2-1-2009

Examining the Teacher Efficacy and Achievement Goals as Predictors of Turkish Student Teachers' Conceptions about Teaching and Learning

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Abstract: Based on the fact that the relationships among student teachers' efficacy beliefs, achievement goals, and conceptions about teaching and learning has remained to be investigated to date, this study aimed to examine student teachers' efficacy beliefs and achievement goals as predictors of their conceptions about teaching and learning. Results of the present study showed that student teachers' conceptions about teaching and learning are significantly predicted by their efficacy beliefs and achievement goals. Results also demonstrated that the effects of student teachers' efficacy beliefs and motivational beliefs on their conceptions about teaching and learning vary as a function of the fields of study, indicating that the effects of both efficacy beliefs and motivational beliefs on student teachers' conceptions about teaching and learning are domain-specific. Overall results of the study suggested that the relationships among teacher efficacy, motivational beliefs, and conceptions about teaching and learning are not negligible. Implications for teacher education and directions for future studies were also discussed.

Despite the fact that teachers' efficacy beliefs and achievement goals have long been investigated in educational settings (Gibson & Dembo, 1984; Tschannen-Moran & Woolfolk Hoy, 2001; Ames, 1992; Elliot & Church, 1997; Elliot, 1999; Wang, Biddle, & Elliot, 2007), few studies directly investigated the relationship between them (Midgley, Anderman & Hicks, 1995; Deemer, 2004; Wolters & Daugherty, 2007). In fact, there is no such study, to the best of the researcher's knowledge, in which both student teachers' efficacy beliefs and achievement goals were examined as predictors of their conceptions about teaching and learning. However, it is important to examine teacher efficacy and achievement goals as predictors of student teachers' conceptions about teaching and learning for at least three reasons. First, teachers' efficacy beliefs, achievement goals, and conceptions about teaching and learning are related to important educational outcomes such as student motivation and classroom-related behaviors, each of which is important to achieve desirable educational and instructional goals in educational settings. Second, teachers' efficacy beliefs are important to explain teachers' adaptation and resistance to reform agendas (Pajares, 1992). Investigating the relationships among student teachers' efficacy beliefs and their conceptions about teaching and learning would reveal important results in order to change teachers' beliefs

in a desired way. Finally, previous research showed that teachers' conceptions about teaching and learning are belief-driven (Chan, 2003; Chan & Elliott, 2004).

Although it has been known that teachers' self-efficacy beliefs and classroom goal structures are two of these beliefs (Deemer, 2004; Wolters & Daugherty, 2007), it has not been known whether the same is also true for both personal goals such as achievement goals and teachers' efficacy beliefs. Indeed, Bobbett, Olivier, and Ellett (2008) recently showed that teachers' efficacy beliefs and teachers' self-efficacy beliefs are distinctly different constructs, although these concepts have long been used interchangeably. Specifically, teacher efficacy or teachers' sense of efficacy refers to "teachers' beliefs in their abilities to affect student performance" (Dellinger et al., 2008, p. 753) whereas teachers' self-efficacy beliefs refer to "teachers' beliefs in their capabilities to perform specific teaching tasks at a specified level of quality in a specified situation" (Dellinger et al., 2008, p. 753; see also Guskey & Passaro, 1994; Denzine, Cooney, & McKenzie, 2005). Classroom goal structures, on the other hand, describe the "type of achievement goal emphasized by the prevailing instructional practices and policies within a classroom, school, or other learning environment" (Wolters, 2004, p. 236), whereas achievement goals reflect achievement-related personal goals in educational settings (Elliot, 1999).

A good deal of research showed that perceived classroom goal structures are positively and significantly linked to students' achievement goals (Bong, 2001, 2008; Wolters, 2004; Meece, Anderman, & Anderman, 2006) and classroom-related behaviours (Sideridis, 2007), pointing out that students' personal goals and perceived classroom goal structures are closely related with one another. Although these studies on the relationship between achievement goals and classroom goal structures were mainly based on the students in the classrooms, there is no reason to put the student teachers out of this relational goal framework because they also infer and pursuit the goal perceived in the classroom based on the various aspects of classroom environment such as instruction, evaluation, grouping strategies, and teaching approaches (Meece et al., 2006).

Thus, one can hypothesize that student teachers' teaching/learning-related behaviours may also be explained partly by their personal goals due to the fact that students' perceptions of classroom goal structures are effective on personal goals. If this is the case, not only the student teachers' perceptions of classroom goal structures, but also the effects of their personal goals on conceptions about teaching and learning should be investigated together with the effects of efficacy beliefs in order to broaden our understanding regarding the antecedents of student teachers' teaching/learning-related conceptions, which is an important issue in teacher education. Relevant concepts are summarized below.

