Differences between Elementary and Secondary Preservice Science Teachers' Perceived Efficacy Belies and their Classroom Management Beliefs

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Abstract

Teacher efficacy has been one of the few variables consistently related to positive teaching behavior and student outcomes. Teacher efficacy can also be related with teacher's classroom management approaches (Henson, 2001). The purpose of this study was to assess differences between Turkish elementary and secondary preservice teachers' science teaching efficacy and classroom management beliefs. Data in this study were collected from a total number of 646 preservice teachers enrolled in elementary and secondary science teacher education programs in Turkey using Science Teaching Efficacy Belief Instrument (STEBI-B) (Enochs & Riggs, 1990) and the Attitudes and Beliefs On Classroom Control (ABCC) Inventory (Martin, Yin, & Baldwin, 1998). Results indicated that secondary preservice teachers were more efficacious than the elementary counterparts on the two dimensions of the STEBI-B. However, all participants were found to be more interventionist on the instructional management and non-interventionist on the people management. In addition, analyses were not revealed any significant gender and education level differences on the subscales of the ABCC Inventory.

Keywords: self-efficacy, classroom management, elementary teachers, and secondary science teachers.

Introduction

Much research in recent years have given a great attention to the importance of self-efficacy concept in understanding teachers' and students' behaviors in the learning process. Tschannen-Moran and Hoy (2001) defined teacher efficacy as a teacher's judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated.

Teacher efficacy has been found one of the few variables consistently associated with positive teaching behavior and student outcomes (Ashton & Webb, 1986; Woolfolk & Hoy, 1990). Research on efficacy of teachers suggests that behaviors such as persistence at a task, risk taking, willing to implement instructional innovations and competent teaching methods are related to degrees of efficacy (Czerniak & Lumpe, 1996; Gibson & Dembo, 1984; Guskey 1988).

Teacher efficacy would also be related with teacher's classroom management approaches (Henson, 2001; Woolfolk & Hoy 1990). Doyle (1986) suggested that one of the major tasks of teaching is to establish and maintain order in the classroom. Within the difficulty of this task, classroom discipline and motivating students were perceived as much greatest concern of preservice teachers' (Evans & Tribble, 1986) and beginning teachers' (Veenman, 1984). Henson (2001) postulated that in establishing an effective learning environment, a teacher' belief in his/her ability to positively facilitate student learning impacts classroom management behavior. Teachers' with a higher sense of efficacy tended to favor more humanistic and less controlling classroom management orientations in how they handle their students' behaviors (Enochs, Scharmann, & Riggs, 1995; Henson, 2001; Woolfolk & Hoy, 1990; Woolfolk, Rosoff, & Hoy, 1990).

According to the literature, teachers' efficacy development and classroom management orientations are changeable as a factor of different variables such as sexuality, experience, age, education, etc. Therefore, the purpose of this study was to assess differences between Turkish elementary and secondary preservice science teachers' science teaching efficacy and classroom management beliefs.

Theoretical Framework

The Construct and Measurement of Teacher Efficacy

The conceptualization of teacher efficacy have been based on Bandura's (1977, 1997) social cognitive theory and his construct of self-efficacy. Bandura (1997) described perceived self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p.3). He postulated that efficacy beliefs were powerful predictors of behavior because they were ultimately self-referent in nature and directed toward perceived abilities given specific task. Such beliefs influence the courses of action people choose to pursue, how much effort they will expended in given endeavors, how long they will persist in

the face of obstacles and failures. In his theory, Bandura (1977) theorized that behavior is based on two sources; outcome expectations and self-efficacy expectations. He defined outcome expectancy as a person's estimate that a given behavior will lead to certain outcomes whereas an efficacy expectation is the conviction that one can successfully execute the behavior required to produce the outcomes.

In terms of the construct and measurement teacher efficacy, Tschannen-Moran, et al. (1998) identified two strands of research. The first is grounded in Rotter's (1966) social learning theory of internal versus external control (Rotter, 1966). Among of these, the RAND organization, which first conducted research on teacher efficacy, developed two items to measure a teachers' locus of control (Armor et al., 1976). RAND researchers defined efficacy as "the extent to which the teachers believes he or she has the capacity to affect student performance" (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977, p.137).

