

## EXAMINING STUDENT TEACHERS' SELF-EFFICACY FOR IMPLEMENTING THE CONSTRUCTIVIST APPROACH IN TERMS OF THE VARIABLES OF GENDER, DEPARTMENT AND GRADE LEVEL

Res. Assist. Ertuğ EVREKLİ  
Celal Bayar University,  
Faculty of Education, Manisa, TURKEY

Assist. Prof. Dr. Fatma ŞAŞMAZ ÖREN  
Celal Bayar University,  
Faculty of Education, Manisa, TURKEY

Res. Assist. Didem İNEL  
Usak University,  
Faculty of Education, Usak, TURKEY

### ABSTRACT

This study aims to examine student teachers' self-efficacy for implementing the constructivist approach in terms of gender, department and grade variables. To achieve this purpose, the study was conducted using 160 student teachers studying in the third and fourth grades in the Departments of Classroom Teacher Education and Science Teacher Education in Celal Bayar University. As a result of assessing the data obtained from the implementations, a significant relationship between the levels of self-efficacy of female and male student teachers regarding lesson planning was found to be in favor of the female student teachers. In the examinations performed considering the department variable, it was observed that the scores of classroom student teachers are much higher than those of science student teachers for the aspects of self-efficacy belief for the assessment-evaluation process and for developing a learning environment. Additionally, as a result of the assessment made considering the grade variable, no significant relationship was found between the self-efficacy beliefs of student teachers studying at third and fourth grades based on subscales and total scores.

**Keywords:** Classroom and science student teachers, self-efficacy, constructivist approach, gender, department and grade level

### INTRODUCTION

The radical change in primary school programs realized in the 2005 – 2006 academic year in Turkey was based on the constructivist approach. Particularly the results Turkey obtained in the international and national comparative achievement studies urged the authorities to adopt such a change. The program and the issues it covered and the Science and Technology course curriculum in particular were designed within the scope of the spirality principle and enriched with learning, teaching and assessment activities appropriate to the constructivist approach. Unlike the traditional approaches, considering an individual's brain as a "tabula rasa", the constructivist approach argues that students try to form connections between their previous knowledge and their new knowledge by using the prior knowledge when they encounter any learning situation or information. In other words, constructivism implies that students construct their own meanings in their minds based on the relationship between their prior knowledge and experience (Aviram, 2000; Harland, 2003). According to Spigner-Littles and Anderson (1999), this approach suggests that knowledge should be acquired as a result of a process where individuals continuously construct their experience buy means of active mental

processes. According to this approach, knowledge emerges as a result of a cognitive construction of an individual and thus involves aspects peculiar to the person. Since the process of knowledge construction is the process of forming a relationship between prior and new knowledge, and since each individual's knowledge based on his/her previous experience is different, individuals' constructing knowledge will be different. According to Güçlü (1998), one of the basic views of constructivists is that knowledge is subjective. Therefore, the constructivist approach generally stresses the process of students' cognitive learning and conceptual understanding and their development within these processes instead of directly focusing on their level of achievements. Adams (2006) states that the constructivist approach practices try to understand how students construct knowledge. When these aspects of the constructivist approach are considered, it can be seen that defining knowledge and how learning happens are explained in a different way than the other approaches.

When the practices of the constructivist approach for learning settings are considered, it is clear that there are great changes in roles inside the classroom compared to the traditional approaches. While students are more in the center in the constructivist approach, teachers have the role of assisting and guiding them in the knowledge construction process. Warwick and Stephenson (2002) argue that constructivist teachers accept that learning is an individual and active process and they are aware of the fact that students arrive in the classroom with several alternative understandings against real scientific knowledge. It can be said that teachers have a lot of essential roles in helping students increase their cognitive activities (Canpolat and Pınarbaşı, 2002): creating learning environments appropriate to students' previous experiences (Chen, Burry-Stock and Rovegno, 2000); revealing students' prior knowledge (Bağcı-Kılıç, 2001); determining misconceptions and lack of knowledge that can have a preventive effect on them acquiring new knowledge and eliminating these; providing effective participation in the lesson; orienting students toward first-hand sources; assessing them by using different techniques before, after and during the process; and developing social learning settings in the classroom where they can learn together.