Literature Review
Teachers' Efficacy Beliefs

Since the date of the Rand Corporation evaluation studies first conceptualized teacher efficacy (Armor, Conroy-Osequera, Cox, King, McDonnell, Pascal, Pauly, & Zellman, 1976; Berman & McLaughlin, 1977), a considerable amount of research demonstrated that teachers' sense of efficacy is related to important educational outcomes such as student achievement and motivation (Ashton & Webb, 1982; Pajares,

1996; Tschannen-Moran & Woolfolk Hoy, 2001; Labone, 2004). Teachers with low levels of efficacy often expend little effort in finding materials and planning lessons that challenge students, show little persistence with students having difficulty and display little variety in their teaching approaches, whereas teachers with high levels of efficacy are more likely to seek out resources and develop challenging lessons, persist with students who are struggling and teach in multitude ways that promote student understanding (Deemer, 2004, p. 74). Therefore, it is reasonable to conclude that teachers' efficacy beliefs influence students' attitudes and achievement as well as affect teachers' teaching behaviors (Huang, Liu, & Shiomi, 2007, p. 707).

On the other hand, in recent years the development of the constructivist view of learning has resulted in modifications of teaching and learning designs in many countries educational systems such as Turkey and Singapore (Chang, 2005, p. 96; see also Gencer & Çakıroğlu, 2007; Kimonen & Nevalainen, 2005; De Kock, Sleegers & Voeten, 2005; Chan, Tan, & Khoo, 2007). Such a view requires a classroom environment that encourages students to become active, self-motivated or mastery-oriented learners (Deemer, 2004). It is obvious that teachers play an important role in creating such environments (Pajares, 1992). Specifically, teachers' beliefs are one of the most important factors that affect the implementation of curriculum reforms (Van Veen, Sleegers & Van de Ven, 2005; Day, Elliot, & Kington, 2005; Tatto, Schmelkes, Guevara, & Tapia, 2006). For example, teachers with high self-efficacy beliefs are likely to adopt more student-centered approaches than teacher-centered approaches in educational settings such as classrooms (Swars, 2005).

Finally, recent research showed that student teachers' efficacy beliefs are affected by both their culture and fields of study (Çakıroğlu, Çakıroğlu, & Boone, 2005; Lin & Gorrell, 2001; Chan et al., 2007), suggesting that student teachers' efficacy beliefs may be constructed through a dynamic integration of cultural and social perspectives, as well as the nature of the teacher education program (Cheung, 2006; Yeung & Watkins, 2000). These studies highlight the importance of studying the relationships among efficacy beliefs, motivational beliefs, and conceptions of teaching and learning in different domains and different cultures.

Conceptions about Teaching and Learning

Teachers' conceptions about teaching and learning can be defined as "beliefs held by teachers about their preferred ways of teaching and learning" (Chan & Elliott, 2004, p. 819). In the current literature, conceptions about teaching and learning are defined in two philosophically grounded learning/teaching conceptions (Chan & Elliott, 2004; Chan, 2003). First, the traditional learning/teaching conceptions refer to teaching-centered applications that contain knowledge transmission from teacher as a source of knowledge, to students as passive recipients of knowledge (Kember & Gow, 1994; Kember, 1997). Second, the constructivist conceptions refer to learning-centered applications that contain collaborative learning processes through which both teacher as a counsellor, and students as liable agents, are collaboratively active in order to construct meaningful learning experiences (Kember, 1997; Chan & Elliott, 2004; Samuelowicz & Bain, 2001).

Previous research showed that teachers' conceptions about teaching and learning are belief-driven. Chan (2003), for example, found significant relationships among student teachers' epistemological beliefs and teaching and learning conceptions. Chan's

(2003) study revealed that student teachers with traditional conceptions are most likely to hold beliefs that knowledge is certain, it is derived from authority, and one's learning ability is innate, whereas student teachers with constructivist conceptions are likely to believe that knowledge is tentative and changing, and that one's ability is not inborn.

Based on the relational analysis of student teachers' personal epistemology and conceptions about teaching and learning, Chan and Elliott (2004) also found that student teachers' teaching and learning conceptions are belief-driven. Specifically, results of the Chan and Elliott (2004) study showed that authority/expert knowledge and certainty knowledge are positively and moderately related to traditional conceptions which refer to teaching-centered applications in educational settings. Additionally, they also found that student teachers' innate/fixed ability and authority/expert knowledge beliefs were weakly correlated to student teachers' constructivist conceptualizations whereas student teachers' effort beliefs were negatively related to constructivist conceptions (see also Cheng, Chan, Tang, & Cheng, in press for similar results). They explained these results by the cultural effects of Chinese Confucianism. In fact, as a crucial cultural heritage in China, Confucianism strongly emphasizes the value of effort in learning and achievement (Chan & Elliott, 2004). The results of Chan and Elliott (2004) study revealed that the effect of culture on student teachers' conceptions about teaching and learning is important.

Recently, Saban, Koçbeker, and Saban (2007) investigated Turkish student teachers' conceptions about teaching and learning based on metaphor analysis. They abstracted 10 conceptual categories such as teacher as knowledge provider and student as passive recipient of knowledge, teacher as counsellor and student as significant other, and teacher as cooperative/democratic leader and student as active participant in a community of practice. Based on the philosophical views that underlie these metaphors, it can be said that Turkish student teachers' conceptions may also be defined under the headings of traditional and constructivist conceptions. Finally, based on a sample of Singaporean student teachers, Chan et al. (2007) showed that their conceptions about teaching and learning varied across program groups (e.g. diploma in education, undergraduate degree, and secondary school teachers), pointing out that student teachers' conceptions about teaching and learning are domain specific.

