The Views of Secondary School and Pre-service Mathematics Teachers about the Seven Principles for Good Practice in Education

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ABSTRACT

This study focuses on the views and practices of both secondary school and pre-service mathematics teachers in Turkey regarding the seven principles for good practice in education. Its sample consisted of two groups; one group consisted of 79 pre-service mathematics teachers in either their second or fourth years of undergraduate study at university education departments, while the other consisted of seven mathematics teachers currently working at secondary schools. This study implemented a survey to determine the views and practices of the sample regarding the seven principles for good practice in education created by Chickering and Gamson (1987). For most of the items relating to all of the principles, it was determined that current mathematics teachers have more positive views than pre-service mathematics teachers regarding the effectiveness of the seven principles. In terms of gender, it was determined that females have more positive views of the principles than males.

Key Words: Seven principles for good practice in education, Chickering and Gamson, Secondary school mathematics teachers, Pre-service teachers

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INTRODUCTION

Education has been an edification process socially maintained since the development of human civilization (Can, 2006). Changing human lifestyles and viewpoints about the world have also changed perspectives regarding education. With these changes, new educational programs have continually been initiated that accommodate the needs of learners, such as the classification of students by age. In turn, new teaching practices have continually caused new viewpoints about learning to be respected during the development of educational programs.

If the process of developing new teaching strategies once focused only on how teachers taught students, new developments have begun to include everything that affects how students learn. During this process, the use of active learning methods have activated students and more generally changed all aspects related to learning. With this change, teacher perception also changes; if before teachers occupied didactic positions, they now occupy directorial roles. This shift from didacticism to something like coaching has encouraged students, as well as academic environments, to reassess which learning methods are most effective. Additionally, teachers now must experience a thorough university education in order to be effective in implementing this process. Part of the university education for aspiring teachers means acquiring knowledge related to the ways that help to include students in the learning process, especially regarding undergraduate students.

After these and similar changes, Chickering and Gamson (1987) developed seven principles for good practice in undergraduate education. In practice, these seven principles are: 1) encouraging contact between students and faculty; 2) developing reciprocity and cooperation among students; 3) encouraging active learning; 4) giving prompt feedback; 5) emphasizing time on task (i.e., completing tasks on time); 5) communicating high expectations; and 7) respecting diverse talents and ways of learning (Chickering & Gamson, 1987). These seven principles are intended as guidelines for faculty members, students, and administrators—with support from state agencies and trustees—to improve teaching and learning. If these principles seem like good common sense, they are because one, many teachers and students have experienced them, and two, research supports them (Gamson, 1991; Bangert, 2004; Aydoğdu, Doymuş & Şimşek, 2012).

In undergraduate education, student-faculty contact plays a very important role during the learning process because students encounter communication problems with their classmates, faculty advisors, and instructors (Erdoğan, Şanlı, & Bekir, 2005; Aydoğdu, 2012). These problems affect communication skills, the ability to articulate complications, and a student's ability to empathize with another student's seemingly negative ways (Kim & Sax, 2011). Thus, providing student-faculty contact is the first of the seven principles because it not only removes negativity but also provides effective communication and boosts self-esteem (Chickering & Gamson, 1987; Yeşil, 2004). Student-faculty contact in university populations stands out as much as student-teacher contact stands out in secondary schools. The quality of student-teacher contact affects not only student achievement but also student behavior. Plus, student-teacher contact heavily influences student attitudes toward learning and thus academic achievement. Perhaps above all, increasing student-teacher contact develops students' social and participatory behavior in school (Bradley, Pauley & Pauley, 2006; Decker, Dona & Christenson, 2007; İpek & Terzi, 2010).

In order to provide effective learning, it is necessary to construct cooperation among students. Chickering and Gamson (1987) specified that studying in groups increases the

permanence of knowledge. Studying with groups also increases student skills in terms of coming into contact with knowledge (Karaçöp & Doymuş, 2012). Asking other students questions and answering these questions in groups provides students with an opportunity to express their opinions and understand subjects in more depth (Umdu Topsakal, 2010; Sandi-Urena, Cooper & Stevens, 2012). With cooperative learning, students can also determine their and other students' views, as well as similarities and differences among those views, and thus learn much by working together (Doymuş, 2008). Altogether, "encouraging cooperation among students," the second of the seven principles, inspires effective learning by activating the above ways to work together (Thompson; 2001; Peele, 2010; Şimşek, Aydoğdu, & Doymuş, 2012).

Several studies have determined that these seven principles increase teaching effectiveness socially, psychologically, and academically by initiating in students a desire to learn, to study cooperatively, and to improve their attitudes toward lessons (Bishoff, 2010). According to these studies, in order to properly educate students toward these ends, teachers must stress active learning models more (Karaçöp, 2010), for in active learning models teachers do not directly transfer knowledge but instead guide students toward making discoveries for themselves (Gök, Doğan, Doymuş & Karaçöp, 2009; Demirel, 2010). Plus, active learning models are easily implemented within the strictures of the seven principles and even cooperate with them (Şimşek, Aydoğdu & Doymuş, 2012). With active learning, students associate their intuitions with previous experiences in order to solve problems that they likely (or will likely) face in their daily lives. Active learning is a process by which students take responsibility for their learning, which offers them the opportunity to relate different ways of learning and self-regulate (Açıkgöz, 2003; Prince, 2004). Thus, "good practice encourages active learning" is the third principle because it helps to make students aware of how they acquire knowledge, how they connect previous knowledge to new knowledge, and how they may use such knowledge in their daily lives (Chickering & Gamson, 1987).

Effective learning should take students' views and suggestions into account, and according to these views and suggestions, regulate learning environments to increase the efficiency of learning processes. Another conglomerate topic necessary to improving educational processes is that of what students learn, what they should learn, and how they evaluate themselves (Chickering & Gamson, 1987; Demirel, 2010). In this respect, the fourth principle "good practice gives prompt feedback" supports more effective and more permanent learning for students (Bishoff, 2010). According to Huba and Freed (2000), students need feedback in order to improve upon what faculty have (tried to) teach. Sorcinelli (1991) argues that "the most significant conclusion to be reached from research on innovative teaching methods, then, is that immediate, corrective, and supportive feedback is central to learning" (Bishoff, 2010).

In an effective learning environment, it is very important to manage time while teaching and learning (Şimşek, Aydoğdu & Doymuş, 2012). Using time effectively increases academic achievement by activating permanent learning. One of the most effective methods for faculty to achieve this principle of learning is to encourage effective time management among students, instructors, advisors, and other faculty positions (Chickering & Gamson, 1987). Similarly, using time effectively plays an important role in students' and teachers' achievement in secondary schools. For these reasons, "emphasizing time on task" is the fifth principle to providing effective learning because by cultivating student awareness about their responsibilities, students become responsible and successful during the educational

process (Chickering & Erhmann, 1996; Şimşek, Aydoğdu & Doymuş, 2012; Tirrel & Quick, 2012).

One of the most important aims of schools should be to encourage students to have high expectations. For this reason, it must be remembered by teachers to express their expectations of students. In order to meet these expectations, students will have to endeavor to study more (Chickering & Gamson, 1987). Similarly, secondary schools need to instill in students high expectations that relate to their own personal goals so that their desires or aims are achieved more easily in the future (Chickering & Erhmann, 1996). For this reason, "communicating high expectations" is the sixth principle because it motivates students to reach society's and their own expectations, as well as it encourages students to study willingly (Şimşek, Aydoğdu & Doymuş, 2012; Tirrell & Quick, 2012).