When relevant literature is examined, it can be seen that there are studies put forth revealing the differing attitudes of teachers and student teachers towards the constructivist approach (Ray, 2002; Plourde and Alawiye, 2003; Baylor and Kitsantas, 2005; Unal and Akpınar, 2006; Sung, 2007; Karadağ et al., 2008; Kesercioğlu et al., 2008; Balım et al., 2009; Bonner and Chen, 2009; Evrekli et al., 2009; Gürbütürk and Şad, 2009; Saunders, 2009; Shirvani, 2009; Evrekli, Şaşmaz-Ören and İnel, 2010; Semerci and Yeşilyurt, 2010; Uzuntiryaki et al., 2010). As a result of the examination, it can be seen that student teachers' sensual and cognitive behaviors, beliefs, opinions...etc. in terms of different variables regarding the constructivist approach have been examined; however, there has been a limited number of studies examining their self-efficacy (Evrekli, Şaşmaz-Ören and İnel, 2010) and therefore, it became apparent that there is a need for the present study. In this respect, the main problem statement of the study is as follows: "Is there a significant relationship between the levels of self-efficacy of student teachers on classroom teacher education and science teacher education programs for implementing the constructivist approach in terms of gender, department and grade level?" The sub problems of the study are listed below:

"Is there a significant relationship between the levels of self-efficacy of student teachers on classroom teacher education and science teacher education programs for implementing the constructivist approach in terms of the independent variable gender?"

"Is there a significant relationship between the levels of self-efficacy of student teachers on classroom teacher education and science teacher education programs for implementing the constructivist approach in terms of the independent variable department?"

"Is there a significant relationship between the levels of self-efficacy of student teachers on classroom teacher education and science teacher education programs for implementing the constructivist approach in terms of the independent variable grade level?"

## METHOD

### The Research Design

Within the scope of the current study, a survey was conducted for the purpose of determining the self-efficacy of student teachers for implementing the constructivist approach in terms of gender, department and grade level variables. The survey is a widely used technique, which is not empirical. It is generally referred to as a data gathering method performed by means of asking a sample representing a group opinions about the subject matter condition (generally through conducting surveys) (Christensen, 2004).

### Participants

The participants of the study are composed of 160 student teachers on science teacher education and classroom teacher education programs in the 2009 – 2010 academic year. The participants were determined as 40 student teachers from each grade and department. 63.1% (n=101) of the participants were female while 36.9% (n=59) were male student teachers. 50% of the student teachers (n=80) were studying in third grade and 50% were in fourth grade. Similarly, 50% (n=80) were students of the classroom teacher education program while the rest 50% (n=80) were students of the science teacher education program. 54.4% of the participants were graduates of a normal high school, 30.6% (n=49) were graduates of super high school and 15% (n=24) were graduates of Anatolian high schools.

### Data Gathering Instrument

*The Self-efficacy Scale for Implementing the Constructivist Approach:* Within the scope of the study, the self-efficacy scale developed by the researchers was used in order to determine student teachers' self-efficacy for implementing the constructivist approach. The preliminary implementation form of the scale was developed under the scope of four aspects, as a result of literature examination, and then submitted for expert opinions. The preliminary implementations with regards to the scale were conducted with 284 student teachers studying at the same university where the study would be conducted. The scale development process involves exploratory factor analysis and confirmatory factor analysis. The KMO value in the first analysis of exploratory factor analysis process was found to be .94 while the Bartlett test was found to be significant at .001 level ( $\chi^2=8673,37$ ;  $df=1431$ ;  $p=.000<.001$ ). The factor load cutting value was found to be .40 in the first analysis and the analysis was conducted by using basic elements analysis with the Varimax vertical rotation technique. Thirteen items were left out of the scale, which was originally composed of 54 items, as a result of the analysis. The variance value based on the exploratory factor analysis of the scale is 13.97% for the first factor (eigenvalue: 5.73), 13.74% for the second factor (eigenvalue: 5.63), 12.88% for the third factor (eigenvalue: 5.04) and 10.33% for the fourth factor (eigenvalue: 4.24). The reliability values of the subscales in the scale are, respectively, as follows: .84, .88, .91 and .89. Variance for the whole scale was found to be 50.92% while the Cronbach alpha reliability value was found to be .96. For the purpose of determining the agreement between the model obtained as a result of the exploratory factor analysis and the data, the confirmatory factor analysis was done. It was found, as a result of the analysis that  $\chi^2/df=1,67$ , RMSEA= .047, NFI= .96, NNFI= .98, CFI=.98, RMR=.029, SRMR= .047. The values of agreement were found to be, comparatively, at a good level.

