responsibility and valuing learning are observed to be among the components involved in the self-knowledge and -control dimensions of metacognition. In parallel, epistemological beliefs stand for a multidimensional structure that covers not only beliefs concerning knowledge, but also beliefs related to the learning and teaching abilities in the context of the acquisition and utilisation of knowledge (Schommer-Aikins & Hutter, 2002; Deryakulu, 2004).

The literature indicates that possessing metacognition skills, critical thinking and matured epistemological beliefs contributes to the multilateral development of teaching in the dimension comprising the professional values of teachers. Pantić and Wubbels (2012) examined the factors that influence the moral professional values of teachers and their relations with students and identified a positive correlation between the liberal beliefs of teachers within the scope of their professional values and the motivational components of their metacognition skills and cultural competence. Santisi, Magnano, Hichy, and Ramacib (2014) conducted a study on elementary and secondary school teachers in Italy to examine the relationship between the learning and working motivation of teachers and the use of metacognition strategies. They found a positive correlation between the learning and

working motivation of teachers–covered in the personal responsibility dimension of professional competences–and the metacognition strategies. Kessels (2013) looked into the relationship between epistemological beliefs and cultural values and sex. As a result of the study, male students defended the value of power, whereas female students defended the value of conformity in parallel with their feminine characteristics. In addition, the COPES model developed by Winne and Hadwin (1998) places epistemological beliefs into the self-regulatory metacognition system and includes the stages of task definition, targeting and planning, decision-making and adaptation (Cited by Pieschl, Staahl, & Bromme, 2008).

As established in the study findings, it can be stated that teachers possessing metacognition, critical thinking and matured epistemological beliefs are influential on the formation of the desired professional values and, in parallel, that as teachers develop and strengthen their belief that knowledge is represented by a contextual and complex network incorporating their own responsibility of learning, planning, organisation and assessment skills and science, this will contribute positively to the professional values in teaching. However, the Turkish literature does not present any research study looking into the relationships between metacognition, critical thinking and epistemological beliefs, and professional values in teaching. The justification of the present study concerns the identification of the relationships between metacognition, critical thinking and epistemological beliefs to be embraced by teachers and professional values in teaching.

The main objective of the present research study is to examine the predictive relationships between the "perceptions of teachers on professional values" and their "metacognition skills, critical thinking skills and epistemological beliefs". The study seeks answers to the following questions in line with this aim:

1) Do critical thinking, metacognition and epistemological beliefs predict the professional values of prospective teachers to a significant extent?

2) Which one of the variables of metacognition, critical thinking and epistemological beliefs predict the professional values of prospective teachers to a greater extent?

2. Method

The present study is a predictive study implemented in the correlational research model. Predictive studies provide us with three types of information: (1) Predictability of the behavioural pattern used as a criterion, (2) Determinants of the behavioural pattern used as a criterion, and (3) Predictive validity of test(s) in affiliation with the behavioural pattern used as a criterion (Borg & Gall, 1989). The present study addresses the professional values in teaching as the behavioural pattern used as a criterion, i.e. the dependent variable, and identifies metacognition skills, critical thinking and epistemological beliefs as predictive variables.

2.1 Population and Sample

The study population comprised of prospective teachers attending the Departments of Turkish Teaching, Elementary School Teaching and Social Sciences Teaching, Science Teaching and Psychological Guidance and Counselling Teaching under the Faculty of Education and enrolled at the initial Elementary Mathematics, Chemistry, History, Literature and Music teaching programs at Kafkas and Çukurova Universities in the 2014-2015 academic year. The study sample was consisted of 557 prospective teachers attending the relevant departments as identified through the non-probabilistic cluster sampling method. 273 (49%) of the students were female and 255 (45.8) were male, whereas 29 students (5.2%) did not specify their sex. 334 (60%) of the students attended Kafkas University and 233 (40%) Çukurova University.