Learning that accommodates an array of individual differences is a sophisticated process, and there are a lot of different student preferences related to obtaining knowledge and integrating it into learning processes (Parker, 2000). One's learning style is an important concept that expresses individual difference and shows student tendencies toward having preferences (Güven & Kürüm, 2006). In order to activate learning, an appropriate environment should be arranged to accommodate individual differences and learning styles of students during the educational process. In a certain sense, teachers much cultivate this environment (Karademir & Tezel, 2010). For this reason, "respecting diverse talents and ways of learning" is the seventh and final principle because it expresses the idea that every student has different features and talents related to learning.

Mathematics is generally the most difficult subject for students. For this reason, mathematics teachers should consider all of the factors that affect their students' learning processes in order to endear mathematics to their students. To effectively implement successful learning of mathematics, future teachers should learn from their current teachers about how to implement these seven principles in their classes. For this reason, teachers must know about the seven principles and know how to implement them during the learning process.

For the above reasons, the seven principles created by Chickering and Gamson (1987) should be implemented in order to realize effective education. Therefore, this study focuses on the views and practices of secondary school and pre-service mathematics teachers in Turkey about the seven principles for good education.

METHOD

Research Design

Descriptive studies are usually used to determine current situations (Çepni, 2009) by resisting the urge to control natural and social facts (Sönmez & Alacapınar, 2011). Many researchers investigating instructional processes prefer descriptive studies in order to analyze but not change natural conditions (Çepni, 2009; McMillan & Schumacher, 2010). Therefore, this study uses a survey method in order to determine the views and practices of secondary school and pre-service mathematics teachers about the seven principles for good education numerated above. These principles and their characteristics are provided in the Appendix.

Population-Sample

A non-random sampling method was used to create a sample of current and pre-service mathematics teachers. A non-random sampling method is the most preferred method for experimental and non-experimental research designs of educational studies (Yıldırım & Şimşek, 2005; McMillan & Schumacher, 2010). This study's sample consisted of two groups; one group consisted of 79 pre-service mathematics teachers in either the second or fourth year of undergraduate study at education departments in Turkey, while the other consisted of seven mathematics teachers currently teaching at secondary schools in Turkey.

Though Turkish undergraduate years of study are commonly referred to as 'classes' (i.e., a freshman or first year student is known as a first class student), this essay will refer to undergraduates by their year of study.

Data Gathering Instrument

A scale was used a as data gathering instrument aimed at determining to what degrees the sample respected the seven principles for good education as established by Chickering and Gamson (1987). This scale was created by Bishoff (2010) and adapted by Aydoğdu, Doymuş, and Şimşek (2012). It contains 10 items for each of the seven principles, making a total of 70 items. The scale was designed to evaluate items according to the five-point Likert type system, in which a response of 'one' signifies the most negative opinion regarding the item and a response of 'five' signifies the most positive. According to Cronbach Alpha, the reliability of the scale was determined to be 0.68. **Data Analysis**

Data analysis used descriptive statistics, ANOVA, and a series of independent t-tests.

FINDINGS

Table 1 presents data gathered by descriptive statistics and ANOVA regarding how the sample understood that "good practice encourages contact between students and faculty." Table 2 presents data regarding responses in terms of the gender of sample members.

Table 1. *Descriptive statistics of findings from obtained "good practice encourages student – faculty contact" principle's items and results of ANOVA*

Items of Principle 1	Second Class pre-service Mathematics		Fourth Class pre-service Mathematics		Secondary Mathematics Teachers		Results of ANOVA	
	X	SD	X	SD	X	SD	F	p
I1	3.19	0.890	3.24	0.895	3.43	1.134	0.209	0.812
I2	2.38	0.795	2.33	0.956	2.43	0.976	0.048	0.953
I3	3.66	1.039	3.73	0.732	3.43	1.618	0.286	0.752
I4	3.33	1.004	3.62	0.861	2.67	1.633	2.630	0.078
I5	3.57	1.085	3.73	0.871	3.71	0.951	0.268	0.766
I6	4.41	0.774	4.49	0.651	4.50	0.837	0.109	0.897
I7	3.67	1.074	4.05	0.815	3.29	1.380	2.503	0.088
I8	3.88	1.041	3.97	0.799	3.71	0.756	0.263	0.769
I9	2.38	1.011	2.57	0.959	2.29	1.380	0.432	0.651
I10	3.81	0.943	4.08	0.682	4.43	0.787	2.191	0.118

X: maximum 5 scores

The results of ANOVA suggest that there is not a statistically significant difference among items.

Table 2. *The results of independent t-test of "good practice encourages student – faculty contact" principle's items*

Items of Principle 1	Gender	N	X	SD	t	p
I1	Female	51	3.27	0.896	0.518	0.967
	Male	35	3.17	0.923		
I2	Female	51	2.31	0.836	-0.659	0.370
	Male	34	2.44	0.927		
I3	Female	51	3.67	0.931	-0.045	0.444
	Male	34	3.68	1.036		
I4	Female	50	3.46	0.952	0.521	0.379
	Male	35	3.34	1.110		
I5	Female	51	3.78	0.832	1.534	**0.020**
	Male	35	3.46	1.146		
I6	Female	50	4.46	0.706	0.117	0.981
	Male	34	4.44	0.746		
I7	Female	51	3.90	0.900	1.100	0.057
	Male	35	3.66	1.162		
I8	Female	51	4.04	0.774	1.538	**0.023**
	Male	35	3.71	1.073		
I9	Female	51	2.41	0.920	-0.459	0.162
	Male	35	2.51	1.147		
I10	Female	51	4.04	0.747	0.831	0.174
	Male	35	3.89	0.963		

In order to determine the statistical significance of difference for the variable of gender, an independent t-test was implemented. As shown in Table 2, there are significant differences respecting the fifth ($t_{(114)}$=1,534; p<0,05) and eighth ($t_{(115)}$=1,538; p<0,05) items, for which females generally reported more positive views than males.

Table 3 presents data gathered by descriptive statistics and ANOVA regarding how the sample valued the idea that "good practice encourages cooperation among students." Table 4 presents data regarding responses in terms of the gender of sample members.

According to the results of ANOVA shown in Table 3, there are significant differences among the first ($F_{(2-83)}$=5,282; p<0,05), sixth ($F_{(2-83)}$=7,750; p<0,05), seventh ($F_{(2-83)}$=4,639; p<0,05), eighth ($F_{(2-82)}$=5,802; p<0,05), ninth ($F_{(2-83)}$=6,155; p<0,05), and tenth ($F_{(2-83)}$=3,904; p<0,05) items. The least significant difference (LSD) from post-hoc tests was implemented in order to determine the statistical difference among groups.

Regarding the first, seventh, and eighth items, our findings show that fourth year pre-service teachers, as well as current teachers, expressed a more positive valuation than second year pre-service teachers.

Regarding the sixth and tenth items, there is also a significant difference, since fourth year pre-service teachers more positively valued these items than second year pre-service teachers.

Table 3. *Descriptive statistics of findings from obtained "good practice encourages cooperation among students" principle's items and results of ANOVA*

Items of Principle 2	Second Class pre-service Mathematics		Fourth Class pre-service Mathematics		Secondary Mathematics Teachers		Results of ANOVA	
	X	SD	X	SD	X	SD	F	p
I1	3.64	0.879	4.08	0.759	4.57	0.787	5.282	**0.007**
I2	3.45	0.916	3.78	0.787	3.00	1.155	2.910	0.060
I3	3.55	1.087	3.89	0.737	3.57	1.397	1.277	0.284
I4	3.14	1.049	3.24	0.925	4.14	1.215	2.955	0.058
I5	3.38	1.035	3.57	0.987	3.71	0.756	0.541	0.584
I6	3.48	1.042	4.22	0.712	3.14	1.345	7.750	**0.001**
I7	3.38	0.936	3.86	0.822	4.29	1.113	4.639	**0.012**
I8	2.95	0.999	3.62	0.861	3.86	1.345	5.802	**0.004**
I9	3.62	1.058	4.32	0.784	3.43	1.272	6.155	**0.003**
I10	3.45	0.993	4.05	0.780	3.71	1.496	3.904	**0.024**

For the ninth item, there are significant differences, for though current teachers more highly valued these items than second year pre-service teachers, fourth year pre-service teachers expressed an even higher valuation than current teachers regarding these items.