## FINDINGS AND INTERPRETATION

**Findings and interpretation of the first sub problem:** In line with the solution of the sub problem; "Is there a significant relationship between the levels of self-efficacy of student teachers on classroom teacher education and science teacher education programs for implementing the constructivist approach in terms of the independent variable gender?" Data obtained from the participants were analyzed with Mann Whitney U Test as they were not in normal distribution. Table 1 shows the results of the analysis regarding the scores the student teachers obtained from whole self-efficacy scale and sub factors for implementing the constructivist approach.

Table 1  
 Examining the level of self-efficacy of student teachers for implementing the constructivist approach  
 in terms of the gender variable

Subscales	Gender	N	Mean rank	U	Z	p
Self-efficacy belief for planning the lesson	Female	101	88,46	2176,00	2,852	.004*
	Male	59	66,88			
Self-efficacy belief for the learning-teaching process	Female	101	82,31	2796,50	.649	.516
	Male	59	77,40			
Self-efficacy belief for assessment-evaluation process	Female	101	85,41	2483,50	1,759	.079
	Male	59	72,09			
Self-efficacy belief for developing a learning environment	Female	101	84,08	2617,50	1,283	.200
	Male	59	74,36			
Total	Female	101	84,98	2527,00	1,601	.109
	Male	59	72,83			

\*significant at  $p < .05$

When the results obtained from the analysis made are examined and whole scale and subscales are considered, it can be seen that the values of the female mean ranking are higher than those of males in all dependent variables. However, when the self-efficacy aspect for only lesson planning is examined, a significant relationship is found between the groups in favor of females ( $Z=2,852$ ;  $p=.004 < .05$ ). Moreover, when self-efficacy ( $Z=1,759$ ;  $p=.079 > .05$ ) and total scores ( $Z=1.601$ ;  $p=.109 > .05$ ) for the assessment-evaluation process are evaluated, it is found out that the values of mean rankings of female scores are quite higher than those of males, although not significant. When the self-efficacy aspect for the learning and teaching process ( $Z=.649$ ;  $p=.516 > .05$ ) and self-efficacy aspect for developing a learning environment ( $Z=1.283$ ;  $p=.200 > .05$ ) are examined, no significant relationship is found between the groups.

**Findings and interpretation of the second sub problem:** In line with the solution of the sub problem; "Is there a significant relationship between the levels of self-efficacy of student teachers on classroom teacher education and science teacher education programs for implementing the constructivist approach in terms of the independent variable department?", it was found that data did not show a normal distribution, and therefore, analysis was done by using Mann Whitney U Test. Table 2 shows the result of the analysis.

Table 2  
 Examining the level of self-efficacy of student teachers for implementing the constructivist approach  
 in terms of the department variable

Subscales	Department	N	Mean rank	U	Z	p
Self-efficacy belief for planning the lesson	science	80	74,73	2738,50	1,581	.114
	classroom	80	86,87			
Self-efficacy belief for the learning-teaching process	science	80	79,89	3151,00	.168	.867
	classroom	80	81,11			
Self-efficacy belief for assessment-evaluation process	science	80	73,36	2629,00	1,954	.051
	classroom	80	87,64			
Self-efficacy belief for developing a learning environment	science	80	73,93	2674,00	1,799	.072
	classroom	80	87,08			
Total	science	80	75,63	2810,00	1,331	.183
	classroom	80	85,38			

\*significant at  $p < .05$

When the results of the analysis are examined, it is determined that there is no significant relationship between self-efficacy of student teachers for implementing the constructivist approach for the department variable. When the mean rankings of student teachers are examined it can be seen that classroom student teachers' level of efficacy are higher than those of science student teachers, considering all aspects and total scores. Additionally, for the aspects of self-efficacy for assessment and evaluation ( $Z=1,954$ ;  $p=.051>.050$ ), one of the subscales of the scale, and self-efficacy for developing a learning environment ( $Z=1,799$ ;  $p=.072>.050$ ), the mean rankings differ in favor of classroom teachers.