On the other strand of teacher efficacy, many researchers have applied Bandura's (1977) social cognitive theory and his construct of self-efficacy to teachers. Based on Bandura's (1977) construct, Ashton and Webb (1982, 1986) were among the first researchers to develop a multidimensional model of teacher efficacy for assessing two dimensions of teacher efficacy by using two items that were developed by the RAND studies (Armor et al., 1976; Berman et al., 1977). A teacher in agreement with the first statement indicates that environmental factors overwhelm the teacher's power to influence student learning was labeled "teaching efficacy" that corresponded to Bandura's outcome expectations. The other indicates that teachers' confidence in their abilities to overcome factors that could make learning difficult for a student was labeled "personal teaching efficacy" that corresponded to Bandura's self-efficacy expectations.

Following Ashton and Webb's work, in attempt to further development of teacher efficacy belief instrument, Gibson and Dembo (1984) developed a 30-item Likert type Teacher Efficacy Scale (TES) to measure two dimensions of teacher efficacy. Factor analysis of responses from 208 elementary school teachers confirmed the existence of two factors, one that Gibson and Dembo called personal teaching efficacy assumed to reflect self-efficacy, and another called general teaching efficacy assumed to capture outcome expectancy. Gibson and Dembo (1984) concluded that teacher efficacy is multidimensional, consisting of at least two dimensions and may influence certain patterns of classroom behavior.

Reinforcing Bandura's definition of self-efficacy as a situation-specific construct, Riggs and Enochs (1990) developed an instrument to measure efficacy of teaching science. It was called the Science Teaching Efficacy Belief Instrument (STEBI) that has two versions; the Science Teaching Efficacy Belief Instrument form A (STEBI-A) for inservice elementary teachers (Riggs & Enochs, 1990) and the Science Teaching Efficacy Belief Instrument form B (STEBI-B) for preservice elementary teachers (Enochs & Riggs, 1990). Consistent with Gibson and Dembo, they have found two distinct dimensions, the first one was named as Personal Science Teaching Efficacy Belief (PSTE) scale which reflects elementary science teachers' confidence in their ability to teach science and the second was named as Science Teaching Outcome Expectancy (STOE) scale which reflects elementary science teachers' beliefs that student learning can be influenced by given effective instruction.

The construct of teacher efficacy has been explored by a number of researchers in recent years. In response to the confusion how to best measure teacher efficacy, Tschannen-Moran et al. (1998) and Tschannen-Moran and Woolfolk Hoy (2001) presented an integrated model of efficacy development in the cyclical nature of teacher efficacy that emerged from two interrelated factors of teaching task analysis for the given context and assessment of competence in this context. The model postulates that teachers draw information to make these assessments from four sources as suggested by Bandura (1997); enactive mastery experiences, vicarious experiences, verbal persuasion, and physiological arousal. Within this model, teacher's efficacy judgments are the result of the interaction between a personal judgment of the relative importance of factors that make teaching difficult and an assessment of his or her personal teaching competence or skill. It was postulated that a valid measure of teacher efficacy must measure teachers' assessments of their competence across the wide range of activities and tasks in terms of the resources and constraints in particular teaching contexts.

<u>Teachers' Classroom Management Approaches</u>

In terms of providing effective learning environment in a classroom in its complex endeavor, research findings continuously have shown that the key to successful management is the teacher's ability to manage the classroom and to organize instruction (Brophy, 1983, 1988; Brophy & Alleman, 1998; Emmer, Evertson, & Worsham, 2000; Evertson, Emmer, Sanford, & Clements, 1983; Doyle, 1986, Weade & Everston, 1988). In this manner, Brophy (1988) defines classroom management as "the actions taken to create and maintain a learning environment conducive to attainment of the goals of instruction-arranging the physical environment of the classroom, establishing rules and procedures, maintaining attention to lessons and engagement in academic activities" (p.2).

In its dynamic process being aware of factors, teachers' attitudes and beliefs toward classroom management have been linked to their classroom management orientations. Martin and Baldwin (1992) asserted that teachers' approaches toward managing the classroom would vary as a function of their beliefs regarding the

nature of appropriate and inappropriate behaviors and how to control them. Accordingly, Glickman and Tamashiro (1980) classified beliefs toward discipline on a continuum of control that reflects the extent to which teachers want to exercise control over students ranges from non-interventionists at one extreme to interventionists at the other, and interactionalists midway between them.