Table 4. *The results of independent t-test of "good practice encourages cooperation among students" principle's items*

Items of Principle 2	Gender	N	X	SD	t	p
I1	Female	51	4.00	0.825	1.210	0.154
	Male	35	3.77	0.910		
I2	Female	51	3.57	0.900	0.129	0.579
	Male	35	3.54	0.919		
I3	Female	51	3.73	0.961	0.315	0.934
	Male	35	3.66	1.027		
I4	Female	51	3.33	0.993	0.315	0.934
	Male	35	3.17	1.098		
I5	Female	51	3.51	1.007	0.241	0.773
	Male	35	3.46	0.980		
I6	Female	51	3.82	1.014	0.617	0.978
	Male	35	3.69	1.022		
I7	Female	51	3.75	0.935	0.979	0.892
	Male	35	3.54	0.950		
I8	Female	51	3.35	0.996	0.386	0.682
	Male	34	3.26	1.082		
I9	Female	51	4.00	0.980	1.016	0.578
	Male	35	3.77	1.087		
I10	Female	51	3.98	0.761	2.719	**0.005**
	Male	35	3.37	1.165		

In order to determine the significance of difference regarding the variable of gender, an independent t-test was implemented. As shown in Table 4, there is significant difference for the tenth ($t_{(84)}$=2,719; p<0,05) item, for which females generally reported more positive views than males.

Table 5 presents data gathered by descriptive statistics and ANOVA regarding how the sample valued the idea that "good practice encourages active learning among students." Table 6 presents data regarding responses in terms of the gender of sample members.

Table 5. *Descriptive statistics of findings from obtained "good practice encourages active learning" principle's items and results of ANOVA*

Items of Principle 3	Second Class pre-service Mathematics Teachers		Fourth Class pre-service Mathematics Teachers		Secondary Mathematics Teachers		Results of ANOVA	
	X	SD	X	SD	X	SD	F	p
I1	3.27	0.949	3.68	0.784	3.86	1.069	2.669	0.075
I2	2.88	0.942	3.38	0.953	3.29	1.254	2.672	0.075
I3	3.55	0.861	4.27	0.693	3.14	1.215	10.144	**0.001**
I4	3.36	0.983	3.46	0.989	3.29	1.496	0.140	0.870
I5	3.67	0.846	4.03	0.799	4.00	1.528	1.708	0.188
I6	4.14	0.899	4.32	0.709	4.29	0.951	0.490	0.614
I7	2.74	0.964	3.11	1.063	4.57	0.787	10.288	**0.001**
I8	3.55	0.968	3.97	0.833	3.86	1.069	2.149	0.123
I9	3.29	0.970	3.84	1.014	3.57	1.272	2.919	0.060
I10	3.14	1.002	3.65	0.919	3.43	1.618	2.400	0.097

According to the ANOVA results shown in Table 5, there are significant differences for the third ($F_{(2-83)}$=10,144; p<0,05) and seventh items ($F_{(2-82)}$=10,288; p<0,05).

With respect to LSD, for the third item there is a significant difference, for fourth year pre-service teachers more highly valued this item than second year pre-service teachers. For the seventh item, current teachers expressed a higher valuation than all pre-service teachers.

Table 6. *The results of independent t-test of "good practice encourages active learning" principle's items*

Items of Principle 3	Gender	N	X	SD	t	p
I1	Female	51	3.51	0.834	0.194	0.328
	Male	34	3.47	1.022		
I2	Female	51	3.18	0.865	0.546	0.100
	Male	35	3.06	1.162		
I3	Female	51	3.78	0.856	-0.505	0.664
	Male	35	3.89	0.993		
I4	Female	51	3.39	0.961	-0.035	0.171
	Male	35	3.40	1.117		
I5	Female	51	4.02	0.812	2.167	0.217
	Male	35	3.60	0.976		
I6	Female	51	4.18	0.740	-0.763	0.134
	Male	35	4.31	0.932		
I7	Female	51	3.02	0.969	-0.280	0.058
	Male	34	3.09	1.288		
I8	Female	51	3.75	0.796	-0.128	0.084
	Male	35	3.77	1.114		
I9	Female	51	3.59	0.963	0.449	0.270
	Male	35	3.49	1.147		
I10	Female	51	3.24	1.031	-1.609	0.803
	Male	35	3.60	1.035		

In order to determine the significance regarding the variable of gender, a t-test was implemented, which revealed that there were no significant differences among genders as shown in Table 6.

Table 7 presents data gathered by descriptive statistics and ANOVA regarding how the sample valued the idea that "good practice encourages giving prompt feedback to students." Table 8 presents data regarding responses in terms of the gender of sample members.

Table 7. *Descriptive statistics of findings from obtained "good practice gives prompt feedback" principle's items and results of ANOVA*

Items of Principle 4	Second Class pre-service Mathematics Teachers		Fourth Class pre-service Mathematics Teachers		Secondary Mathematics Teachers		Results of ANOVA	
	X	SD	X	SD	X	SD	F	p
I1	3.74	1.014	3.70	0.939	4.29	1.113	1.058	0.352
I2	3.88	0.916	4.11	0.699	4.43	0.787	1.689	0.191
I3	3.67	0.786	3.81	0.811	4.29	0.951	1.803	0.171
I4	3.95	0.825	4.41	0.599	4.43	0.787	4.179	**0.019**
I5	3.55	0.968	3.78	0.750	3.71	0.951	0.723	0.488
I6	3.71	0.944	4.16	0.688	4.57	0.787	4.809	**0.011**
I7	3.57	1.085	4.00	0.816	3.57	1.618	1.826	0.167
I8	3.76	0.958	3.81	0.908	4.43	1.512	1.389	0.255
I9	3.21	1.025	3.00	1.202	4.29	1.254	3.865	**0.025**
I10	3.90	1.100	3.62	0.953	3.43	1.718	0.969	0.384

According to the ANOVA results shown in Table 7, there are significant differences for the fourth ($F_{(2\text{-}83)}$=4,179; p<0,05), sixth ($F_{(2\text{-}83)}$=4,809; p<0,05) and ninth items ($F_{(2\text{-}83)}$=3,865; p<0,05). Regarding the LSD for the fourth item, there is a significant difference, since fourth year pre-service teachers more highly valued this than second year pre-service teachers. For the sixth item, there are significant differences, for though fourth year pre-service teachers more highly valued this item than second year pre-service teachers, current teachers valued this item more than all pre-service teachers. For the ninth item, there are significant differences, for current teachers more highly valued this item than all pre-service teachers.