2.2 Data Collection Instruments

The research study utilised a "Personal Information Form" to identify the personal characteristics of the candidates; the "Professional Values Scale for Elementary School Teachers" (TPVS) to determine their professional values in teaching; the "Metacognition Scale" (MS) to measure their metacognitive skills; the "Critical Thinking Scale" (CTS) to measure their critical thinking processes; and the "Epistemological Beliefs Scale" (EBS) to identify their epistemological beliefs.

2.2.1 Metacognition Scale (MS)

The Metacognition Scale (MS) was developed by Demir (2013) with a view to identifying the level of metacognition skills of prospective teachers. For the metacognition scale, KMO=.914; Barlett Sphericity Test χ^2=1.853, df=153, and p<.001. The MS comprised of three dimensions, i.e. Evaluation, Organisation and Planning. The Cronbach Alpha internal consistency coefficient for the whole scale is .89. One of the items in the "evaluation" and its Cronbach Alpha internal consistency coefficient is .87. One of the items in the "organisation" and its Cronbach Alpha internal consistency coefficient is .65. One of the items in the "planning" and its

Cronbach Alpha internal consistency coefficient is .70.

Along with the reliability analysis performed for the present study, the Cronbach Alpha internal consistency coefficient for the whole scale was found to be .91. The Cronbach Alpha values for the sub-scales of the scale were .85 for the sub-scale of "Evaluation", .71 for the sub-scale of "Organisation" and .80 for the sub-scale of "Planning".

2.2.2 Professional Values Scale for Elementary School Teachers (TPVS)

The Professional Values Scale for Elementary School Teachers was developed by Tunca and Sağlam (2013) to determine the professional values of elementary school teachers. As a result of the exploratory factor analysis, the scale was formulated with four sub-dimensions including the professional values of "respecting differences, personal and societal responsibility, opposing violence and openness to cooperation" and these dimensions explained 46.57% of the total variance. The analysis resulted in a KMO value of .85. The sum of the three internal consistency coefficients obtained from the responses provided by 418 respondents of the Professional Values Scale for Elementary School Teachers to 24 items in the scale was identified to be .82. The internal consistency coefficients of the four dimensions constituting the scale were as follows: .77 for "Respecting Differences", .78 for "Personal and Societal Responsibility", .70 for "Opposing Violence" and .72 for "Openness to Cooperation".

Along with the reliability analysis performed for the present study, the Cronbach Alpha internal consistency coefficient for the whole scale was found to be .86. The Cronbach Alpha values are .83 for the first sub-scale, .79 for the second sub-scale, .67 for the third sub-scale and .71 for the fourth sub-scale.

2.2.3 Critical Thinking Scale (CTS)

The critical thinking scale used in the research study was developed by Saracaloğlu and Yılmaz (2011). The scale is composed of 19 items and four sub-scales. The validity-reliability analysis of the scale was realised with 307 university students attending the faculty of education in the spring term of 2008-2009 academic year. Following the principal components analysis repeated within the scope of the present study, the Cronbach Alpha reliability coefficients for each sub-scale were calculated as .69 (Establishing Hypotheses), .71 (Evidence-Based Decision-Making), .70 (Identifying The Problem) and .62 (Collecting Information), respectively.

Along with the reliability analysis performed for the present study, the Cronbach Alpha internal consistency coefficient for the whole scale was found to be .83. The Cronbach Alpha values are .71 for the first sub-scale, .82 for the second sub-scale, .85 for the third sub-scale and .82 for the fourth sub-scale.

2.2.4 Epistemological Beliefs Scale (EBS)

The Epistemological Beliefs Scale used in the research study was developed by Demir and Kop (2014) to identify the epistemological beliefs of prospective teachers. The Kaiser-Meyer-Olkin (KMO) coefficient and Barlett Sphericity values of the scale applied to 176 students from the faculty of education were identified to be statistically significant (KMO=0.784; Barlett Sphericity test χ^2 =610.108 df =105 p<.001). The total Cronbach Alpha reliability value of the three-dimensional structure of the 15-item EBS) was .71, whereas the same value was .78 for the first sub-factor (The Belief That Learning Depends On Effort) (item 7), .69 for the second sub-factor (The Belief That Learning Depends On Talent) (item 4) and .51 for the third sub-factor (The Belief That There Is A Single Truth) (item 4). The three sub-scales explain 47.783% of the total variance.