**Findings and interpretation of the third sub problem:** Data obtained from student teachers were analyzed with Mann Whitney U Test, which is one of the non-parametric tests, for the solution of sub problem: "Is there a significant relationship between the levels of self-efficacy of student teachers on classroom teacher education and science teacher education programs for implementing the constructivist approach in terms of the independent variable grade level?" Table 3 shows the results of the analysis:

Table 3  
 Examining the level of self-efficacy of student teachers for implementing the constructivist approach in terms of the grade variable

Subscales	Grade Level	N	Mean rank	U	Z	p
Self-efficacy belief for planning the lesson	3rd grade	80	79,32	3105,50	.324	.746
	4th grade	80	81,68			
Self-efficacy belief for the learning-teaching process	3rd grade	80	81,26	3139,50	.207	.836
	4th grade	80	79,74			
Self-efficacy belief for assessment-evaluation process	3rd grade	80	80,53	3197,50	.009	.993
	4th grade	80	80,47			
Self-efficacy belief for developing a learning environment	3rd grade	80	85,06	2835,00	1.248	.212
	4th grade	80	75,94			
Total	3rd grade	80	82,12	3070,50	.442	.658
	4th grade	80	78,88			

\*significant at  $p<.05$

According to the results regarding data analysis, when the mean rankings of student teachers' self-efficacy scores for the constructivist approach, and mean rankings of the subscales of the scale were examined, no significant relationship was found in terms of level of grade. In addition to this, when the subscale of self-efficacy belief for developing a learning environment were examined, mean ranking values of third grade students' scores were found to be higher than those of fourth grades ( $Z=1,248$ ;  $p=.212>.05$ ).

## DISCUSSION, CONCLUSION AND SUGGESTIONS

This study attempted to examine the self-efficacy levels of student teachers for implementing the constructivist approach in terms of gender, department and grade level variables. In this respect, analysis obtained were discussed and assessed within the scope of three independent variables.

*Discussion and results regarding the gender variable:* As a result of generally interpreting and examining the data obtained from the study, scores of females are found to be better than the scores of males considering the subscales and total scores and, in general, for the self-efficacy scale for lesson planning, a significant relationship was detected, while in the assessment-evaluation scale, there is an insignificant but high relationship. Similarly, Erişen and Çeliköz (2003) obtained findings as women consider themselves more competent in assessing student success than men do. Moreover, when the general findings in the present study are examined, according to literature women's general attitudes (Akpınar, Yıldız and Ergin, 2006; Çapri

and Çelikkaleli, 2008; Bozdoğan, Aydın and Yıldırım, 2007; Çetinkaya, 2009; Baykara-Pehlivan, 2008; Baykara-Pehlivan, 2010), motivation (Acat and Yenilmez, 2004) and opinions (Özbek, Kahyaoğlu and Özgen, 2007) towards the teaching occupation are more positive (significantly higher or at the level of averages) than those of men. In addition to this, the teacher self-efficacy studies in literature were examined (Cheung; 2008; Kahyaoğlu and Yangın, 2007; Yaman, Koray and Altunçekiç, 2004; Gürbültürk and Şad, 2009) and it was seen that there are studies proving that women have higher self-efficacy beliefs than men. Regarding the study, Evrekli et al. (2009) found out that female science education teachers' attitudes about constructivist approach were more positive than male student teachers. Moreover, similarly, Balım et al. (2009) concluded in their study examining the student teachers' opinions on constructivist approach that females had more positive views than males. Regarding the study, Evrekli et al. (2009) found out that female science education teachers' attitudes about constructivist approach were more positive than male student teachers. Moreover, similarly, Balım et al. (2009) concluded in their study examining the student teachers' opinions on constructivist approach that females had more positive views than males. Likewise, İnel, Evrekli and Türkmen (2010) conducted a study with classroom student teachers and found that there is a significant relationship in favor of female student teachers, in terms of their opinions and attitudes, for the constructivist approach. Karadağ et al. (2008) examined the classroom teachers' opinions about the constructivist approach and concluded that female teachers felt more competent than male teachers, particularly in terms of education status. Yılmaz et al. stated that female student teachers' cognitive models regarding the teaching profession were significantly more student centered. When the relevant literature is examined, the fact that the scores of females are generally higher than males can be explained with the cultural phenomenon in Turkey that the teaching profession is considered more suitable to women in assigning societal roles and therefore, women's attitudes, opinions and motivation for the occupation and their self-efficacy are higher. Related to this view, Cheung (2008) implies in his study conducted in Hong Kong and Shanghai that there is a misconception that women are better in educating young children, and the teaching profession is considered more suitable for women than men, and that this may cause the self-efficacy of women to be higher. Also, Gürbültürk and Şad (2009) indicated in their study that men have significantly higher levels of traditional beliefs in teaching compared to women. Although there is no significant relationship among groups for the constructivist approach in terms of beliefs in the authors' study, it was put forth that mean female scores were slightly higher than those of males. Based on the findings of this research, another reason for the findings in favor of women in the study, in the self-efficacy aspect, for the implication of the constructivist approach is said to be opinions and attachment of men regarding the traditional approach. Acat and Yenilmez (2004) gained a different perspective in their study and they revealed that men had higher resistance in learning the teaching skills and knowledge, and that they thought they would never learn these skills. This finding apparently supports the findings of the present study.