Table 8. *The results of independent t-test of "good practice gives prompt feedback" principle's items*

Items of Principle 4	Gender	N	X	SD	t	p
I1	Female	51	3.86	0.939	1.078	0.200
	Male	35	3.63	1.060		
I2	Female	51	4.16	0.644	1.836	**0.007**
	Male	35	3.83	1.014		
I3	Female	51	3.80	0.722	0.339	**0.021**
	Male	35	3.74	0.950		
I4	Female	51	4.33	0.622	2.221	**0.044**
	Male	35	3.97	0.891		
I5	Female	51	3.73	0.874	0.800	0.807
	Male	35	3.57	0.884		
I6	Female	51	4.16	0.784	2.388	0.293
	Male	35	3.71	0.926		
I7	Female	51	3.75	1.055	-0.115	0.885
	Male	35	3.77	1.031		
I8	Female	51	3.88	1.032	0.507	0.828
	Male	35	3.77	0.942		
I9	Female	51	3.31	1.191	1.008	0.385
	Male	35	3.06	1.110		
I10	Female	51	3.92	1.017	1.786	0.376
	Male	35	3.49	1.173		

In order to determine the significance of difference for the gender variable (see Table 8),an independent t-test was implemented, which shows that there are significant differences for the second ($t_{(84)}$=1,876; p< 0,05), third ($t_{(84)}$=2,899; p< 0,05) and fourth items ($t_{(84)}$=0,429; p< 0,05). Regarding gender, females generally reported more positive view than males for all items.

Table 9 presents data gathered by descriptive statistics and ANOVA regarding how the sample valued the idea that "good practice emphasizes time on task." Table 10 presents data regarding responses in terms of the gender of sample members.

Table 9. *Descriptive statistics of findings from obtained "good practice emphasizes time on task" principle's items and results of ANOVA*

Items of Principle 5	Second Class pre-service Mathematics Teachers		Fourth Class pre-service Mathematics Teachers		Secondary Mathematics Teachers		Results of ANOVA	
	X	SD	X	SD	X	SD	F	p
I1	4.17	0.935	4.27	0.693	4.86	0.378	2.199	0.117
I2	3.76	0.958	3.78	0.672	4.43	0.535	2.075	0.132
I3	3.79	0.871	4.17	0.561	4.00	1.291	2.223	0.115
I4	3.81	0.917	4.38	0.721	4.14	1.215	4.278	**0.017**
I5	3.40	0.939	3.22	0.787	3.57	1.618	0.626	0.537
I6	4.02	0.897	4.14	0.855	4.57	0.535	1.240	0.295
I7	3.38	1.081	3.58	1.025	4.29	1.496	2.099	0.129
I8	4.00	1.012	4.30	0.777	4.57	0.787	1.809	0.170
I9	4.05	0.854	3.92	0.829	4.57	0.787	1.791	0.173
I10	3.98	0.869	4.24	0.683	4.14	1.574	0.937	0.396

According to the ANOVA results shown in Table 9, there is a significant difference for the fourth ($F_{(2-83)}$=4,278; p<0,05) item. Regarding the LSD there is significant difference, for fourth year pre-service teachers more highly valued this item than second year pre-service teachers.

Table 10. *The results of independent t-test of "good practice emphasizes time on task" principle's items*

Items of Principle 5	Gender	N	X	SD	t	p
I1	Female	51	4.47	0.644	2.899	0.389
	Male	35	3.97	0.954		
I2	Female	51	4.00	0.825	2.449	0.464
	Male	35	3.57	0.778		
I3	Female	50	4.06	0.767	1.279	0.295
	Male	35	3.83	0.857		
I4	Female	51	4.20	0.825	1.440	0.484
	Male	35	3.91	0.981		
I5	Female	51	3.33	0.931	-0.046	0.582
	Male	35	3.34	0.968		
I6	Female	51	4.29	0.807	2.378	0.920
	Male	35	3.86	0.879		
I7	Female	51	3.69	1.068	1.490	0.733
	Male	34	3.32	1.147		
I8	Female	51	4.27	0.850	1.235	0.875
	Male	35	4.03	0.985		
I9	Female	51	4.20	0.775	2.178	0.397
	Male	35	3.80	0.901		
I10	Female	51	4.33	0.653	2.854	**0.019**
	Male	35	3.77	1.031		

In order to determine the significance of difference for the gender variable (see Table 10), an independent t-test was implemented, which shows that there is a significant difference for the tenth ($t_{(84)}$=2,854; p<0,05) item. For this item, females generally reported more positive views than males.

Table 11 presents data gathered by descriptive statistics and ANOVA regarding how the sample valued the idea that "good practice communicates high expectations among students." Table 12 presents data regarding responses in terms of the gender of sample members.

Table 11. *Descriptive statistics of findings from obtained "good practice communicates high expectations" principle's items and results of ANOVA*

Items of Principle 6	Second Class pre-service Mathematics Teachers		Fourth Class pre-service Mathematics Teachers		Secondary Mathematics Teachers		Results of ANOVA	
	X	SD	X	SD	X	SD	F	p
I1	4.12	0.803	4.08	0.595	5.00	0.001	5.534	**0.006**
I2	3.88	0.889	3.89	0.843	4.57	0.535	2.102	0.129
I3	3.62	1.011	3.92	0.862	4.14	1.069	1.491	0.231
I4	3.90	0.850	4.24	0.723	4.57	0.787	3.115	0.050
I5	3.60	0.964	4.11	0.658	4.14	0.900	4.099	**0.020**
I6	3.57	1.129	3.57	0.987	3.71	1.113	0.059	0.943
I7	3.52	1.131	3.46	0.869	3.00	1.732	0.701	0.499
I8	3.26	1.061	3.24	1.188	3.43	1.618	0.075	0.927
I9	3.88	0.993	4.27	0.693	4.29	1.254	2.040	0.137
I10	3.52	0.994	4.03	0.986	4.71	0.488	5.853	**0.004**

According to the ANOVA results shown in Table 11, there are significant differences for the first ($F_{(2-83)}$=5,534; p<0,05), fifth ($F_{(2-83)}$=4,099; p<0,05), and tenth ($F_{(2-83)}$=5,853; p<0,05) items. Regarding the LSD, there are significant differences for the first item, since between teachers more highly valued this than all pre-service teachers. For the fifth item, fourth year pre-service teachers more highly valued this than second year pre-service teachers. Finally, for the tenth item, there was also significant difference, for though fourth year pre-service teachers more highly valued this than second year pre-service teachers, teachers more highly valued this than all pre-service teachers.

Table 12. *The results of independent t-test of "good practice communicates high expectations" principle's items*

Items of Principle 6	Gender	N	X	SD	t	p
I1	Female	51	4.31	0.583	2.059	0.279
	Male	35	3.97	0.857		
I2	Female	51	4.14	0.749	2.634	0.108
	Male	35	3.66	0.938		
I3	Female	51	3.94	0.904	1.778	0.272
	Male	35	3.57	1.008		
I4	Female	51	4.22	0.757	1.543	0.726
	Male	35	3.94	0.873		
I5	Female	51	4.06	0.785	2.565	0.076
	Male	35	3.57	0.917		
I6	Female	51	3.65	1.016	0.693	0.360
	Male	35	3.49	1.121		
I7	Female	51	3.65	1.016	2.003	0.570
	Male	35	3.17	1.124		
I8	Female	51	3.51	1.065	2.421	0.698
	Male	35	2.91	1.197		
I9	Female	51	4.22	0.901	1.669	0.770
	Male	35	3.89	0.900		
I10	Female	51	3.94	1.066	1.148	0.621
	Male	35	3.69	0.932		

In order to determine the significance of difference for the gender variable (See Table 12), an independent t-test was implemented, which showed no significance among genders.

Table 13 presents data gathered by descriptive statistics and ANOVA regarding how the sample valued the idea that "good practice respects diverse talents and ways of learning." Table 14 presents data regarding responses in terms of the gender of sample members.