Along with the reliability analysis performed for the present study, the Cronbach Alpha internal consistency coefficient for the whole scale was found to be .71. The Cronbach Alpha values are .91 for the first sub-scale, .75 for the second sub-scale and 0.9 for the third sub-scale. As the reliability of the third sub-factor is such a low value as .09, this sub-scale was excluded from the scope in the multiple regressions.

2.3 Data Analysis

Before the data analysis, a review was performed to detect incomplete and faulty coding. At the following stage, an outlier analysis was performed with a view to examining the premises of the regression analysis and values with high Mahalanobis distance values were excluded from the analysis. Consequently, as a result of the analyses performed on incomplete values and outliers, ten observations were deleted from the dataset and the analyses were resumed on 557 respondents.

The research study went on with the performance of multiple linear regression analysis in order to predict the dependent variables. While the dependent variable of the research study is represented by the scores from the Professional Values Scale for Elementary School Teachers, the independent variables are the scores obtained from the sub-scales of MS, CTS and EBS. As the reliability of the third sub-factor of EBS is such a low value

as .09, this sub-scale was excluded from the scope in the multiple regressions.

A multiple linear regression analysis was performed with a view to identifying to what extent the scores obtained in the planning, organisation and evaluation sub-scales of MS; the establishing hypotheses, evidence-based decision-making, problem identification and data collection sub-scales of CTS; and the sub-scales of EBS concerning the beliefs that learning depends on effort and learning depends on talent predict the professional values in teaching. For this analysis, the order of independent values to enter the equation is determined by statistical criteria. Every independent variable is determined in accordance with what it adds to the equation with respect to its order of entrance (Tabachnick & Fidell 2001). The significance of the findings was interpreted with a significance level of .05.

3. Results

A multiple linear regression analysis was performed in order to identify the variables that predict the professional values of prospective teachers. Table 1 indicates the mean, standard deviations of variables and inter-variable correlations. The findings firstly present the descriptive values indicating mean, standard deviations and correlation matrix of dependent and predictive variables and then the results of the multiple linear regression analysis.

3.1 Inter-Variable Correlation

Table 1 shows mean, standard deviations of variables used in the study and inter-variable correlations.

Table 1. Sub-scale scores of the professional values scale for elementary school teachers, metacognition scale, critical thinking scale and epistemological beliefs scale and mean, standard deviation and correlation values of predictive variables

Variable	X	Ss	1	2	3	4	5	6	7	8	9	10	11	12	13
TPVS total	89.01	12.65	.89**	.85**	.33**	.77**	.54**	.55**	.49**	.25**	.36**	.41**	.44**	.63**	.15**
1. Respecting differences	31.72	5.62	1	.71**	.06	.68**	.52**	.53**	.46**	.19**	.28**	.42**	.41**	.63**	.11**
2. Personal and societal responsibility	29.71	5.19	.71**	1	-03	.69**	.48**	.51**	.49**	.10*	.18**	.31**	.41**	.51**	-019
3. Opposing violence	16.14	4.04	.06	-03	1	-018	.081	.065	.031	.28**	.37**	.14**	.09*	.14**	.36**
4. Openness to cooperation	11.42	2.42	.68**	.69**	-018	1	.42**	.45**	.39**	.17**	.22**	.28**	.31**	.48**	-029
Predictive (independent) Variables															
5. Evaluation	26.35	5.17					1	.70**	.71**	.09*	.20**	.44**	.50**	.58**	-068
6.Organisation	11.26	2.44						1	.63**	.06	.18**	.38**	.42**	.51**	-046
7. Planning	14.64	3.05							1	.047	.10*	.41**	.45**	.45**	-09*
8. Estab. Hypotheses	11.12	2.94								1	.62**	.06	.098*	.16**	.21**
9. Evidence-based decision-making	28.19	6.36									1	.073	.13**	.26**	.25**
10. Problem identification	19.59	4.35										1	.61**	.43**	.006
11. Data	11.73	2.68											1	.42**	-023

collection													
12. Belief that learning depends on effort	28.43	5.38										1	-.039
13. Belief that learning depends on talent	12.12	3.55											1