According to Martin et al. (1998), the non-interventionist "presupposes the child has an inner drive that needs to find its expression in the real world" (p.6). At the opposite end of the continuum are interventionists who emphasize "what the outer environment does to the human organism to cause it to develop in its particular way"(p.6). Midway between these two extremes, interactionalists focus on "what the individual does to modify the external environment, as well as what the environment does to shape the individual. Interactionalists strive to find solutions satisfactory to both teacher and students, employing same of the techniques as non-interventionists and interventionist" (p.7).

In an attempt to capture a multi dimensional aspects of classroom management, Martin, Yin, and Baldwin (1998) developed the 26-item scale of the Attitudes and Beliefs on Classroom Control (ABCC) Inventory to measure teachers' perceptions of their classroom management beliefs grounded from the three approaches of the continuum to classroom interaction; non-interventionist, interactionalist and interventionist, as originally conceptualized by Glickman and Tamashiro (1980). The ABCC Inventory (Martin et al. 1998) includes three broad, independent dimensions: Instructional Management (14 Items), People Management (8 Items), and Behavior Management (4 Items). According to Martin et al. (1998), the instructional dimension "includes aspects such as monitoring seatwork, structuring daily routines, and allocating materials;" the people management dimension "pertains to what teachers believe about students as persons and what teachers do to develop the teacher-student relationship;" and the behavior management dimension "focuses on preplanned means of preventing misbehavior rather than the teacher's reaction to it" (p.7).

Method

Sample

Data in this study were collected from a total number of 646 preservice teachers enrolled in elementary and secondary science teacher education programs in Turkey. Among the participants, 412 of them were seniors who were ready to be teachers in secondary schools and 234 of them were ready to be teachers in elementary schools. The sample included 361 females and 285 males.

Instruments

Science Teaching Efficacy Belief Instrument (STEBI-B)

The participants completed the adapted forms of the two questionnaires; Science Teaching Efficacy Belief Instrument (STEBI-B) (Enochs & Riggs, 1990) and the Attitudes and Beliefs On Classroom Control (ABCC) Inventory (Martin, Yin, & Baldwin, 1998). The Science Teaching Efficacy Belief Instrument (STEBI-B) (Enochs and Riggs, 1990) was developed to measure efficacy of teaching science for preservice elementary teachers. The STEBI-B consists of 23 items in a five- point Likert type scale ranging from strongly agree to strongly disagree. The STEBI-B is comprised of two subscales; Personal Science Teaching Efficacy (PSTE) (13 items) and Science Teaching Outcome Expectancy (STOE) (10 items). Enochs and Riggs (1990) reported that the STEBI-B is a valid and reliable instrument.

The STEBI-B was first adapted to Turkish by Tekkaya, Çakıroğlu and Özkan (2002). This version of the STEBI-B was submitted to principal components analysis with varimax rotation to confirm underlying dimensions of the scale. A factor analysis suggests the factorial structure of the STEBI-B developed by Enochs and Riggs (1990) was the same as that was observed for the Turkish sample. After reverse scoring of negatively worded items, high scores on the PSTE subscale indicate greater science teaching self-efficacy beliefs to have positive students' outcomes. Likewise, high scores on the STOE subscale indicate greater outcome expectancy related to the power of teaching to overcome any negative influences that lie outside the classroom. Reliability coefficients for the two scales were .81, and .74 for the PSTE, and STOE, respectively. The results of these analyses indicate that the STEBI-B could be considered reasonable instrument to produce valid and reliable data.

The Attitudes and Beliefs On Classroom Control (ABCC) Inventory

The ABCC Inventory, an instrument designed to measure teachers' perceptions of their classroom management beliefs and practices consists of 26 Likert format statements. Within this inventory, classroom management was defined as a multi-faceted construct that includes three broad dimensions: Instructional Management, People Management, and Behavior Management. Each scale was derived to assess a continuum of

control ranging from interventionist to interactionalist to non-interventionist. After reverse scoring of some items endorsing non-interventionist expression, high subscale scores indicate a more controlling, interventionist approach while lower scores are indicative of a less controlling belief in that dimension of classroom management style. After using the principal component analysis, some of the items were deleted and final modified version of ABCC Inventory included two scales; the instructional management scale including 12 items and the people management scale including 8 items. Reliability coefficient for the two scales were found to be .71 and .73 for Instructional Management and the People Management, respectively.