Table 13. *Descriptive statistics of findings from obtained "good practice respects diverse talents and ways of learning" principle's items and results of ANOVA*

Items of Principle 7	Second Class pre-service Mathematics Teachers		Fourth Class pre-service Mathematics Teachers		Secondary Mathematics Teachers		Results of ANOVA	
	X	SD	X	SD	X	SD	F	P
I1	4.55	0.803	4.76	0.435	5.00	0.001	2.084	0.131
I2	4.48	0.890	4.68	0.530	5.00	0.001	1.924	0.153
I3	3.67	0.954	3.97	0.763	4.29	0.756	2.218	0.115
I4	3.36	1.055	3.51	0.870	3.57	1.134	0.314	0.732
I5	3.60	0.964	3.84	0.898	3.71	1.380	0.612	0.545
I6	3.43	0.991	3.41	0.832	3.71	1.496	0.304	0.739
I7	3.48	0.969	3.89	0.875	4.29	1.254	3.206	**0.046**
I8	3.69	1.047	3.84	0.866	4.29	0.951	1.183	0.311
I9	3.88	1.064	4.16	0.800	3.57	1.397	1.436	0.244
I10	3.67	0.979	4.00	0.816	3.71	1.704	1.162	0.318

According to the ANOVA results shown in Table 13, there is a significant difference for the seventh item ($F_{(2\text{-}83)}$=3,206; p<0,05). Regarding the LSD, there is a significant difference, for teachers more highly valued this item than second year pre-service teachers.

Table 14. *The results of independent t-test of "good practice respects diverse talents and ways of learning" principle's items*

Items of Principle 7	Gender	N	X	SD	t	p
I1	Female	51	4.78	0.415	1.737	**0.001**
	Male	35	4.51	0.853		
I2	Female	51	4.69	0.707	1.255	0.188
	Male	35	4.49	0.742		
I3	Female	51	3.82	0.817	-0.322	0.178
	Male	35	3.89	0.963		
I4	Female	51	3.47	0.924	0.327	0.432
	Male	35	3.40	1.063		
I5	Female	51	3.73	1.002	0.186	0.646
	Male	35	3.69	0.932		
I6	Female	51	3.39	0.918	-0.574	0.330
	Male	35	3.51	1.040		
I7	Female	51	3.84	0.903	1.407	0.262
	Male	35	3.54	1.067		
I8	Female	51	3.78	0.966	-0.207	0.959
	Male	35	3.83	0.985		
I9	Female	51	4.14	0.825	1.833	**0.026**
	Male	35	3.74	1.172		
I10	Female	51	4.00	0.825	2.027	**0.002**
	Male	35	3.54	1.146		

In order to determine the significance of difference for the gender variable (see Table 14), an independent t-test was implemented, which shows that there are significant differences for the first ($t_{(84)}$=1,737; p<0,05), ninth ($t_{(84)}$=1,833; p<0,05), and tenth ($t_{(84)}$=2,027; p<0,05) items. Regarding the gender of positive respondents, females generally reported more positive views than males for all items.

RESULTS

Our findings show that both pre-service and current teachers agree that increasing the efficiency of education requires effectively implementing the seven principles created by Chickering and Gamson (1987). As shown in Table 1, regarding whether "good practice encourages student-faculty contact" matters, there is not a statistically significant difference between groups. It is inferred that pre-service mathematics teachers and secondary school mathematics teachers have similar ideas regarding student-faculty contact.

According to the independent t-test whose results are shown in Table 2, females are more positive than males about whether discussing student problems with school administration and guidance counselors matters. Female respondents were also more positive than males about serving as advisors or helpers for their students. Regarding these results, it can be inferred that female teachers are more sensitive to students' problems. Ceja and Rivas (2010), Sax, Bryant and Harper (2005), and Sizemore (2000) and have similarly determined that gender matters in regard to helping students, while Hagerdon, Maxwell, Rodriguez, Hocevar and Fillpot (2000) did not find a significant difference among genders.

Regarding the second principle—that "good practice encourages cooperation among students"—Table 3 shows that fourth year pre-service teachers as well as current teachers are more positive than second year pre-service teachers when it comes to encouraging students to share their learning domain, accumulated knowledge, and interests with classmates who possess different ideas about important topics. These teachers are also more positive when it comes to organizing students in project groups or learning societies, as revealed by their answers to the first, seventh, and eighth items. Regarding these teachers' positive thinking, it can be inferred that creating opportunities to observe students' deficiencies in their learning environment is an effective pedagogical strategy (Aktepe, 2005). At the same time, it may also be inferred that if teachers verbally recognize their students' well-rounded academic achievements, inter-student communication will increase. Given the thinking of fourth year pre-service teachers, these figures may be explained by the fact that they anticipate being actual teachers.

As shown in Table 3 respecting the sixth and tenth items, fourth year pre-service teachers are more positive than second year pre-service teachers that recognizing students for congratulating their friends' achievements matters to effective teaching, as well as that informing students about the quality of their performances according to established measurement criteria matters. This may be explained by the fact that fourth year pre-service teachers anticipate becoming teachers and also experiencing school-specific teacher training. According to the ninth item in Table 2, current teachers are more positive than second class pre-service teachers that encouraging students to join social, cultural, and athletic activities at school matters. It can thus be inferred that these teachers value educational processes that guide students toward learning instead of directly conveying knowledge.

According to the results of the independent t-test shown in Table 4, females are more positive than males in respect to informing students about performance measurement

criteria. It can thus be inferred that females are more sensitive to understanding students' grasp during lessons (Bishoff, 2010; Özkan & Yılmaz, 2010).

In order to increase its efficiency, educational processes should effectively implement that seven principles created by Chickering and Gamson (1987). As shown in Table 5, which shows results regarding the third principle—"good practice encourages active learning"—fourth year pre-service teachers are more positive than second year pre-service teachers in respect to associating classroom lessons to real life situations. This can especially be seen in responses to the third item, whose suggestions may be explained by the fact that fourth year pre-service teachers are closer to becoming actual teachers and thus want to practice all innovations attendant to lesson practicality (Tirrell & Quick, 2012) Regarding the seventh item, current teachers more often value the use of simulation and drama techniques, or they host more laboratory sessions, than all pre-service teachers. Such techniques contribute to active learning practices that also include discussion, peer teaching, laboratory experiments, research, group projects, and community experience, among other activities that promote engagement with the material (Cromack, 2008). Hence, using active learning techniques increases students' learning related to the subject, for as Tirrell and Quick (2012) determined, knowledge level increases with active learning. Furthermore, Bishoff (2010) determined in a similar study that faculty interviewed had often given students real life situations to analyze, had provided labs and simulations, and had encouraged students to challenge and analyze their own understanding of ideas.

According to the results of the independent t-test shown in Table 6, there is not a significant difference between genders in respect to this principle. McCabe and Meuter (2011) also determined that there is no difference between genders in a study that assessed the seven principles in relation to technology in the classroom.

Regarding the fourth principle—"good practice gives prompt feedback"—whose results are shown in Table 7, fourth year pre-service teachers expressed that they more often instruct students according to the lesson's form and content than second year pre-service teachers do. This can especially be seen in responses to the fourth item and may be explained by the fact that fourth year pre-service teachers are closer to becoming teachers and thus want to do everything that encourages giving prompt feedback to students. Regarding the sixth item, current teachers and fourth year pre-service teachers are more active than second year pre-service teachers in respect to distributing report assessments to students, as well as presenting them with exam results in both negative and positive ways. This result may be explained by the fact that current teachers already have students who come to them in order to know their scores and because these teachers are required to give reports to students regarding their academic performance. Similar, fourth year pre-service teachers are nearly full-time teachers, so they would want to recognize student performance as a measure to improve student learning.

In order for learning to be effective, students need feedback about how and what they are doing (Collard, 2009). For the ninth item, current teachers are more positive than pre-service teachers about reviewing exam results with students. Feedback allows students to understand where they stand in regard to learning and understanding course content (Collard, 2009). For this reason it is necessary to evaluate exam results. Burke (2009) and Crook et al. (2012) determined that students do not often get effective feedback on their studies or lessons, while other studies have shown that delayed feedback affects students' motivation and attitudes (van der Kleij, Eggen, Timmers & Veldkamp, 2012). In addition,

Ferguson (2011) and Voerman, Meijer, Korthagen and Simons (2012) determined that teachers have some problems about giving effective feedback.