Achievement Goals

Achievement goals reflect "the desire to develop, attain or demonstrate competence in an activity" (Okun, Fairholme, Karoly, Ruehlman, & Newton, 2006, p. 255). Achievement goal theorists have separated achievement goals into two dimensions: the goal to develop ability, i.e. mastery goals, and the goal to demonstrate ability or to avoid the demonstration of lack of ability, i.e. performance goals (Dweck & Leggett, 1988; Ames, 1992; Kaplan & Midgley, 1997; Midgley, Kaplan, Middleton, Maehr, Urdan, Anderman, Anderman, & Roeser, 1998; Slavin, 2003). Recently, performance goals have been divided as performance-approach goals, i.e. refer to attain normative competence and performance-avoidance goals, i.e. refer to avoid normative incompetence (Urdan & Schoenfelder, 2006; Elliot, 1999; Elliot & Church, 1997). A great deal of research showed that students' mastery goals are associated with a range of adaptive learning variables such as positive perceptions of self-efficacy (Wolters, 2004; Gerhardt & Brown, 2006; Bong, 2001) and positive coping strategies (Friedel, Cortina, Turner, & Midgley, 2007), whereas performance-avoidance goals are found to be linked

to negative outcomes such as test anxiety, poor academic performance, and fear of failure (Elliot, 1999; Elliot & Church, 1997).

More recently, the mastery goal dimension was also partitioned as mastery-approach goal orientations and mastery-avoidance goal orientations (Elliot & McGregor, 2001; Cury, Elliot, Fonseca, & Moller, 2006; Wang et al., 2007). Within this framework (Elliot & McGregor, 2001), mastery-approach goal orientations refer to intrapersonal competence, whereas mastery-avoidance goal orientations refer to avoidance of intrapersonal incompetence (Cury et al., 2006). Recent research demonstrated that mastery-approach goals are positively correlated with perceived competence and deep processing whereas mastery-avoidance goals are negatively correlated with the perceived competence and fear of failure (Elliot & McGregor, 2001).

Few studies investigated the relationships among students' self-efficacy beliefs or self-efficacy belief-related dimensions such as perceived academic competence (Kaplan & Midgley, 1997) and achievement goals (Bong, 2001; Deemer, 2004; Friedel et al., 2007). To sum up the results, these studies showed that (a) perceived stress on task goals significantly predicted both students' and teachers' efficacy beliefs (Midgley et al., 1995); (b) both students' learning goals and perceived competence positively predicted learning strategies while they negatively predicted maladaptive learning strategies (Kaplan & Midgley, 1997); (c) Students' Korean and English languages, mathematics, and science self-efficacy beliefs were positively correlated with mastery and performance–approach goals while they were negatively and insignificantly correlated with performance-avoidance goals (Bong, 2001); (d) personal teaching efficacy and teachers' perceptions of a supportive school culture were related to teachers' use of instructional practices and students' perceptions of a mastery classroom goal orientation (Deemer, 2004); (e) mastery goal orientations were positively correlated with students' self-efficacy beliefs (Friedel et al., 2007); (f) self-efficacy for instruction, self-efficacy for management, and self-efficacy for engagement were significantly related to mastery goal structure (Wolters & Daugherty, 2007).

Based on the explanations above, it can be said that both efficacy beliefs and motivational beliefs are important educational variables to explain student teachers' conceptions about teaching and learning. Therefore, the present study aims to examine student teachers' efficacy beliefs and achievement goals as predictors of their conceptions about teaching and learning. In line with this aim, two research questions were formulated: (a) what are the relationships among student teachers' efficacy beliefs, achievement goals, and conceptions about teaching and learning?; (b) do student teachers' efficacy beliefs and achievement goals predict their conceptions about teaching and learning? Because the present study is explorative in nature no specific hypotheses were suggested.

Method
Participants

Based on the survey method, a total of 374 (243 females) student teachers, majoring in classroom teaching (n = 180) and Turkish teaching (n = 194) in a large university which is located in North-West of the Black Sea Region in Turkey, voluntarily participated in the study. These majors are chosen because of their relative importance in Turkish primary schools, as explained below. The sample consisted of 72

first-year, 78 second-year, 119 third-year, and 105 final-year students. Participants ranged in age from 17 to 33 years (M = 21.57, SD = 1.98). In Turkey, as in other countries, higher education is relatively expensive (Çakıroğlu & Çakıroğlu, 2003). Thus, it was assumed that sample students' Socio-Economic Status (SES) was at least medium.

Teacher Education in Turkey

Since 1989, regardless of the level they teach (e.g. elementary or secondary) teachers must graduate from education faculties. The only way of entering a bachelor degree for four years or more is to enter a nation wide and single stage examination called as Student Selection Examination (SSE), which is conducted by the Student Selection and Placement Center (see Çakıroğlu & Çakıroğlu, 2003 for more information). The Turkish teaching and classroom teaching are important majors in the Turkish education system due to the nature of the primary school curriculum, which is developed under the authority of National Ministry of Education. The first five years of the primary school education in Turkey, which is the first part of the eight-year compulsory education, is largely conducted by the classroom teachers. Within this period, it is mainly aimed to develop pupils' speaking, understanding, reading, and writing abilities in Turkish. On the other hand, both classroom teaching students and Turkish teaching students have to take common pedagogical courses such as educational psychology, classroom management, and teaching principles and methods. In addition, teaching practice is one of the major compulsory courses for both classroom teaching students and Turkish teaching students in the final year of teacher education.