Results

A series of two-way ANOVAs was run on the scale scores of each subscales of the STEBI-B and the ABCC Inventory in order to determine differences between elementary and secondary preservice teachers' science teaching efficacy and classroom management beliefs as a function of the main and interaction effects of gender and education level. Results indicated significant education level main effect difference with only the subscales of the STEBI-B (Table 1 and Table2), but not any significant main and interaction effect on the subscales of the ABCC Inventory (Table 1 and Table2).

Tablo 1 Results of two-way ANOVA on the PSTE subscale of the STEBI-B

	N	Mean	Sd	F	P
Main effects				25.39	.000
Gender				.257	.612
Female	361	45.93	6.75		
Male	285	45.64	7.76		
Education level				74.91	.000
Elemantary	234	42.70	7.57		
Secondary	412	47.57	6.36		
2-way interactions				.227	.634

Tablo 2 Results of two-way ANOVA on the STOE subscale of the STEBI-B

	N	Mean	Sd	F	P
Main effects				4.54	.004
Gender				.054	.817
Female	361	29.15	4.28		
Male	285	28.89	4.80		
Education level				12.78	.000
Elemantary	234	29.18	4.35		
Secondary	412	29.52	4.54		
2-way interactions				.119	.730

Tablo 3 Results of two-way ANOVA on the Instructional Management subscale of the ABCC Inventory

	N	Mean	Sd	F	P
Main effects				1.83	1.40
Gender				.878	.349
Female	361	36.42	4.64		
Male	285	35.92	5.67		
Education level				3.88	.049
Elemantary	234	35.64			
Secondary	412	36.52			
2-way interactions				.029	.866

Tablo 3 Results of two-way ANOVA on the People Management subscale of the ABCC Inventory

	N	Mean	Sd	F	P
Main effects				2.04	.107
Gender				3.30	.070
Female	361	18.93	4.06		
Male	285	19.49	4.97		
Education level				3.37	.067
Elemantary	234	18.79	5.01		
Secondary	412	19.40	4.16		
2-way interactions				.117	.733

Discussion

Analysis of the self-efficacy survey indicated that both elementary and secondary preservice science teachers had generally more positive self-efficacy beliefs regarding science teaching. However, two-way ANOVAs analysis revealed a significant educational level difference on the subscales of the STEBI-B. In fact, education level is a more of a factor than gender in determining one's beliefs regarding efficacy beliefs. Secondary preservice science teachers were more efficacious than the elementary counterparts on the PSTE (M=47.57, and M=42.70, respectively) and the STOE (M=29.52, and M=28.18, respectively). It seems that secondary science teachers have stronger beliefs in their ability to teach science more effectively and enhancing students' learning given effective instruction. This result can be explained with the differences in the programs of the elementary and science teachers in which science teacher education programs comprise more science courses. Czerniak and Chiarelott (1990) asserted such positive relationships that teachers who completed more science courses had higher sense of science teaching.

Furthermore, according to the results of two-way ANOVAs, there were no significant gender and educational level differences on the subscales of the ABCC Inventory. However, both elementary and secondary preservice science teachers were found to be more interventionist on the instructional management (M=36.52, and M=35.64) which addresses aspects of classroom management such as monitoring seatwork, structuring daily routines and allocating materials. In addition, all participants were favored non-interventionist style on the people management (M=19.40, and M=18.78), which includes teacher-student relationships. It is interesting to note that the main effects of gender and educational level did not yield any significant differences on the subscales of the ABCC Inventory. Given the difference in the literature, however, males are more controlling, authoritarian, rigid, impersonal, assertive, and aggressive than their female counterparts. Martin and Yin (1997) found that male teachers more interventionist on classroom management. In addition, Martin, Baldwin, and Beatrice (1996) found that elementary teachers were less interventionist than their secondary level counterparts.

In understanding the relationships between the variables in educational settings, teacher efficacy has been found consistently related to positive teaching behavior and student outcomes and teachers' classroom management approaches. Particularly, preservice teachers' efficacy beliefs seems to be an area of fruitful for future research.
This study provides insights to investigate preservice teachers' classroom management approaches and science teaching efficacy beliefs in Turkey. Such research findings can help undergraduate programs and educators in revision their program or practicum experiences result in enhancing preservice teachers' sense of efficacy and conceptual understanding of management for successful teaching.

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