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Educational Research Association The International Journal of Research in Teacher Education
2012, 3(1): 13-20
ISSN: 1308-951X

http://www.eab.org.tr

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ELEMENTARY MATHEMATICS TEACHERS' FEEDBACK BEHAVIORS: STUDENT TEACHERS' VIEWPOINT

(İlköğretim Matematik Öğretmenlerinin Geribildirim Davranışları: Öğretmen Adayları Açısından)

Davut KÖĞCE[1] **Cemalettin YILDIZ**[2] **Mehmet AYDIN**[3]

[1,2] KTÜ, Fatih Eğitim Fakültesi, İlköğretim Bölümü, Matematik ABD, TRABZON

[3] KTÜ, Fatih Eğitim Fakültesi, OFMA Eğitimi Bölümü, TRABZON

d_kogce@yahoo.com cemalyildiz61@hotmail.com maydin2005@ktu.edu.tr

Abstract

This study was undertaken to determine the elementary mathematics student teachers' perceptions related to feedback behaviors performed by in service elementary mathematics teachers within the scope of "School Experience" course. This study was carried out by using the survey method. As data collection tool, a likert type questionnaire which consists of two sections was used. This questionnaire was administered to 82 senior mathematics student teachers from Karadeniz Technical University, Fatih Faculty of Education, Department of Elementary Mathematics Education in 2008–2009 education terms in Trabzon, Turkey. After responses given by student teachers to the questionnaire form were marked, these data were analyzed by using the statistical package SPSS. At the end of the study, it was found that positive feedback behaviors were given only by a few teachers from the point of student teachers views. Based on the findings of the study, some suggestions about the potential of feedback in teaching-learning process were given both mathematics student teachers and in service mathematics teachers.

Keywords: feedback, elementary mathematics, student teachers

Özet

Bu çalışma, ilköğretim matematik öğretmen adaylarının okul deneyimi dersi kapsamında okullarda gözledikleri matematik öğretmenlerinin öğretim sürecinde sergiledikleri geribildirim davranışlarına ilişkin düşüncelerini ortaya koymak amacıyla yapılmıştır. Çalışmada betimsel yöntem kapsamında Survey Metodu kullanılmıştır. Veri toplama aracı olarak iki bölümden oluşan likert tipi bir anket kullanılmıştır. Çalışmanın verileri, 2008–2009 öğretim yılında, KTÜ Fatih Eğitim Fakültesi İlköğretim Matematik Anabilim Dalı'nda öğrenin gören ve okul deneyimi dersi kapsamında okullarda gözlem yapan toplam 82 dördüncü sınıf öğretmen adayına bu anket uygulanarak elde edilmiştir. Öğretmen adaylarının anket formuna vermiş oldukları cevaplar puanlandırıldıktan sonra, bu veriler SPSS programından yararlanılarak değerlendirilmiştir. Çalışma sonucunda, çok sayıda olumlu geribildirim davranışlarının öğretmenlerin ancak bir kısmı tarafından yerine getirildiği saptanmıştır. Eğitim-öğretim sürecinde öğrenciye verilen geribildirimin öğrencinin başarısı ve gelişimi için sahip olduğu potansiyelle ilgili hem öğretmenlerin hem de öğretmen adaylarının nasıl bilgilendirileceğiyle ilgili bazı önerilerde bulunulmuştur.

Anahtar Kelimeler: geribildirim, ilköğretim matematik, öğretmen adayı

1. INTRODUCTION

The fact that some teachers still try to teach without considering how students learn is a misfortune but real. Learning can be defined as experience and changes in knowledge, skill, understanding and attitudes as a reflection of experiences. One way of explaining learning is constructivism. Human beings show a great effort in order to deduce a meaning from what they heard of. According to Vygotsky, every child realizes his/her own learning and but adults intervene this learning to help. Vygotsky suggests that students that are unsuccessful in accomplishing tasks and solving problems will usually be successful if they're helped by their teachers. Vygotsky used the term of zone of proximal development in order to distinguish the level of learning accomplished by working individually and the level of potential learning accomplished through cooperating with more skillful peers or teacher guidance. According to Vygotsky, this cooperation is important both for learning and the development of the student and increases success (Wood, Bruner & Ross 1976).