Research Instruments

All items in the research instruments were translated into Turkish by the researcher with the assistance of three lecturers in the foreign languages department of the university where the present study was carried out. The agreement rates on the items of the scales were approximately 85 %. Disagreements were resolved through discussion of the items.

Teacher Efficacy Scale for Prospective Teachers

Because it theoretically and empirically captures the dimensions of teachers' sense of efficacy, the Teacher Efficacy Scale for Prospective Teachers (TESPT) was used to assess student teachers' efficacy beliefs in the present study (Denzine et al., 2005). The TESPT has three factors: self-efficacy beliefs i.e. teachers' beliefs about their ability to perform specific behaviors; outcome expectations i.e., adaptive outcomes that were attributable to the teachers' actions; and external locus of causality i.e. teachers' beliefs about the influence of external factors such as family background. As in the original scale, the items in the TESPT were presented in a 6-point Likert scale format, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*).

The TESPT has three items on self-efficacy beliefs (e.g. if a student did not remember information I gave in a previous lesson, I would know how to increase his/her retention in the next lesson) with possible scores ranging from 3 to 18, three

items on outcome expectations (e.g. when the grades of my students improve, it is usually because I found more effective teaching approaches) with possible scores ranging from 3 to 18, and four items on external locus of causality (e.g. the amount a student can learn is primarily related to family background) with possible scores ranging from 4 to 24.

Using the maximum likelihood estimation method from STATISTICA 6, Confirmatory Factor Analysis (CFA) was conducted to check the factor structure of TESPT in terms of fit indices such as Chi-square, Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), and the Root MSE of approximation (RMSEA) (Hu & Bentler, 1999). The results of CFA analysis showed that three-factor model has acceptable fit to data ($\chi^2 = 88.53$ df = 33; $\chi^2/df = 2.68$; NNFI = .93; CFI = .95; RMSEA = .065) (Hu & Bentler, 1999). The internal reliabilities were .76, .80, and .72 for self-efficacy beliefs, outcome expectations, and external locus of causality dimensions, respectively.

Teaching and Learning Conceptions Questionnaire

The Teaching and Learning Conceptions Questionnaire (TLCQ) (Chan & Elliott, 2004) was used to assess student teachers' conceptions about teaching and learning. The TLCQ has two factors: constructivist conceptions and traditional conceptions. In the traditional conceptions, "teaching is seen as a transfer of knowledge from expert or teacher to novice or student; learning is then the absorption of this knowledge" (Chan & Elliott, 2004, p. 821). In the constructivist conceptions, on the other hand, "learning is the creation and acquisition of knowledge by the learner through reasoning, and teaching is a provision and facilitation of the learning process" (Chan & Elliott, 2004, p. 821). In the original scale, constructivist conceptions were represented in 12 items (e.g. it is important that a teacher understands the feelings of the students), whereas traditional conceptions were represented in 18 items (e.g. students have to be called on all the time to keep them under control) in the TLCQ. As in the original scale, TLCQ items were presented in a 5-point Likert scale format, ranging from 1 *(strongly disagree)* to 5 *(strongly agree)*.

The results of CFA analysis showed that two-factor model have poor fit to data ($\chi^2 = 1242.68$ df = 404; $\chi^2/df = 3.08$; NNFI = .82; CFI = .84; RMSEA = .082). It was observed that one item in the constructivist conceptions subscale (e.g. different objectives and expectations in learning should be applied to different students) and a total of nine items in the traditional conceptions subscale (e.g. a teacher's major task is to give students knowledge/information, assign them drill and practice, and test their recall and learning means remembering what the teacher has taught) have insignificant and/or low parameter estimations (p>.05). This may be due to the cultural differences between two samples, pointing out that Turkish student teachers perceived the traditional conceptions about teaching and learning differently to their peers in Hong Kong. Consequently, when these items were excluded from the analysis, fit indices were increased to acceptable ranges ($\chi^2 = 409.02$ df = 169; $\chi^2/df = 2.42$; NNFI = .93; CFI = .94; RMSEA = .061). Moreover, internal reliabilities were quite high for both constructivist conceptions ($\alpha = .92$) and traditional conceptions ($\alpha = .89$). Thus, further analyses were conducted based on the 11 items of constructivist conceptions dimension, with possible scores ranging from 11 to 55, and 9 items of traditional conceptions dimension, with possible scores ranging from 9 to 45.