**P<.001, *P<.005.

3.2 Predictive Power of MS, CTS and EBS Sub-Scales on the TPVS Total Scores

The first multiple regression equation in the research study was formulated in the structure where the sub-dimensions Metacognition, Critical Thinking and Epistemological Beliefs scales were regarded as predictors and the total score in the Professional Values Scale for Elementary School Teachers as the dependent variable. The values obtained as a result of the analysis are shown in Table 2.

Table 2. Results of multiple regression analysis on the total score in professional values scale for elementary school teachers and predictive variables

Variable	B	St Error B	β	T	P	Binary r	Partial R
Constant	20.613	2.817	-	7.318	.000	-	-
Evaluation (MS)	-.035	.121	-.014	-.288	.773	.540	-.012
Organisation (MS)	1.070	.221	.206	4.846	.000	.555	.203
Planning (MS)	.566	.178	.137	3.185	.002	.495	.135
Est. hypotheses (CT)	.201	.158	.047	1.270	.205	.253	.054
Evidence-based decision-making (CT)	.263	.076	.132	3.449	.001	.364	.146
Prob. identification (CT)	.159	.110	.055	1.438	.151	.419	.061
Data collection (CT)	.440	.182	.094	2.414	.016	.445	.103
Belief that learning depends on effort (EB)	.869	.088	.370	9.839	.000	.631	.388
Belief that learning depends on talent (EB)	.524	.107	.147	4.916	.000	.154	.206

R=0.745; R^2=0.555; Corrected R^2=0.548; $F_{(9,556)}$=75,851 ; p=.000

As can be seen in Table 2, all predictive variables significantly explain 55 per cent of the variance in the TPVS total score (R=.745, R^2=.555, F(9-557)=75.851, p<.001).

A review into the t-test scores pertaining to the significance of regression coefficients leads to the observation that all variables except for the sub-scales of hypothesising and problem identification of the scales of assessing cognitive differences and critical thinking are able to predict the total scores for the professional values of teachers at a significant level.

3.3 Predictive Power of MS, CTS and EBS Sub-Scales on the TPVS Scores in Respecting Differences

The second multiple regression equation in the research study was formulated in the structure where the sub-dimensions Metacognition, Critical Thinking and Epistemological Beliefs scales were regarded as predictors and the "respecting differences" score in the Professional Values Scale for Elementary School Teachers as the dependent variable. The values obtained as a result of the analysis are shown in Table 3.

Table 3. Results of multiple regression analysis on the "respecting differences" score in professional values scale for elementary school teachers and predictive variables

Variable	B	St Error B	β	T	P	Binary R	Partial R
Constant	3.706	1.319		2.810	.005		
Evaluation (MS)	-.002	.057	-.001	-.027	.978	.522	-.001
Organisation (MS)	.447	.103	.194	4.328	.000	.532	.182
Planning (MS)	.189	.083	.103	2.272	.023	.469	.097
Est. hypotheses (CT)	.081	.074	.042	1.093	.275	.197	.047
Evidence-based decision-making (CT)	.047	.036	.053	1.311	.190	.280	.056
Prob. identification (CT)	.124	.052	.096	2.397	.017	.426	.102
Data collection (CT)	.081	.085	.039	.953	.341	.411	.041
Belief that learning depends on effort (EB)	.433	.041	.414	10.466	.000	.635	.408
Belief that learning depends on talent (EB)	.193	.050	.122	3.873	.000	.110	.163

$R=0.712$; $R^2=0.507$; Corrected $R^2=0.499$; $F_{(9,556)=}$ 62.577 ; p=.000

As can be seen in Table 3, all predictive variables significantly explain 51 per cent of the variance in the TPVS score in "respecting differences" (R=.712, R^2=.507, F(9-556)=62.577, p<.001).