*Discussion and results regarding the department variable:* As a result of a general interpretation of the findings about the department variable, it can be seen that the self-efficacy of classroom student teachers for implementing the constructivist approach, and their self-efficacy for the subscales of the scale are higher than those of science education student teachers. However, it is clear that these two groups significantly differ from each other in the aspects of assessment and evaluation and developing learning environments. The relevant literature examinations demonstrate that there are studies proving that classroom student teachers' attitudes towards the teaching profession are higher (significantly higher or higher than the average) than science education teachers (Bulut and Doğar, 2006; Çapri and Çelikkaleli, 2008; Bulut, 2009; Baykara-Pehlivan, 2010). On the other hand, Kahyaoğlu and Yangın (2007) stated that there is no significant relationship between the professional self-efficacy of students on classroom teacher education and science teacher education programs. In his study conducted at the primary-school teacher's level, Karacaoğlu (2008) stated that classroom teachers considered themselves more competent than all other fields of study, particularly in aspects such as, professional knowledge, knowing students, the learning-teaching process, and assessment considering all subscales. Moreover, Gürbültürk and Şad (2009) examined the constructivist approach beliefs of the student teachers in terms of the field of study variable and, as a result of interpreting the findings, it was determined that beliefs of classroom student teachers are higher than science student teachers. Also, when the findings of



the attitude survey by Evrekli et al. (2009) conducted with science student teachers regarding the constructivist approach, the opinion survey by Balım et al. (2009) regarding the constructivist approach, and attitude and opinion survey by İnel, Evrekli and Türkmen (2010) conducted with the classroom student teachers regarding the constructivist approach are considered together, it can be seen that means of classroom and science student teachers are very close to each other, in terms of opinion and attitude variables. The findings of the research show that the reason why the self-efficacy of classroom teachers is particularly higher than that of science student teachers can be linked to the successful experiences in courses on teaching practice and school experience which classroom student teachers attend, starting from the third grade. The case that classroom student teachers were found to be more competent in the field of self-efficacy for assessment and evaluation can be related with their generally attending the course on assessment-evaluation a term before the science education student teachers.

*Discussion and results regarding the grade level variable:* In conclusion to the general interpretation of the findings regarding the grade level, it can be seen that the fourth grades consider themselves more competent in the self-efficacy aspect for planning a lecture, and third grades consider themselves more competent in the self-efficacy aspect for the learning-teaching process and developing a learning environment, and also considering the total score. When the relevant literature is examined, some studies in parallel with the research findings and some in contrast with them have been seen. For instance, Evrekli et al. (2009) in their study on attitudes of science student teachers towards the constructivist approach, and Balım et al. (2009) in their study on the opinions of science student teachers towards the constructivist approach found out that the scores of fourth grades were higher than the third grades, although not significant. Also, in a study conducted with classroom student teachers, İnel, Evrekli and Türkmen (2010) stated that third grade students' views on the constructivist approach were higher than those of fourth grades, while the attitudes of former were lower than those of the latter. Aslan and Köksal-Akyol (2006) concluded in their study on preschool student teachers that there was no significant relationship between the attitudes towards the teaching occupation and grade level. In parallel with the study, Şahin and Ersoy (2009) investigated the classroom teachers' level of competency in assessment-evaluation with regards to the new program and found out that fourth graders considered themselves more competent than the third graders. As well as this, Akpınar, Yıldız and Ergin (2006) put forth that attitudes of third grades were higher than fourth grades in their study that aimed at determining science student teachers' attitudes towards the teaching profession. The closest findings to the research were obtained in another study by Gürbüztürk and Şad (2009). The researchers demonstrated that the beliefs of third graders about the constructivist approach were higher than the other grades in terms of mean value, although it wasn't significant. As a result of interpreting the findings obtained in the study, it can be said that the main reason why self-efficacy scores of student teachers studying in third grade are higher than those of fourth grades is the special education methods course, in which science education student teachers can learn about the methods, techniques and strategies in the constructivist approach. The science education student teachers participate in the continuation of this course in fourth grade, and do some practice by preparing sample lecture plans. The method courses, in particular, are an essential pre-service preparation for the teachers, in their professional careers. These courses aim at assisting the student teachers in gaining necessary professional skills, for example, instructing different teaching methods, assessing student knowledge and implicating classroom management techniques (Yılmaz-Tuzun, 2008). The reason why self-efficacy scores of student teachers studying in the fourth grade are lower than the ones studying in third grade can be the negative performances experienced in teaching practice I & II, and special teaching methods course II. Performances are associated with any activity, task or one experience. Such experiences are referred to as mastery experiences by Bandura (2004) and are one of the most important sources of developing a self-efficacy belief. According to Watters and Ginns (1995), students' self-efficacy may change during the teacher education program. The authors explained this with the fact that experiences that students succeed in, or fail at, change throughout the program in different aspects.