Achievement Goal Questionnaire

The Achievement Goal Questionnaire (AGQ) (Elliot & McGregor, 2001) was used to assess student teachers' achievement goal orientations in the present study. The AGQ comprises mastery-approach, mastery-avoidance, performance–approach, and performance-avoidance goal dimensions, each of which has three items. As in the original scale, AGQ items were presented in a 7-point Likert scale format ranging from 1 (*not at all true of me*) and 7 (*very true of me*). Accordingly, possible scores ranged from 3 to 21 for each dimension of AGQ. The results of the CFA revealed that four-factor model fit to data well ($\chi^2 = 91.06$ df = 48; χ^2/df = 1.90; NNFI = .97; CFI = .98; RMSEA = .049). Internal reliabilities were .83, .87, .85, and .77, for performance-approach goals, mastery-avoidance goals, mastery–approach goals, and performance-avoidance goals respectively.

Procedure

The data were obtained during the spring semester of 2006-2007 academic years. The TESPT, TLCQ, and the AGQ were applied with a few day intervals in order to avoid possible response bias. The scales were presented to students with instructions concerning the aim of the study. Demographic information such as gender, age (reported as open ended), and year of study levels were assessed by self-report on a separate sheet. Administration lasted approximately 10-15 minutes for TESPT, 15-20 minutes for TLCQ, and 10-15 minutes for AGQ.

Results

For the first research question, Pearson-product moment correlations were computed, while for the second research question, hierarchical regression analyses were conducted (Stevens, 1996).

Correlation Analysis

Zero-order correlations, means, and standard deviations are presented in Table 1. As seen in Table 1, student teachers' constructivist conceptions were significantly and positively correlated with their self-efficacy beliefs (r =.17, p<.01) and mastery-approach goals (r =.16, p<.01), whereas they were negatively correlated with performance-avoidance goals (r = -.14, p<.01) and traditional conceptions (r = -.39, p<.01). However, student teachers' outcome expectations, external locus of causality, performance-approach goals, and mastery-avoidance goals were not significantly correlated with constructivist conceptions.

None of the teacher efficacy and achievement goal variables were significantly correlated with traditional conceptions. Students' mastery-approach goals were the only achievement goal dimension that weakly related to traditional conceptions (r = -.10, p<.06). Self-efficacy beliefs were moderately and positively correlated with outcome expectations (r =.30, p<.01), performance-approach goals (r =.19, p<.01) mastery-approach goals (r =.27, p<.01), whereas they were negatively and moderately related to

performance-avoidance goals (r = -.21, p<.01). Student teachers' outcome expectations were positively and moderately related to both performance-approach goals (r =.25, p<.01) and mastery-approach goals (r =.18 p<.01). Finally, student teachers' performance-avoidance goals were moderately and negatively correlated with external locus of causality (r =.24, p<.01).

Variable	M	SD	1	2	3	4	5	6	7	8	9
ConsC	48.64	6.87	-								
TradC	19.32	6.91	-.39**	-							
SEB	14.55	2.38	.17**	-.04	-						
OE	12.70	2.60	.02	.02	.30**	-					
E-Loc	11.31	3.82	-.02	.05	-.07	.04	-				
PAP	12.86	4.21	-.08	.09	.19**	.25**	.07	-			
MAV	11.95	4.60	-.00	-.04	-.07	-.02	.06	.20**	-		
MAP	17.91	3.50	.16**	-.10	.27**	.18**	-.06	.13*	.01	-	
PAV	7.58	3.84	-.14**	.08	-.21**	.02	.24**	.10	.12*	-.37**	-

* p < .05 ** p < .01

Note. ConsC: constructivist conceptions; TradC: traditional conceptions; SEB: self-efficacy beliefs: OE: outcome expectations: E-Loc: external locus of causality; PAP: performance- approach goals; MAV: mastery-avoidance goals; MAP: mastery-approach goals; PAV: performance-avoidance goals.

Table 1: Zero-order correlations and descriptives

Hierarchical Regression Analyses

Age, gender, year of study, and fields of study variables were entered in the first step of the regression analysis, whereas self-efficacy, outcome expectations, and external locus of causality were included in the second step. Achievement goal variables were added in the final step of the analyses. The results of the regression analyses are presented in Table 2.

Variable	ConsC					TradC			
	B	S. E.	β	p		B	S. E.	β	p
Step 1									
Age	0.40	0.23	.11	.09		-0.29	0.24	-.08	.23
Gender	-1.53	0.75	-.11*	.04		0.38	0.77	.03	.62
Fields of study	2.64	0.70	.19**	.00		-2.69	0.72	-.20**	.00
Freshmen	-0.78	1.29	-.05	.55		1.44	1.32	.08	.28
Sophomores	1.88	1.12	.11	.09		2.07	1.14	.12	.07
Juniors	1.96	0.91	.13*	.03		0.12	0.93	.01	.90
Step 2									
Age	0.41	0.23	.12	.08		-0.30	0.24	-.09	.21
Gender	-1.58	0.75	-.11*	.03		0.38	0.77	.03	.62
Fields of study	2.46	0.71	.18**	.00		-2.62	0.73	-.19**	.00
Freshmen	-0.45	1.31	-.03	.72		1.34	1.35	.08	.32
Sophomores	1.79	1.12	.11	.11		2.06	1.15	.12	.07
Juniors	1.94	0.93	.13*	.03		0.14	0.93	.01	.88
SEB	0.41	0.15	.14*	.01		-0.08	0.16	-.03	.61
OE	-0.07	0.14	-.03	.64		0.07	0.14	.03	.62
E-Loc	0.03	0.09	.02	.74		0.03	0.09	.02	.71
Step 3									
Age	0.42	0.23	.12	.07		-0.35	0.24	-.10	.15
Gender	-1.18	0.75	-.08	.12		0.05	0.77	.03	.95
Fields of study	2.38	0.71	.17**	.00		-2.67	0.73	-.19**	.00
Freshmen	-0.22	1.31	-.01	.87		1.14	1.35	.07	.40
Sophomores	1.85	1.11	.11	.10		2.12	1.15	.13	.07
Juniors	2.14	0.91	.15*	.02		0.04	0.94	.00	.97
SEB	0.36	0.16	.12*	.03		-0.08	0.16	-.03	.61
OE	-0.41	0.14	-.02	.77		0.05	0.15	.02	.75
E-Loc	0.06	0.09	.03	.51		0.03	0.10	.01	.80
PAP	-0.15	0.09	-.09	.08		0.16	0.09	.10	.07
MAV	0.09	0.08	.06	.23		-0.17	0.08	-.11*	.03
MAP	0.21	0.11	.11ᵃ	.05		-0.16	0.11	-.08	.15
PAV	-0.08	0.10	-.05	.42		0.01	0.11	.00	.96