According to the results of the independent t-test shown in Table 8, females are more active than males in addressing problems, immediately giving study-related reports to students, and informing students about a lesson's topics. It can thus be inferred that females more often value using effective measurement tools to measure students' performance. Bishoff (2010) reaches similar results in her research.

In a study by Donovan and Loch (2012) addressing technology in mathematics education, it was determined that active learning and prompt feedback increase this study.

Regarding the fifth principle—"good practice emphasizes time on task"—whose survey results appear in Table 9, fourth year pre-service teachers are more positive than second year pre-service teachers that helping students to determine their reachable aims matters. It can thus be inferred that fourth year pre-service teachers think more realistically and have high expectations concerning with student potential (Uras & Kunt, 2006).

According to the results of the independent t-test shown in Table 10, females are more positive than males regarding having to prepare lessons to compensate for previously misunderstood lessons. It can be thus be inferred that females are interested in their students' comprehension. These results match those of Bishoff's (2010) study, while Asfelt and Hvenegaard (2013) also determined a significant difference between female and males on this point.

Regarding the sixth principle—"good teaching communicates high expectations"—whose survey results appear in Table 11, current teachers are more positive than all pre-service teachers that communicating high expectations to students matters. Such a result could be explained by the fact that teachers are in the habit of clearly expressing their expectations of students to them. By the same token, pre-service teachers have not yet begun their careers and thus cannot give enough importance to this aspect of teaching. Since teachers can be most responsible for establishing and upholding expectations of students, by expressing their expectations they increase student achievement (Demirtaş & Kahveci, 2010). Also according to Table 11, fourth year pre-service teachers are more positive than second year pre-service teachers when it comes to wanting to explain the consequences of not completing work according to these expectations. Furthermore, Table 11 shows that current teachers and fourth year pre-service teachers are more positive than second year pre-service teachers that explaining to students how to improve their work matters. This result may be explained by the fact that fourth class pre-service teachers are closer to becoming teachers, thus anticipate performing these tasks to keep students on track. A study by Yenilmez and Ata (2012) determined that school implementation lessons provide experiences to pre-service teachers and they get around for recognizing students.

According to the results of the independent t-test shown in Table 12, there is no significant difference between genders regarding this point. Other studies (Dursun & Dede, 2004; McCabe & Meuter, 2011) also report no significance regarding gender on this point.

Regarding the seventh principle—"good practice respects diverse talents and ways of learning"—whose results appear in Table 13, current teachers are more positive than second year pre-service teachers in thinking that providing students with adaptable conditions to motivate them to study more as individuals matters. Results for the seventh item especially report this finding. Such thinking may be attributed to the previously documented importance of encouraging students' diverse talents and ways of learning in order to boost

student achievement and self- confidence (Mahiroğlu & Bayır, 2009; Hsieh, Jang, Hwang & Chen, 2011). Bishoff (2010) also reports similar results in a study of faculty who reported often using diverse teaching activities and providing extra material and exercises to students who needed alternative help.

According to the results of the independent t-test shown in Table 14, females think more highly of encouraging practices that accommodate learning differences, encouraging students to study their personal interests, and taking into account different ways of learning, interests, and experiences. Çiğdem and Memiş (2011) and Karademir and Tezel (2010) studied ways of learning between genders and found significant difference in regard to gender. However, Altun, Bağ and Paliç (2011) and Can (2011) did not find any significant difference in regard to gender. It can thus be somewhat inferred that females are more successful at communicating and effectively empathizing with students.

Upon reviewing the literature, it can be seen that implementing the abovementioned seven principles into educational process positively affects learning (Mukawa, 2006; Tirrel, 2009; Junco, Heibergert & Lokent, 2011).

DISCUSSION AND SUGGESTIONS

This study investigated the views and practices of secondary school and second and fourth year pre-service mathematics teachers in regards to the seven principles created by Gamson and Chickering (1987).

According to this study's results, current mathematics teachers have more positive views than pre-service mathematics teachers in their second and fourth years of study regarding most of the items of all principles. It can thus be inferred that teachers generally use the seven principles during their teaching processes. In terms of gender, this study shows that females have more positive views than males, from which it can be inferred that females are more sensitive toward students when it comes to teaching.

More importantly, this study's findings suggest that implementing the seven principles is necessary for both effective teaching and learning.

For future studies, it is suggested that the seven principles should be implemented into learning environments and should be effectively implemented into new, experimental studies.

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APPENDIX

The seven principles and its items for good practice in education

Principle 1: Good Practice Encourages Student-Faculty Contact	
1. I advise my students about career opportunities in their major field.	I1
2. Students drop by my office just to visit.	I2
3. I share my past experience, attitudes, and values with students.	I3
4. I attend events sponsored by student groups	I4
5. I work with student affairs staff on issues related to students.	I5
6. I know my students by name by the end of the first two weeks of the term.	I6
7. I make special efforts to be available to students of a race or culture different from my own.	I7
8. I serve as mentor or informal advisor to students.	I8
9. I take students to professional meetings or other events in my field.	I9
10. Whenever there is a conflict on campus involving students, I try to help resolve.	I10
Principle 2: Good Practice Encourages Cooperation Among Students	
1. I ask students to tell each other about their interests and backgrounds.	I1
2. I encourage my students to prepare together for classes or exams	I2
3. I encourage students to do projects together.	I3
4. I ask my students to evaluate each other's work.	I4
5. I ask my students to explain difficult ideas to each other.	I5
6. I encourage my students to praise each other for their accomplishments	I6
7. I ask my students to discuss key concepts with other students whose viewpoints are different from their own.	I7
8. I create "learning communities," study groups, or project teams	I8
9. I encourage students to join at least one campus organization.	I9
10. I distribute performance criteria to students so that each person's grade is independent of others.	I10
Principle 3: Good Practice Encourages Active Learning	
1. I ask my students to present their work.	I1
2. I ask my students to summarize similarities and differences among research findings.	I2
3. I ask my students to relate outside events or activities to the course.	I3