A review into the t-test results pertaining to the significance of regression coefficients reveals that evaluation under cognitive awareness and evidence-based decision-making, establishing hypotheses and data collection under critical thinking do not provide significant predictions. However, the other variables do predict the "respecting differences" dimension of professional values in teaching to a significant extent.

3.4 Predictive Power of MS, CTS and EBS Sub-Scales on the TPVS Scores in Personal and Societal Responsibility

The third multiple regression equation in the research study was formulated in the structure where the sub-dimensions Metacognition, Critical Thinking and Epistemological Beliefs scales were regarded as predictors and the "personal and societal responsibility" score in the Professional Values Scale for Elementary School Teachers as the dependent variable. The values obtained as a result of the analysis are shown in Table 4.

Table 4. Results of multiple regression analysis on the "personal and societal responsibility" score in professional values scale for elementary school teachers and predictive variables

Variable	B	St Error B	β	T	P	Binary R	Partial R
Constant	9.511	1.353		7.029	.000		
Evaluation (MS)	-.032	.058	-.032	-.543	.587	.488	-.023
Organisation (MS)	.448	.106	.211	4.225	.000	.511	.178
Planning (MS)	.335	.085	.197	3.919	.000	.491	.165
Est. hypotheses (CT)	.000	.076	.000	.006	.995	.103	.000
Evidence-based decision-making (CT)	.027	.037	.033	.731	.465	.183	.031
Prob. identification (CT)	-.071	.053	-.060	-1.345	.179	.318	-.057
Data collection (CT)	.317	.088	.164	3.618	.000	.415	.153
Belief that learning depends on effort (EB)	.273	.042	.284	6.443	.000	.516	.266
Belief that learning depends on talent (EB)	.019	.051	.013	.378	.706	-.019	.016

R=0.625; R^2=0.390; Corrected R^2=0.380; $F_{(9.556)}$=38.81; p=.000

As can be seen in Table 4, all predictive variables significantly explain 39 per cent of the variance in the TPVS score in "personal and societal responsibility" (R=.625, R^2= .390, F(9-556)=38.81, p<.001).

A review into the t-test scores pertaining to the significance of regression coefficients, the variables of evaluation under cognitive awareness; establishing hypotheses, evidence-based decision-making and problem identification under critical thinking and the belief that learning depends on talent do not provide significant predictions for the "personal and societal responsibility" dimension of the professional values in teaching. However, the other variables do predict the "personal and societal responsibility" dimension of professional values in teaching to a significant extent.

3.5 Predictive Power of MS, CTS and EBS Sub-Scales on the TPVS Scores in Opposing Violence

The second multiple regression equation in the research study was formulated in the structure where the sub-dimensions Metacognition, Critical Thinking and Epistemological Beliefs scales were regarded as predictors and the "opposing violence" score in the Professional Values Scale for Elementary School Teachers as the dependent variable. The values obtained as a result of the analysis are shown in Table 5.

Table 5. Results of multiple regression analysis on the "opposing violence" score in professional values scale for elementary school teachers and predictive variables

Variable	B	St Error B	β	T	P	Binary R	Partial R
Constant	4.588	1.176		3.901	.000		
Evaluation (MS)	.003	.051	.003	.052	.959	.081	.002
Organisation (MS)	-.047	.092	-.028	-.508	.612	.065	-.022
Planning (MS)	-.035	.074	-.026	-.467	.641	.031	-.020
Est. hypotheses (CT)	.061	.066	.044	.923	.356	.284	.039
Evidence-based decision-making (CT)	.167	.032	.263	5.249	.000	.378	.219
Prob. identification (CT)	.108	.046	.117	2.356	.019	.140	.100
Data collection (CT)	-.007	.076	-.005	-.089	.929	.099	-.004
Belief that learning depends on effort (EB)	.038	.037	.051	1.029	.304	.142	.044
Belief that learning depends on talent (EB)	.331	.045	.291	7.432	.000	.369	.303

$R=0.490$; $R^2=0.240$; Corrected $R^2=0.228$; $F_{(9.556)}= 19.212$; $p=.000$

As can be seen in Table 5, all predictive variables significantly explain 24 per cent of the variance in the TPVS score in "opposing violence" ($R=.490$, $R^2=.240$, $F(9.556)=19.212$, $p<.001$).