## SUGGESTIONS

The following suggestions were provided as a result of interpreting data obtained from the findings of the study: Considering that male student teachers and science education student teachers have lower self-efficacy scores than female student teachers and classroom student teachers, it is important that these groups should be encouraged, particularly for the implication of the constructivist approach. Regarding future studies, considering different variables and different samples, it is thought that similar studies should be conducted, and a case study is necessary, for the purpose of determining the reasons for differences among student teachers, in terms of gender and department variables, and putting forth different solution ways. It can be said that student teachers should be provided with the opportunities to prepare lesson plans for implementing the constructivist approach in courses such as, school practice and teaching practice, and some experience in order to assess and evaluate these in practice activities, and that they should receive feedback from the instructors of these courses.

**IJONTE's Note:** This article presented at International Conference on New Trends in Education and Their Implications, 11-13 November, 2010, Antalya- Turkey, and selected for publishing for Special issue of IJONTE 2010 by ICONTE Science Committee.

## BIODATA AND CONTACT ADDRESSES OF AUTHORS



Res. Assist. Ertuğ EVREKLİ was born in İzmir at 1986 and graduated Department of Science Education at 2007, Master of Education 2010 at Dokuz Eylül University, Institute of Educational Sciences. Now he is a PhD student in same department. He interests in science education, concept cartoons, mind mappings, problem based learning, constructivism in in-service and pre-service science teachers. He is working at Celal Bayar University, Faculty of Education, Department of Science Education.

Res. Assist. Ertuğ EVREKLİ  
Celal Bayar University  
Faculty of Education, Department of Science Education  
45900, Demirci-Manisa, TURKEY  
E-mail: [evrekli@gmail.com](mailto:evrekli@gmail.com)



Assist. Prof. Dr. Fatma ŞAŞMAZ ÖREN was born in Alaşehir at 1977 and graduated Department of Science Education at 1998, Master of Education 2001 at Celal Bayar University, Institute of Science. Her main field of study involves alternative assessment approaches in science education, constructivism, concept cartoons, concept mappings, learning cycle approach and visual aids. She works as an assistant professor in the Department of Science Education of the Education Faculty at Celal Bayar University, Turkey.

Assist. Prof. Dr. Fatma ŞAŞMAZ ÖREN  
Celal Bayar University  
Faculty of Education, Department of Science Education  
45900, Demirci-Manisa, TURKEY  
E-mail: [fsasmazi@gmail.com](mailto:fsasmazi@gmail.com)





Res. Assist. Didem İNEL was born in İzmir at 1985 and graduated Department of Science Education at 2007, Master of Education 2009 at Dokuz Eylül University, Institute of Educational Sciences. Now, she is a PhD student in same department. She interests in science education, problem based learning, constructivism in in-service and pre-service science teachers. She is working at Usak University, Faculty of Education, Department of Science Education.

Res. Assist. Didem İNEL  
Usak University  
Faculty of Education, Department of Science Education  
64200, Usak, TURKEY  
E-mail: [dideminel@gmail.com](mailto:dideminel@gmail.com)

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