The intervention of the teachers should be in the form of scaffolding to help students reach an objective and solve a problem they couldn't otherwise afford (Baki, 2006). Teachers can make this by giving feedback that will improve learning and enhance development. But for the feedback to act as a scaffolding, it should be presented suitable to the understanding levels of the students and their needs (Orsmond, Merry & Reiling, 2005), because the key element of a high quality instruction is effective and high quality feedback. Feedback has long been claimed to have an important role in learning and improvement of performance in and beyond the formal educational environments. If the student knew clearly what to do and how to do it better, they would learn faster and more effectively (Rowe & Wood, 2008). These arguments are supported by the findings of several meta analyses. In a meta-analysis of 87 studies, the most effective variable on student achievement is reported to be feedback (Hattie, 1987). In a similar study, feedback is suggested to have widespread and consistent positive effects on learning when compared with other elements of instruction (Black & William 1998). Considering that the most important provider of feedback in the process of education is teachers, it can be stated that teacher have an important role in enhancing students' learning. They realize this by observing the development of student and providing timely feedback for the student's task (Nicaise, Bois & Fairclough 2007).

It's reported in the literature that when feedback is focused on the individual himself, it leads to a negative effect on the performance. When giving feedback, teachers should concentrate more on behaviors of the students related with the task rather than concentrating on their egos. Feedback should allow students to study harder and be more systematic in the future and involve a prescription for their future studies. Otherwise the feedback given will not improve the performance (Wiliam, 1999). Academic circles accept the view that feedback is a essential component of learning process in order to generate ideas and provide development. Warning students about their strengths and weaknesses may help them assess their own performances and use these information in their future works. Although timely, useful and guiding feedback is known to be important for the improvement of learning, it's not a widely studied subject (Weaver, 2006; Wojtas 1998). For this reason, the main purpose of this study is to reveal the views of preservice mathematics teachers about feedback practices of mathematics teachers observed during the context of the course named school experience.

METHOD

A descriptive survey method was used in the study. This method is used for determining the present situation of a case. Questionnaires are used in survey studies (Çepni, 2007). A likert type questionnaire consisting of two parts was used as a data collecting tool. In the first part of this questionnaire questions about the personal characteristics of students were posed and in the second part a survey consisting of 31 5-point likert type items about feedback developed by Erişen (1997) and revised by Oral (2000) was used. For 24 items containing positive feedback behaviors, a scoring such as ("all do (5)", "most do (4)", "some do (3)", "few do (2)" and "none do (1)") and for last 7 items about negative feedback exactly the opposite of this scoring was used. Therefore, contrary to the positive items, high mean values for negative items should be understood as teacher not using negative feedback expressions. The data of the study was obtained by conducting this questionnaire to total 82 4th year preservice teachers pursuing a degree in KTU Fatih Faculty of Education, Elementary Mathematics Education Department who made observations in schools in the context of the course named school experience during 2008-2009 academic year. The data collected in the course of this study was analyzed using arithmetic mean and t test in SPSS for Windows. A significance level of 0.05 was used for statistical tests. When interpreting arithmetic means, for positive feedback behaviors, mean values between 1.00-1.79 were accepted as "none do", mean values between 1.80-2.59 were accepted as "few do", mean values between 2.60-3.39 as "some do", mean values between 3.40-4.19 were accepted as "most do" and mean values between 4.20-5.00 were accepted as "all do". On the other hand, for the negative feedback behaviors the above mean values were interpreted as quite the opposite. Furthermore, these intervals of levels were determined by dividing the serial width between the maximum value 5 given to the options and the minimum value 1 with the number of options (levels) (Oral, 2000).

Findings and Discussion

According to the observations of preservice teachers, the change in the positive and negative feedback behaviors of elementary mathematics teachers in the education process in terms of some variables are presented in Table 1.

The positive ($\overline{X}_{male}$ = 78.979, $\overline{X}_{female}$ = 75.030 and $t_{(80)}$ = 1.217, p = 0.227 > 0.05) and negative ($\overline{X}_{male}$ = 24.408, $\overline{X}_{female}$ = 24.424 and $t_{(80)}$ = 0.014, p = 0.989 > 0.05) feedback behaviors of teachers in the education process did not reveal any significant difference in terms of gender variable. But when the mean values are examined, it can be seen that males demonstrate positive and negative feedback behaviors more than females.

Table 1 *The Positive and Negative Feedback Behaviors of Elementary Mathematics Teachers Terms of Some Variables*

Features of Mathematics Teachers	**Sup-Features**	**Feedback Behaviors**				
		f	**Positive**		**Negative**	
			$\bar{X}$	**p**	$\bar{X}$	**p**
Gender	Male	49	78.979	$t_{(80)}$ = 1.217 p = 0.227	24.408	$t_{(80)}$ = 0.014 p = 0.989
	Female	33	75.030		24.424	
Professional experience	6-10 years	31	78.322	$t_{(80)}$ = 0.453 p = 0.652	25.709	$t_{(80)}$ = 1.811 p = 0.074
	11 and more	51	76.823		23.627	
Faculty of Graduation	Education Faculty	54	78.277	$t_{(80)}$ = 0.780 p = 0.438	25.574	$t_{(80)}$ = 2.331 p = 0.023
	Faculty of Arts and Sciences	19	75.157		22.421	