4. I ask my students to undertake research or independent study.	I4
5. I encourage students to challenge ideas.	I5
6. I give my students concrete, real-life situations to analyze.	I6
7. I use simulations, role playing, or labs in my classes.	I7
8. I encourage my students to suggest new readings, research projects, field trips, or other course activities.	I8
9. My students and I arrange field trips, volunteer activities, or internships related to the course.	I9
10. I carry out research projects with my students	I10
Principle 4: Good Practice Gives Prompt Feedback	
1. I give quizzes and homework assignments.	I1
2. I prepare classroom exercises and problems which give students immediate feedback on how well they do.	I2
3. I return examinations and papers within a week.	I3
4. I give students detailed evaluations of their work early in the term.	I4
5. I ask my students to schedule conferences with me to discuss their progress.	I5
6. I give my students written comments on their strengths and weaknesses on exams and papers.	I6
7. I give my students a pre-test at the beginning of each course.	I7
8. I ask students to keep logs or records of their progress.	I8
9. I discuss the results of the final examination with my students at the end of the semester.	I9
10. I call or write a note to students who miss class.	I10
Principle 5: Good Practice Emphasizes Time on Task	
1. I expect my students to complete their assignments promptly.	I1
2. I clearly communicate to my students the amount of time they should spend preparing for classes.	I2
3. I make clear to my students the time that is required to understand complex material.	I3
4. I help students set challenging goals.	I4
5. When oral reports or class presentations are called for I encourage students to rehearse.	I5
6. I underscore the importance of regular work, steady application, and scheduling.	I6
7. I explain to my students the consequences of nonattendance.	I7
8. I make it clear that fulltime study is a full-time job.	I8
9. I meet with students who fall behind to discuss their study habits.	I9
10. If students miss classes, I require them to make up work.	I10
Principle 6: Good Practice Communicates High Expectations	
1. I tell students that I expect hard work.	I1
2. I emphasize the importance of holding high standards.	I2
3. I make clear my expectations orally and in writing for each course.	I3
4. I help students set challenging goals for learning.	I4
5. I explain to students what will happen if they do not complete their work on time.	I5
6. I suggest extra reading or writing.	I6
7. I encourage students to write a lot.	I7
8. I publicly call attention to excellent performance.	I8
9. I revise my courses.	I9
10. I periodically discuss how well we are doing.	I10
Principle 7: Good Practice Respects Diverse Talents and Ways of Learning	
1. I encourage students to speak up when they don‟t understand.	I1
2. I discourage stride remarks and class behaviors that may embarrass students.	I2
3. I use diverse teaching activities.	I3
4. I select reading and activities related to student background.	I4
5. I provide extra material for students who lack essential skills.	I5
6. I integrate new knowledge about underrepresented populations.	I6
7. I make explicit provisions for students who wish to carry out independent studies.	I7
8. I have developed mastery learning, learning contracts, or computer assisted learning.	I8
9. I encourage my students to design their own majors.	I9
10. I try to find out about my students‟ learning styles, interests, or backgrounds.	I10

İlköğretim Matematik Öğretmenleri ve Öğretmen Adaylarının İyi Bir Eğitim Ortamı İçin Yedi İlke Hakkındaki Görüşleri

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Giriş

Bilim ve teknolojideki hızlı değişimle birlikte, eğitimin tüm kademelerinde özellikle programlar üzerinde sürekli değişikliklere gidilmektedir. Eğitim bir bütün olarak ele alındığında yenilikler ve değişimler sadece programlar bakımından değerlendirilmemelidir. Bu nedenle Chickering ve Gamson'un (1987) uzun süreli çalışmaları sonucunda eğitimde verimi artırmak için oluşturduğu yedi ilkeyi eğitim sürecinde etkili bir şekilde kullanmak gerekmektedir. Bu yedi ilke; öğrenci-fakülte etkileşiminin sağlanması, öğrenciler arası işbirliğinin sağlanması, aktif öğrenmenin kullanılması, anlık geribildirimlerin verilmesi, görevlerin zamanında yapılmasının sağlanması, üst düzey ulaşılabilir beklentilere cevap verilmesi ve farklı yetenek ve öğrenme stillerine karşı toleranslı olunması şeklinde ifade edilmektedir (Chickering & Gamson, 1987).

Eğitim sürecinin tüm aşamalarında yedi ilkenin öğrencileri öğrenmeye teşvik ettiği, öğrenciler arası işbirliğini arttırdığı, öğretmenleri aktif öğrenme yöntemlerini kullanmaya teşvik ettiği, öğretmenler ve öğrenciler arasında yüksek düzeyde iletişimi sağladığı, öğrencilerle birebir ilgilenilmesine olanak tanıdığı, öğrencilerin bütün çalışmalarıyla ilgili anında geri dönüt sağladığı, öğretmenleri çeşitli ilgi ve yeteneklere sahip öğrencilere karşı toleranslı davranmaya sevkettiği ve farklı öğrenme yollarının öğrenilmesine katkı sağladığı Gamson (1991) tarafından belirlenmiştir (Şimşek, Aydoğdu & Doymuş, 2012).

Yükseköğretim seviyesinde öğrenciler çeşitli iletişim problemleriyle karşı karşıya gelmektedirler. Bu problemlerin başında da öğrencilerin öğretim üyeleri, fakülte çalışanları ve arkadaşlarıyla yaşadıkları iletişim problemleri gelmektedir (Erdoğan, Şanlı & Bekir, 2005; Aydoğdu, 2012). Bu tür problemler onların etkili iletişim becerilerine sahip olmalarını, kendilerini iyi ifade edebilmelerini ve karşılarındakileri daha iyi anlayabilmeleri için uygun dinleme ve konuşma alışkanlıkları kazanmalarını olumsuz yönde etkilemektedir. Yedi ilkenin ilk ilkesi olan "öğrenci-fakülte etkileşiminin sağlanması", etkili bir şeklide uygulanması bu olumsuzlukları gidermenin yanı sıra öğretim üyelerinin öğrencileriyle daha iyi bir iletişime sahip olmalarını, öğrencilerin kendi değerleri hakkında düşünmelerini ve gelecekle ilgili plan yapmalarını sağlayacaktır (Chickering & Gamson, 1987).

Bir konunun grup halinde çalışılarak öğrenilmesi bilginin kalıcılığını ve öğrencilerin öğrendikleri bilgiler arasında ilişki kurabilme kabiliyetlerini artırmaktadır (Karaçöp & Doymuş, 2012). Grup içinde öğrencilerin birbirlerine soru sormaları ve bu soruları cevaplamaları, fikirlerini rahatça ifade edebilmelerini ve bu sayede konunun derinlemesine anlaşılmasını sağlar. İşbirlikli öğrenme ile öğrenciler grup çalışmaları sürecinde, uygulanan stratejiler ve problem çözme yöntemleri ile birlikte kendilerinin ve diğer öğrencilerin bakış açıları arasındaki farkları tanımlayabilir ve buna bağlı olarak birlikte karar verme ve

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yardımlaşmayla birbirlerinden birçok şey öğrenebilirler (Doymuş, 2008). Yedi ilkenin ikinci ilkesi olan "öğrenciler arası işbirliğinin sağlanması", öğrencilerin işbirliği içerisinde çalışarak yukarıda belirtilen yönlerde öğrenmeyi etkili bir şekilde gerçekleştirmelerini teşvik eder.

Öğrencilerin öğrendiklerini geçmişteki tecrübeleriyle ilişkilendirerek zihinde yapılandırmaları ve öğrendikleriyle günlük hayatta karşılaştıkları problemlere çözüm üretmesi aktif öğrenme ile gerçekleşir ve aktif öğrenme, öğrenenin öğrenme sürecinin sorumluluğunu taşıdığı, öğrenene öğrenmenin çeşitli yönleri ile ilgili karar alma ve öz düzenleme yapma fırsatlarının verildiği bir öğrenme sürecidir (Açıkgöz, 2003; Prince, 2004; Demirel, 2010). Yedi ilkenin üçüncü ilkesi olan "aktif öğrenmenin sağlanması", öğrencilerin bilgiye nasıl ulaşabileceklerinin farkında olmalarına, öğrenilen yeni bir bilgi ile önceki bilgiler arasında bağlantı kurabilmelerine ve günlük yaşamlarında bu bilgileri kullanabilmelerine yardımcı olmaktadır (Chickering & Gamson, 1987).

Öğrenme sürecinde öğrencilerin etkili öğrenmeleri bakımından, görüş ve önerilerine başvurulması ve alınan dönütler doğrultusunda gerekli düzenlemelerin yapılması bu süreci daha verimli hale getirecektir. Eğitim sürecinde üzerinde durulması gereken diğer bir konu ise, ders sonunda öğrencilerin ne öğrendiği, neyi öğrenmesi gerektiği ve kendilerini nasıl değerlendirdiği hususudur (Chickering & Gamson, 1987). Derslerin verimliliğini arttırmak için öğrencilerin ne öğrendikleri, öğrendikleriyle ilgili ne gibi eksikliklerinin olduğu ve kendilerini nasıl değerlendireceklerine ilişkin uygun dönütler almaları gerekmektedir (Demirel, 2010). Bu bakımdan yedi ilkenin dördüncü ilkesi olan "anlık geribildirimlerin verilmesi" öğrencilerin daha etkili ve kalıcı öğrenmelerini desteklemektedir (Bishoff, 2010).