ᵃ p = .05, * p< .05, ** p < .01

Note. Constructivist conceptions: R^2 = .09, $F(6, 367)$ = 6.07, p < .001 for step 1; R^2 = .11, $F(9, 364)$ = 4.90, p < .001 for step 2; R^2 = .13, $F(13, 360)$ = 4.19, p < .001 for step 3. Traditional conceptions: R^2 = .07, $F(6, 367)$ = 4.24, p < .001 for step 1; R^2 = .07, $F(9, 364)$ = 2.87, p < .01 for step 2; R^2 = .09, $F(13, 360)$ = 2.70, p < .01 for step 3.

Table 2: The summary of the hierarchical regression analysis

As seen in Table 2, gender (β = -.11, p < .05), fields of study (β = .19, p < .01), and year of study (β = .13, p < .05) variables significantly predicted constructivist conceptions in the first step of the analyses. Specifically, females, Turkish teaching

students, and third-year students have more constructivist conceptions about teaching and learning than males, classroom teaching students, first-year, second-year, and fourth-year students, respectively. In addition, age, gender, fields of study, and year of study variables explained 9 % of the total variance in student teachers' constructivist conceptions ($R^2 = .09$, $F(6, 367) = 6.07$, $p < .001$). In the second step, self-efficacy beliefs, outcome expectations, and external locus of causality beliefs significantly contributed to the variance ($R^2 = .11$, $F(9, 364) = 4.90$, $p < .001$). Among them, the self-efficacy beliefs dimension of the TESPT was the only significant and positive predictor of constructivist conceptions ($\beta = .14$, $p < .01$). Furthermore, gender, fields of study and year of study variables were significantly predicted constructivist conceptions, revealing that females ($\beta = -.11$, $p < .05$), Turkish teaching students ($\beta = .18$, $p < .01$), and juniors ($\beta = .13$, $p < .05$) are more likely to adopt constructivist conceptions than males, classroom teaching students, freshmen, sophomores, and seniors.

When achievement goal variables were included in the third step, the explained variance somewhat increased ($R^2 = .13$, $F(13, 360) = 4.19$, $p < .001$). Accordingly, student teachers' mastery-approach goal orientations positively and significantly predicted constructivist conceptions ($\beta = .11$, $p = .05$). However, none of the remaining motivational variables significantly predicted constructivist conceptions (see Table 2). Finally, the gender effect on constructivist conceptions disappeared in the third step ($\beta = -.08$, $p > .05$), whereas fields of study ($\beta = .17$, $p < .01$), year of study levels ($\beta = .15$, $p < .01$), and self-efficacy beliefs persisted ($\beta = .12$, $p < .05$).

The fields of study variable was the significant predictor of traditional conceptions in the first step ($\beta = -.20$, $p < .01$), indicating that classroom teaching students have more traditional conceptions about teaching and learning than Turkish teaching students (see Table 2). Age, gender, fields of study, and year of study variables together explained 7 % of the total variance in traditional conceptions ($R^2 = .07$, $F(6, 367) = 4.24$, $p < .001$). Including variables of teachers efficacy beliefs in the second step did not significantly contribute to explained variance ($R^2 = .07$, $F(9, 364) = 2.87$, $p < .01$). Fields of study variable was again the significant predictor of traditional conceptions in the second step ($\beta = -.19$, $p < .01$). In the third step, achievement goals marginally increased the explained variance ($R^2 = .09$, $F(13, 360) = 2.70$, $p < .01$). As seen in Table 2, this contribution was mainly originated from the effects of mastery-avoidance goals on traditional conceptions ($\beta = -.11$, $p < .05$). Finally, fields of study was a significant predictor of student teachers' traditional conceptions, indicating that classroom teaching students tended to adopt traditional conceptions about teaching and learning ($\beta = -.19$, $p < .01$).