The positive ($\overline{X}_{\text{6-10 years}}$ = 78.322, $\overline{X}_{\text{11 and more}}$ = 76.823 and $t_{(80)}$ = 0.453, p = 0.652 > 0.05) and negative ($\overline{X}_{\text{6-10 years}}$ = 25.709, $\overline{X}_{\text{11 and more}}$ = 23.627 and $t_{(80)}$ = 1.811, p = 0.074 > 0.05) feedback behaviors of teachers in the education process did not reveal any significant difference in terms of professional experience variable. But when we examine the mean values, it can be seen that the teachers with 6-10 years of experience demonstrate more positive feedback behaviors than the teachers with more than 11 years of experience and for the negative feedback behaviors, the teachers with more than 11 years of experience demonstrated more negative feedback behaviors. This finding can be interpreted that the teachers with 6-10 years of experience give their students more positive feedback.

While positive ($\overline{X}_{\text{Education Faculty}}$ = 78.277, $\overline{X}_{\text{Faculty of Arts and Sciences}}$ = 75.157 and $t_{(80)}$ = 0.780, p= 0.438 > 0.05) feedback behaviors of teachers in the education process did not reveal any significant difference in terms of faculty of graduation variable, negative ($\overline{X}_{\text{Education Faculty}}$ = 25.574, $\overline{X}_{\text{Faculty of Arts and Sciences}}$ = 22.421 and $t_{(80)}$ = 2.331, p= 0.023 < 0.05) feedback behaviors of teachers did. When we look at mean values, teachers who are graduates of faculties of education were found to demonstrate more positive feedback behaviors than those who are graduates of Arts and Sciences Faculties, whereas graduates of Arts and Sciences Faculties were found to demonstrate more negative feedback behaviors. This may stem from the fact that the graduates of faculties of education may have developed themselves pedagogically better with the education courses they've taken in their undergraduate studies.

The degrees of significance of the positive and negative feedback behaviors of the teachers during education process are presented in terms of realization levels are given in Table 2.

Table2 *The Degrees of Significance of The Positive and Negative Feedback Behaviors*

Items No	Positive Feedback Behaviors	Significance Degrees ($\overline{X}$)
03	Asking clear and understandable questions to students	3,780
23	Asking questions about the subject suitable for the readiness level of the class	3,634
05	Given concrete, clear and understandable answers to student's questions	3,609
06	Giving ample time for the students to think about the questions	3,585
04	Merging and asking the questions again when not understood by the students	3,548
14	Trying to take answers for all questions	3,524
02	Asking questions directing to the target behavior	3,512
13	Reinforcing correct answers of students with gestures and mimics	3,451
11	Controlling fast, decisive and correct answers with other questions or giving short reactions such as "Yes, that's right. Ok, go on…"	3,390
18	Where class size is large and it's impossible deal with the students individually, Correcting their mistakes and deficiencies without mentioning student names	3,304
12	In doubted correct answers, clarifying the answer by feedback such as "that's right because.."	3,292
24	Giving appropriate and sufficient clues to students to help them find the correct answer	3,268
01	Controlling students' previous learning and correcting their mistakes and deficiencies at the beginning of every subject	3,231
09	Giving opportunities for other students to find the correct or wrong answers	3,207
08	Determining and telling the students their mistakes and deficiencies,	3,207
16	Continuing counseling and guidance until the students reach correct answers	3,170
17	Using clues first in corrections	3,061
22	At the end of each subject matter, determining the extent to which the students achieved the projected target-behaviors(post-test implementation) giving feedback about and correcting the mistakes and deficiencies	3,024
07	Bringing about discussions on the correctness or incorrectness of students' answers	3,012
21	Determining what the students know about the subject at the beginning of every subject	3,012
15	Presenting the correct answers using visual and audio tools when necessary	2,756
10	Giving an opportunity sufficient clues and peer feedback one another	2,707
20	Giving information to students who take an interest in subject out of teaching commitments	2,682
19	Directing students to primary resources when their answers are wrong or incomplete	2,414
	Negative Feedback Behaviors	
07	Giving negative scores to student when the student does not give correct answer	3,878
03	Remaining silent and quitting after wrong answers	3,731
06	Rebuking the students when they don't give correct answers	3,731
05	Claiming that the students who don't think similar are wrong	3,475
04	Telling the students to study the same subject again when they can't give the correct answer	3,268
01	Using oral expressions such as "No, that's not true" to students' wrong answers Giving no explanations to students wrong answers	3,207
02	Reacting by frowning or shaking head in case of wrong answers	3,122

When we look at the perceived realization levels of positive feedback behaviors in the education process, we can state that most teachers tried to realize the following behaviors: "*Asking clear and understandable questions to students, Asking questions about the subject suitable for the readiness level of the class, Given concrete, clear and understandable answers to student's questions, Giving ample time for the students to think about the questions, Merging and asking the questions again when not understood by the students, Trying to take answers for all questions, Asking questions directing to the target behavior, Reinforcing correct answers of students with gestures and mimics*". When we consider that these behaviors are related with questioning skills, the teachers can be said to have a considerable amount of knowledge about asking high quality questions.