A review into the t-test scores to the significance of regression coefficients, the "opposing violence" dimension of the professional values in teaching is predicted significantly by the dimension signifying the belief that learning is dependent on talent in epistemological beliefs along with the sub-scales of evidence-based decision-making and problem identification of critical thinking. However, all of the other variables are observed not to provide significant predictions for the "opposing violence" dimension of the professional values in teaching.

3.6 Predictive Power of MS, CTS and EBS Sub-Scales on the TPVS Scores in Openness to Cooperation

The fifth multiple regression equation in the research study was formulated in the structure where the sub-dimensions Metacognition, Critical Thinking and Epistemological Beliefs scales were regarded as predictors and the "openness to cooperation" score in the Professional Values Scale for Elementary School Teachers as the dependent variable. The values obtained as a result of the analysis are shown in Table 6.

Table 6. Results of multiple regression analysis on the "openness to cooperation" score in professional values scale for elementary school teachers and predictive variables

Variable	B	St Error B	β	T	P	Binary R	Partial R
Constant	2.808	.671		4.183	.000		
Evaluation (MS)	-.004	.029	-.009	-.152	.879	.427	-.006
Organisation (MS)	.221	.053	.223	4.203	.000	.458	.177
Planning (MS)	.077	.042	.097	1.816	.070	.394	.077
Est. hypotheses (CT)	.058	.038	.071	1.550	.122	.170	.066
Evidence-based decision-making (CT)	.022	.018	.058	1.223	.222	.226	.052
Prob. identification (CT)	-.002	.026	-.004	-.090	.928	.282	-.004
Data collection (CT)	.049	.043	.054	1.121	.263	.318	.048
Belief that learning depends on effort (EB)	.125	.021	.278	5.931	.000	.480	.246
Belief that learning depends on talent (EB)	-.019	.025	-.029	-.766	.444	-.029	-.033

$R=0.558$; $R^2=0.312$; Corrected $R^2=0.300$; $F_{(9.556)}=27.510$; $p=.000$

As can be seen in Table 6, all predictive variables significantly explain 31 per cent of the variance in the TPVS score in "opposing violence" ($R=.558$, $R^2=.312$, $F(9-556)=27.510$, $p<.001$).

A review into the t-test scores pertaining to the significance of regression coefficients leads to the observation that the "openness to cooperation" dimension of the professional values in teaching is predicted by the dimensions of organisation under cognitive awareness and the belief that learning depends on effort under epistemological beliefs at a significant level. However, all of the other variables are observed not to provide significant predictions for the "openness to cooperation" dimension of the professional values in teaching.

4. Discussion

When the t-test scores pertaining to the significance of regression coefficients are examined, it is seen that the total scores in the professional values in teaching are predicted significantly by the planning and organisation dimensions of metacognition. The meaning attached by teachers to their professional values will surely contribute to their internalisation of themselves as a learning student and to their knowledge of and control over their own learning process. In fact, Emrahoğlu and Öztürk (2010) identified that the metacognition level of science and technology teachers is in a highly positive and significant correlation with their academic success scores and that the increase in academic success is in significant direct proportion with the cognitive awareness level. In addition, Wilson and Bai (2010) examined teachers' knowledge of and processes in metacognition. As a result of the research study, significant divergences were observed in teachers' understanding of metacognition. The results revealed, among teachers who provide a rich meaning in this sense, that both cognitive metacognition strategies and the concept of metacognition constitute a requirement in the learning of students in a complex dimension. Prytula (2012) also studied cognitive differences among teachers within the scope of the concept of a professional learning community. The author conducted this study with a view to understanding how metacognition affect teachers' tasks; what teachers define as the catalysers of metacognition; and how they describe metacognition. The study established that teachers that possess such a metacognition skill also influence the learning experiences of others. This influence predicted their metacognition skills within the framework of the professional learning where they reflected their professional values in teaching, which is in parallel with the

findings of the present study.