Discussion

The results of the correlation analysis provided a significant framework in which high mastery-approach goal orientation, high self-efficacy beliefs, low performance-avoidance goals, and low traditional conceptions are the main characteristics of student teachers with constructivist conceptions. Previous research showed that high self-efficacy beliefs are related to high self-esteem (Huang et al., 2007), enthusiasm for teaching (Allinder, 1994), taking responsibility in student learning (Guskey, 1987), and engaging in activities that promote the development of competencies (Morin & Welsh,

1991). Previous studies also showed that mastery-approach goals are related to adaptive outcomes such as perceived competence and deep processing (Elliot & McGregor, 2001). In fact, these associates of high self-efficacy beliefs and mastery-approach goals are also important aspects of constructivist view of learning/teaching (Brooks & Brooks, 1993; Phillips, 1995). In other words, a constructivist view of learning/teaching requires teachers to take responsibility for student learning, engaging in activities that promote the development of competencies, having high self-esteem, persistence, competence, and enthusiasm for teaching, because the "teacher's role shifts from knowledge provider to learning facilitator within this view" (Chang, 2005, p. 96). Thus, it can be claimed that the relationships among mastery-approach goals, self-efficacy beliefs, and constructivist conceptions about teaching and learning are all in expected directions with respect to the constructivist view of learning/teaching.

The results of the regression analysis replicated the positive links among constructivist conceptions, self-efficacy beliefs and mastery-approach goals whereas the negative links among performance-avoidance goals and constructivist conceptions were not replicated. As noted earlier, constructivist conceptions about teaching and learning refer to taking responsibility for student learning (Guskey, 1987), to be more learning-centered (Kember, 1997), to share control with students (Swars, 2005), and to perceive a teacher's role as a counselor in students' knowledge construction process (Samuelowicz & Bain, 2001), each of which indicates a more dynamic and flexible learning/teaching process. Conversely, traditional conceptions were mainly based on teacher-centered applications (Kember & Gow, 1994) and refer to a more controlled and strict environment, and thus, lower risk teaching and learning process (Phillips, 1995). Thus, it is reasonable to expect that student teachers with high self-efficacy beliefs are more tend to adopt constructivist conceptions than their peers with low self-efficacy beliefs due to the fact that the higher their self-efficacy beliefs, the more they could be effective in a demanding environment where the teaching/learning processes are more open to the effects of "here and now" actions than a relatively strict and predictable learning environments (Phillips, 1995; Chang, 2005).

In line with the same reasoning, to learn for its own sake, as well as to focus on intrapersonal competence, is more adaptive goal orientation for student teachers who tend to adopt constructivist conceptions, because high mastery-approach goal orientations may enable them to be more competent in a constructivist teaching/learning process which is more demanding than traditional teaching/learning process (Richardson, 2003). Indeed, previous research on students' mastery-approach goals showed that they are significantly and positively correlated with perceived competence (Elliot & McGregor, 2001; Cury et al., 2006). Consequently, it can be said that the results of the regression analysis are not surprising. However, these explanations remain somewhat speculative because student teachers' actual teaching behaviours were not controlled in the present study. Therefore, these claims need further research before concluding any clear-cut results regarding this issue.

Furthermore, mastery-avoidance goals negatively predicted students' traditional conceptions. As explained earlier, both mastery and performance-avoidance goal-oriented students perceive the teacher as a source of knowledge (Chan, 2003; Chan & Elliott, 2004). If this is the case, student teachers with mastery-avoidance goals may focus on traditional conceptions in order to keep their 'wise man' status in an environment where teacher is a main source of knowledge (Chan, 2003). In line with the previous research (e.g. Chan et al., 2007), the results of the regression analysis

showed that student teachers' conceptions about teaching and learning were significantly affected by their fields of study. This could be due to the fact that student teachers' conceptions about teaching and learning are constructed through the nature of their teacher education program (Lin & Gorrel, 2001; Cheung, 2006). Nevertheless, this explanation could be checked out in future research in which other factors such as background and prior experience of student teachers are included as background variables in the analyses.

Results of the regression analysis also showed that third-year students tended to adopt constructivist conceptions about teaching and learning when compared with first-year, second-year, and fourth-year students. Third-year students may perceive themselves as more competent and skilful to cope with the difficulties of a constructivist teaching/learning environment because students' self-efficacy for teaching increases during university teacher preparation (Kimonen & Nevalainen, 2005). However, fourth year students were found to adopt traditional conceptions rather than constructivist conceptions. This may be due to the impact of teaching practice on student teachers' beliefs (Woolfolk Hoy & Spero, 2005). Student teachers have to take a teaching practicum course in their fourth year of teacher education in Turkey (Gencer & Çakıroğlu, 2007). It means that they may experience a "reality shock" when facing the demands and expectations encountered by experienced teachers (Woolfolk Hoy & Spero, 2005). If this is the case, constructivist conceptions may be perceived as theoretical claims that can not be interpreted in real teaching situations, which, in turn, may cause fourth-year students to adopt constructivist conceptions to a lesser extent than first-year, second-year, and third-year students. Finally, gender effect on constructivist conceptions were suppressed by the effects of achievement goals, suggesting that the relationship between constructivist conceptions and gender are mediated by achievement goals. Obviously, this issue deserves further investigation.