Very few teachers used the feedback behavior of "*Directing students to primary resources when their answers are wrong or incomplete*". This finding portrays an important picture if we consider that it's important to help students to choose the course book, teaching materials and resources in order to complete their learning deficiencies (Oral, 2000).

Moreover, some of the teachers can be listed respectively according to their degrees of importance as "*Controlling fast, decisive and correct answers with other questions or giving short reactions such as "Yes, that's right. Ok, go on…", Where class size is large and it's impossible deal with the students individually, Correcting their mistakes and deficiencies without mentioning student names, In doubted correct answers, clarifying the answer by feedback such as "that's right because", Giving appropriate and sufficient clues to students to help them find the correct answer, Giving opportunities for other students to find the correct or wrong answers, Determining and telling the students their mistakes and deficiencies, Continuing counseling and guidance until the students reach correct answers, Using clues first in corrections, At the end of each subject matter, determining the extent to which the students achieved the projected target-behaviors (post-test implementation) giving feedback about and correcting the mistakes and deficiencies, Bringing about discussions on the correctness or incorrectness of students' answers, Determining what the students know about the subject at the beginning of every subject, Presenting the correct answers using visual and audio tools when necessary"*.

Many positive feedback behavior were found to be used by only a small fraction teachers and this may be interpreted as a negative situation. Because one of the prerequisites to reach the objectives in education process is determining the learning deficiencies of students, possible challenges of students' learning, removing these challenges and using feedback that will increase their motivations and enhance their developments. If the students have a clear knowledge of what to do and how to do it better, they would learn faster and more effectively (Rowe, Wood, 2008).

When we look at degrees of realization of negative feedback behaviors, it was found that the following behaviors were practised by some teachers: "*Reacting by frowning or shaking head in case of wrong answers, Using oral expressions such as "No, that's not true" to students' wrong answers, Giving no explanations to students wrong answers, Telling the students to study the same subject again when they can't give the correct answer*" and it was found that the following behaviors were practised by very few teachers "*Claiming that the students who don't think similar are wrong, Rebuking the students when they don't give correct answers, Remaining silent and quitting after wrong answers and Giving negative scores to student when the student does not give correct answer*". Some negative feedback behaviors being used by only a few teachers is a considerable finding. This kind of negative behaviors may negatively affect student's motivation, development and achievement in the class. In other words, when giving feedback to students no denigrating, rebuking or punishing stimulators should be used; on the contrary the feedbacks should be encouraging, motivating, and descriptive of why some specific behavior is right or wrong (Oral, 2000).

Discussion and Suggestions

Based on the findings of this study on views of preservice teachers, the following results were obtained:

1) Females were found to be less competent in giving feedback than males. This finding contradicts the

common belief in our society that females are better than males in communication skills. Thus, it's thought that it won't be appropriate to generalize this result.

2) In the education process, the teachers with moderate level of experience (6-10 years) were found to demonstrate *positive feedback behaviors* most, whereas the teachers with high level of experience (11+ years) were found to demonstrate *the negative feedback behaviors* most. This is thought to be related with professional fatigue. At the same time, since school–faculty cooperations do not date back for long, fresh teachers in the profession may be thought to be more equipped. Based on this result, it can be recommended that teachers should be informed in group meetings about giving feedback and its importance in education process, and they should be allowed to share their experiences.

3) It's concluded that graduates of faculties of education demonstrate *positive feedbacks* and graduates of faculties of Arts and Sciences Faculties demonstrate *negative feedback* more. Based on this result, graduates of arts and sciences and education faculties pursuing a Master's Degree without thesis in faculties of education should be better informed about pedagogy in general and specifically about the contribution of feedback to learning.

4) Positive feedback behaviors realized by most of the teacher in education process were determined to be behaviors about questioning skills.

5) The *positive feedback behaviors* realized by some of the teachers during education process were found to be behaviors associated with reactions or manners of teachers to the answers given by the students to the questions directed to them.

6) The positive feedback behavior realized by only very few teachers were found to be insufficient to direct student to other resources in case of wrong or incomplete answers.

7) It was concluded that according to perceptions of preservice teachers, the *negative feedback behaviors,* the teachers are supposed not to demonstrate in reply to students' answers for questions were demonstrated by only some of the teachers.

It's recommended that preservice teachers and in-service teachers should be informed respectively via faculty courses and in-service training programs about the potential feedback given during the course of education process has in increasing student motivation, achievement and development.

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