The sub-scales of evidence-based decision-making and data collection under critical thinking and provide significant predictions for the total scores in Professional Values Scale for Teachers. Astleitner, Brünken, and Zander (2002), on the other hand, regarded critical thinking as an intellectual activity aimed at evaluating and determining independent variables or statements. These evaluations are relevant to the standards based on the provision of professional attitudes, values and behaviours among teachers. Similarly, Narin (2009, p.35) addressed the concept of critical thinking by pointing out to the necessity of understanding unwritten values, using the language accurately and appropriately, collecting and interpreting information, understanding logical relationships, testing the results and providing an accurate evaluation of the daily life. As Narin (2009) stated, the dimensions of respecting differences, personal and societal responsibility, opposing violence and openness to cooperation, emerging as professional values in teaching, are in a direct relationship with the evidence-based decision-making and data collection dimensions of critical thinking. Astleitner, Brünken, and Zander (2002) listed the skills required for a critically thinking individual as the abilities to distinguish between information, facts and values; to predict and measure the reliability and accuracy of a statement; to distinguish between relevant and irrelevant pieces of information; to discover implicit assumptions in tables; and to identify the errors in arguments. Furthermore, the development of critical thinking requires not only cognitive skills, but also self-awareness and self-regulation. According to Halpern (1988), the recent studies indicate that a large number of people in the society and especially teachers do not think enough or think inaccurately. On the basis of this conclusion, Halpern (1988) stated that teachers should be trained on thinking in order for them to enable students at school to learn critical thinking and to apply knowledge to new and different situations. On the other hand, Seferoğlu and Akbıyık (2006) express that the training curricula lack the necessary infrastructure despite the fact that critical thinking is a triggering force for the knowledge generation process and that the situation in Turkey for both teachers and course books is not really promising, even though the literature supports the positive impact of critical thinking on academic success. Critical thinking is directly related to the sense of personal and societal responsibility among the professional values in teaching. In fact, according to Facione (1998, p. 13), an independent and responsible teacher should be able to make free choices. Nevertheless, individuals devoid of the skill of critical thinking cannot make rational choices.

The dimensions in epistemological beliefs of the beliefs that learning depends on effort and talent are observed to provide significant predictions for the total scores in the professional values in teaching. Beliefs formed with respect to science and knowledge will also predict the professional values of teachers. The teacher's values of respecting differences, personal and societal responsibility, opposing violence and openness to cooperation will be affected by the teacher's performance in the respective field. In fact, Schommer-Aikins (1990) drew attention to the fact that addressing epistemological beliefs in such a manner as to consider only the beliefs regarding knowledge would stand for a limited approach and argued that these beliefs are not one-dimensional, but multidimensional in structure; that they cover not only beliefs regarding knowledge, but also beliefs concerning learning and teaching abilities (intelligence) with respect to the processes of acquiring and using knowledge; and thus, that it should be regarded as a belief system (Schommer-Aikins & Hutter, 2002; Deryakulu, 2004). The results of this research study represent Shommer's approach, while the opinion that epistemological beliefs cover beliefs concerning both knowledge and learning cast a reflection on the professional values in teaching. Through education, individuals see that knowledge is more complex and relative. Thus, they are able to become aware of the fact that different views arise from focusing on evaluation (King & Kitchener, 2002; Cited by Pieschl, Staahl, & Bromme, 2008). Teachers with the "multilateral" perspective, however, believe that knowledge is a relative, contextual and complex network. They admit that the truth is not certain and may change and knowledge is more structured than "given". Epistemological beliefs cover different dimensions pertaining to the establishment of the accuracy behind claims of knowledge, i.e. are related to every probability of knowledge. The multilateral approach covers the beliefs pertaining to the certainty, source, structure and confirmation of knowledge (Pieschl, Staahl, & Bromme, 2008), which is closely related to teachers' values of personal responsibility and openness to cooperation.