Limitations

This study has several limitations. First, the sample size was small. This may seriously limit the generalizability of the results. Second, although the student teachers' efficacy beliefs and personal goals were determined as the antecedents of their conceptions about teaching and learning based on the previous research, the cross-sectional design of the study does not enable one to conclude such causal inferences regarding the relationships among variables at hand. Finally, the data were obtained from only one university. Although the university, where the present study was carried out, was somewhat representative of the Turkish Higher Educational System; this may also be seen as a limitation.

Implications for Teacher Education

Previous research showed that teachers' conceptions about teaching and learning affect their teaching/learning-related behaviours in educational settings such as classrooms, which, in turn, affect the quality of educational/instructional processes. Also, much of these research revealed that teachers' beliefs affect whether or not curriculum reforms (i.e. establishing the constructivist view of teaching and learning) are adopted (Cheng et al., in press). Accordingly, when teachers perceive that

curriculum reforms are consistent with their educational/instructional beliefs, they are more inclined to adopt these reforms (Pajares, 1992). For example, it is more easy to establish a constructivist teaching/learning environment, which is also one of the main targets of the current curriculum reform in Turkey and Singapore, where the teachers adopt more constructivist conceptions than traditional conceptions. In the light of these explanations, it can be said that it is important to find out the factors that affect teachers' conceptions about teaching and learning at the very beginning of their career pathways, that is, the teacher education. Here, the results of this study suggest two important reference points: student teachers' mastery-approach goals and self-efficacy beliefs. Based on the results of this study it can be speculated that providing meaningful learning/teaching experiences, through which student teachers could develop their self-efficacy beliefs and adopt mastery-approach goals, may lead them to adopt more constructivist conceptions than traditional conceptions.

Furthermore, the results of this study demonstrated that student teachers' conceptions about teaching and learning are significantly affected by the fields of study, even after gender, year of study, and age, as background variables, were controlled. Therefore, domain differences should also be considered in any attempt to change student teachers' conceptions about teaching and learning in a desired way. Indeed, the extent to which teacher education programs can impact on student teachers' beliefs is one of the important concerns in teacher education (Cheng et al., in press). In context of the current results, for example, it can be said that it may be fruitful to reinforceTurkish teaching students' conceptions about teaching and learning, while it may be sensible to alter classroom teaching students' conceptions about teaching and learning. Results of the regression analyses revealed that the final-year student teachers tended to adopt more traditional conceptions about teaching and learning. Given that the final-year students are very close to their professional teaching career, it is important to examine the factors that underlie this sharp difference between the conceptions of third-year students and fourth-year students. This issue deserves longitudinal research in the future to broaden our current understanding regarding the issue of changes in student teachers' beliefs.

Finally, although the sample of this study consisted of Turkish student teachers, those implications above may also be valid for student teachers in other countries because the structure validity and reliability of the research instruments, each of which was developed based on other samples than the samples of Turkish student teachers, were somewhat confirmed in the present study, and also because overall view of the present results were in line with the results of the previous Western and Asian studies. Nevertheless, these implications should cautiously be interpreted in future studies due to the fact that cultural background plays an important role in student teachers' beliefs (Cheung, 2006).

Directions for Future Research

The results of the present study demonstrated that student teachers' conceptions about teaching and learning were significantly predicted by their fields of study. Therefore future investigations, in which various and more domains could be included, would reveal more specific results about the domain effects on students' conceptions about teaching and learning. Results also showed that self-efficacy beliefs, conceptions

about teaching and learning, and achievement goals are significantly correlated with one another. Although this framework was confirmed by the results of the regression analysis, these links could be tested with a more robust method such as Structural Equation Modeling (SEM). Longitudinal studies are needed to examine the possible changes in student teachers' conceptions about teaching and learning. It is obvious that longitudinal studies are crucial both to shed light on the causal effects of student teachers' self-efficacy beliefs and mastery-approach goals on their conceptions and to reveal the degree of malleability in their conceptions. Finally, qualitative studies are also needed to what influences student teachers' conceptions about teaching and learning.

Conclusion

The results of the present study lead to two major conclusions. First, student teachers' self-efficacy beliefs and mastery-approach goals emerged as the significant predictors of their constructivist conceptions, suggesting that student teachers' conceptions about teaching and learning are partly affected by both motivational beliefs and efficacy beliefs. Second, the effects of these beliefs on student teachers' conceptions about teaching and learning are domain-specific, indicating that these significant effects on students' conceptions vary as a function of the fields of study. Therefore, the relationships among student teachers' conceptions about teaching and learning, motivational beliefs, and self-efficacy beliefs should be considered with the effects of various program types in teacher education. Finally, student teachers' motivational beliefs and teacher efficacy beliefs explained only a small amount of variance in conceptions about teaching and learning, pointing out that there is room for other important educational variables that need further investigation to broaden our current understanding about student teachers' conceptions about teaching and learning.

Overall, this study suggests that the relationships among teacher efficacy, motivational beliefs, and conceptions about teaching and learning are not negligible. Thus, it can be claimed that it is worthwhile to move on this line of research to bridging the gaps among motivation, efficacy, and conceptions about teaching and learning in teacher education.

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