İyi bir eğitim ortamında öğrencilerin bir konuyu veya çalışmayı zamanında yapmaları gerektiğinin farkında olmaları çok önemlidir. Öğrencilerin kalıcı öğrenmeyi gerçekleştirebilmeleri bakımından zamanı etkili kullanmaları başarılarını arttırmaktadır. Öğrencilerin, fakülte yönetiminin, öğretim üyelerinin ve diğer çalışanların zamanı etkili kullanmaları o fakültedeki başarının temelinde yatan en önemli etkenlerden biridir (Chickering & Gamson, 1987). Benzer şekilde ilköğretim ve ortaöğretimde de zamanın etkili kullanılmasının öğrencilerin ve öğretmenlerin başarısında önemli bir rol oynadığı söylenebilir. Bu nedenle yedi ilkenin beşinci ilkesi olan "görevlerin zamanında yapılması", eğitim sürecinde etkili öğrenmenin sağlanması, öğrencilerin sorumluluklarının farkında olmaları ve böylelikle sorumluluk sahibi, başarılı bireyler olarak yetişmeleri bakımından önemlidir.

Okulların en önemli hedeflerinden biri öğrencileri yüksek beklentileri olan bireyler olarak hayata kazandırmak olmalıdır. Bu nedenle öğretmen adaylarına gelecekte öğretmen olacaklarını hatırlatmak, kendilerini bir öğretmen olarak düşünmelerini sağlamak ve onlardan bir öğretmen gibi davranmalarını beklemek; öğretmen adaylarının bu beklentiye cevap vermeleri için daha çok çaba sarf etmelerini ve çalışmalarını sağlayacaktır (Chickering & Gamson, 1987). Benzer şekilde ilköğretim ve ortaöğretimde öğrenim gören öğrencilerin kendileriyle ilgili yüksek beklentilere sahip olmaları onların gelecekte istediklerini daha kolay elde etmelerini ve başarıya daha çabuk ulaşmalarını sağlayacaktır. Yedi ilkenin altıncı ilkesi olan "üst düzey ulaşılabilir beklentilere cevap verilmesi", öğrencilerin bu beklentilere ulaşma konusunda çalışmalarını daha istekli yapmalarını sağlayarak onları motive etmektedir.

Öğrenme birçok bireysel farklılıkları bir arada bulunduran oldukça karmaşık bir süreçtir ve bu süreçte öğrencilerin bilgiyi nasıl elde ettikleri ve işledikleri ile ilgili farklı tercihleri vardır. Bu tercihlerinden dolayı öğrenciler öğrenmeye farklı şekillerde yaklaşırlar

(Chickering & Gamson, 1987; Parker, 2000). Bireysel farklılıkları ifade eden en önemli kavramlardan biri öğrenme stilidir (Ekici, 2002) ve öğrenme stili bireylerin öğrenmeye yönelik eğilimlerini veya tercihlerini gösteren özelliklerdir (Güven & Kürüm, 2006). Eğitim-öğretim sürecinde öğrenmenin gerçekleşebilmesi için, öğrencilerin bireysel farklılıklarına ve öğrenme stillerine uygun öğretim ortamlarının hazırlanması gerekmektedir. Böyle bir ortamın oluşturulabilmesi için de öğretmenin, öğretimi uygulayacağı ortamı iyi tanıması ve yapılandırması gerekmektedir (Karademir & Tezel, 2010). Bu bakımdan yedi ilkenin yedinci ilkesi olan "farklı yetenek ve öğrenme stillerine karşı toleranslı olunması" her öğrencinin farklı özelliklere ve yeteneklere sahip olduğunun göz önüne alınması ve bu özelliklere paralel olarak öğrenmeyi farklı şekillerde gerçekleştirdiklerinin, farklı öğrenme stillerine sahip oldukları göz ardı edilmemesi gereken bir konudur.

Yöntem

Bu araştırmada ilköğretim matematik öğretmenlerinin ve öğretmen adaylarının yedi ilke hakkındaki görüşlerinin ve uygulamalarının üzerinde durulmuştur. İlköğretim matematik öğretmenleri ve öğretmen adaylarının örnekleminin seçiminde tesadüfî olmayan örnekleme yöntemi kullanılmıştır. Eğitim araştırmalarında, deneysel veya deneysel olmayan araştırma desenlerinde, tesadüfî olmayan örnekleme yöntemi en çok tercih edilen yöntemdir (Yıldırım & Şimşek, 2005; Mcmillan & Schumacher, 2010). Araştırmanın örneklemi, ilköğretim matematik öğretmenliği 2. ve 4. sınıfında öğrenim gören 79 öğretmen adayı ve Erzurum il merkezinde görev yapan 7 ilköğretim matematik öğretmeninden oluşmaktadır. Çalışmada betimleme-tarama yöntemi kullanılmıştır. Betimleme-tarama yöntemi ile olaylar, objeler, varlıklar ve gruplar betimlenmeye ve açıklanmaya çalışılır (Karasar, 2009).

Araştırmada kullanılan ölçek Chickering ve Gamson tarafından geliştirilen iyi bir öğrenme ortamında var olması gereken yedi temel ilkenin esas alınarak hazırlandığı ölçektir. Ölçek, her biri on madde içeren yedi ilkeden oluşmaktadır ve Aydoğdu, Doymuş ve Şimşek (2012) tarafından Türkçe'ye uyarlanmıştır. Ölçeğin Türkçe'ye uyarlanması aşamasında; soruların ifade ve anlam bakımından uygun olup olmadığı Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi Türkçe Öğretmenliği Bölümünden iki öğretim üyesi tarafından incelenmiş ve önerilen düzeltmeler yapılarak anlam ve yapı bakımından dil bilgisine uyumu sağlanmıştır. Ayrıca ölçek İngilizce aslına uygunluğu bakımından Atatürk Üniversitesi Kazım Karabekir Eğitim Fakültesi İngilizce Öğretmenliği Bölümü ve Fen Bilgisi Öğretmenliği Bölümünden iki öğretim üyesi tarafından incelenmiş ve gerekli görülen düzenlemeler yapılarak ölçeğe son hâli verilmiştir. Ölçeğin güvenirliği 0.68 olarak belirlenmiştir (Aydoğdu, Doymuş & Şimşek, 2012).

Çalışmada ilköğretim matematik öğretmenleri ve öğretmen adaylarına uygulanan ölçekten elde edilen verilerin analizinde tanımlayıcı istatistikler, bağımsız t testi ve ANOVA kullanılmıştır.

Bulgular

Araştırmada elde edilen ANOVA bulgularına göre birinci ilkede gruplar arasında anlamlı bir farklılık belirlenmezken, diğer ilkelerde ise genel olarak ikinci ve dördüncü sınıf ilköğretim matematik öğretmeni adayları arasında dördüncü sınıflar lehine; ilköğretim matematik öğretmenleri ile öğretmen adayları arasında ise öğretmenler lehine anlamlı bir farklılık belirlenmiştir. Araştırmada cinsiyet bakımından gruplar arasında anlamlı bir farklılığın olup olmadığının belirlenmesi amacıyla yapılan bağımsız t- testine göre üçüncü ve

altıncı ilkelerde anlamlı bir farklılık belirlenmezken; anlamlı farklılığının bulunduğu diğer ilkelerin maddelerinde, bu farklılık bayanlar lehinedir.

Anahtar Sözcükler: Yedi ilke, İlköğretim matematik öğretmenleri, Öğretmen adayları

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