Moreover, the dimension of respecting differences of professional values in teaching is predicted significantly by organisation and planning under metacognition. The organisation and planning dimensions of metacognition are shaped on the basis of the ability to see and respect differences. In fact, thinking is a process shaped within a social structure. Phenomena, concepts and generalisations that make up the content elements of the thinking language we employ in our social structures and interactions will find meaning only when the thoughts, meanings, organisations and planning of other learners are valued and respected. Indeed, Vygosky (1978) attached importance to the social structure, to respecting learners in this structure and to tolerance in the

formation of higher-level thinking processes and skills, the shaping of the intellectual language and the planning and organisation of internal conversations in the learner's own learning process. Similarly, the dimension of respecting differences is significantly predicted by the problem identification dimension of critical thinking. The teacher's value of respecting differences will bring together the ability to see situations from the perspectives of others and this is closely related to the problem identification dimension of critical thinking. Teachers respecting differences will also be able to identify the problem. The teacher will be involved in a two-way process through their tolerance-based interaction with students and this will contribute to their ability to see the problems of different students and the varying problems they will encounter in the teaching process.

Moreover, the respect to differences dimension of the professional values of teaching is predicted significantly by the variables attached to the belief that learning is based on effort and the belief that teaching is based on talent in the scale of epistemological beliefs in critical thinking. Learning is an individual process shaped with effort and talent and is open to development. Teachers that have internalised advanced epistemological beliefs in the dimensions pertaining to the beliefs that learning depends on effort and talent will have naturally embraced the value of respecting differences. In fact, a teacher who puts forth a level of effort and experiences the maturation and birth of the learning process will be conscious that every student will be able to perform only in line with their own capacity and competences and will respect differences among students at this dimension. At the same time, education lies at the heart of the principle of continuous development. Thus, educational institutions will be able to continuously develop themselves further with a "client-oriented" management rationale that values employees' and students' opinions through their consciousness of the societal responsibility they assume (Henden, 2004). This is the reason behind the respectful attitude of a teacher towards students' efforts.

The personal and societal responsibility dimension of professional values in teaching is predicted significantly by the organisation and planning in metacognition, data collection in critical thinking and the belief that learning is dependent on effort in epistemological beliefs. The finding that planning and organisation skills under metacognition significantly predict the value of personal and societal responsibility to be embraced by teachers is already expected. Teachers with a good level of knowledge and control over the learning process, as well as self-knowledge and -control, will employ their planning and organisation skills in teaching processes, which will also predict their personal and societal responsibility. In fact, the school and the classroom constitute a who collect data, are able to plan and organise processes in line with the collected data and are in a constant effort for learning. Similarly, Lin, Schwartz, and Hatano (2005) and Wilson and Bai (2010) mentioned the importance of the learning teacher in personal responsibility. Furthermore, Wen (2012) stated that the internalization of metacognition strategies and skills by teachers will provide an important contribution to guided learning support to be provided by them to students as a part of their personal responsibility. Similarly, Pantić and Wubbels (2012) identified positive relationships between the liberal beliefs of teachers and their cognitive awareness skills and motivational components of cultural competence.

The standing against violence dimension of the professional values in teaching is predicted significantly by the dimension signifying the belief that learning is dependent on talent in epistemological beliefs along with the sub-scales of evidence-based decision-making and problem identification of critical thinking. Individuals who are able to think on the basis of evidence and identify problems are individuals who get to the root of situations in different contexts and it is expected from such teachers to oppose violence as a personal value both inside and outside the classroom.

In the current situation, it is possible to state that cognitive awareness, critical thinking and epistemological belief variables are among the determinants of professional values in teaching.

In parallel with the results of the research study, teaching processes designed in such a manner as to consider the interrelations among the critical thinking skills, metacognition skills and matured epistemological beliefs of prospective teachers will provide contributions to the formation and maturation of professional values among the teachers of the future.

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