

GENDER AND EXPERIENCE AS PREDICTOR OF BIOLOGY TEACHERS' EDUCATION PROCESS SELF-EFFICACY PERCEPTION AND PERCEPTION OF RESPONSIBILITY FROM STUDENT SUCCESS

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ABSTRACT

In this research, it is aimed to examine the relation between biology teachers' "education process self-efficacy perception, perception of responsibility from student success" and "gender and experience". The research has been prepared according to the scanning model. A total of 82 biology teachers participated in the research. In the research, "Education Process Self-Efficacy Beliefs Scale" and "Perception of Responsibility from Student Success Scale" are used. For the general of the scales the Cronbach Alpha Reliability Coefficients have been found as 0.93 and 0.90. In data analysis, beside descriptive statistics, Pearson Correlation Coefficient is used in the calculation of the relation between the variables; and linear regression analysis is performed to determine the level of prediction of the dependent variables by the independent variables. At the end of the research, the level of biology teachers' education process self-efficacy perception and the level of perception of responsibility from student success have been found as medium. On the other hand, the results of the regression analysis have shown that both gender and experience variables positively and significantly predict education process self-efficacy perception and perception of responsibility from student success. It has been determined that while gender accounts for 11.4% of the total variance in education process self-efficacy perception and 9.1% of the total variance in the perception of responsibility from student success, experience accounts for 13.6% of the total variance in education process self-efficacy perception and 8.7% of the total variance in the perception of responsibility from student success.

Key Words: Self-efficacy perception, self-efficacy perception of education process, the perception of responsibility from the success of student, biology teacher, gender and experience.

INTRODUCTION

Teachers play an indispensable role in teaching-learning activities. In this vein, a great body of research is being conducted on whether teachers' demographic characteristics affect teachers' qualifications. It can be stated

that of these variables, gender and experience are the most commonly investigated ones. Considering the literature on teacher education particularly in the last 30-40 years, it is observed that the studies focus most on teachers' qualifications and aim to determine in which variables teachers' qualities differ. Rotter's (1996) theory of locus of control and Bandura's (1977) Social Cognitive theory are among the theories which researchers focus on.

Developed by Rotter (1966), the concept of locus of control is individuals' expectations as to what will happen as a result of their behavior, and the tendency to view the situation based on their abilities, characteristics, and behaviors, or the tendency not to view the outcome due to luck, fate, destiny, or the result of any external force (Dönmez, 1986). In this regard, according to the concept of "Taking responsibility for students' success", which is related to the concept of locus of control and coined by Guskey (1981a), while teachers whose perceptions of teaching efficacy are positive take responsible for students' both success and failure, teachers with low perceptions of teaching efficacy attribute students' failure to external factors. It is possible to state that teachers who take responsibility for their students' success in class and attribute the reasons of failure to the problems in their own teaching-learning activities will have a high level of self-efficacy. The concept of self-efficacy, one of the most commonly investigated issues on teachers' qualifications, is closely related to the concept of taking responsibility for students' success.

One of the most important concepts stressed in Bandura's Social Cognitive Learning Theory is the concept of "Self-efficacy" (Bandura, 1977). The concept of self-efficacy is defined as a qualification that plays an effective role in shaping behavior and "individuals' perceptions of themselves in successfully completing necessary activities by planning these activities to achieve specific performance (Bandura, 1977; Zimmerman, 1995). There are many perceptions of self-efficacy in different fields and *Teachers' self-efficacy* is one of these concepts. Teachers' self-efficacy is defined as their perception of their ability to have necessary behavior to conduct their duty successfully (Aston, 1984; Brouwers & Tomic, 2003; Guskey & Passaro, 1994; Tschannen-Moran & Hoy, 2001). Self-efficacy related to teaching process can, on the other hand, be described as their perceptions of their ability to have necessary behavior in teaching-learning activities. In this regard, preparations before class, what should be done during class and evaluation process prove to be crucial. Positive relationships are stated to exist between teachers' high levels of self-efficacy and students' high quality behavior (Anthony & Kritsonis, 2007; Sewell & St-George, 2000; Usher & Pajares, 2006; Wollfolk, Rosoff & Hoy, 1990). Accordingly, this process can only be realized through teachers' both high level perceptions of taking responsibility and self-efficacy.

Although there are different studies conducted on teachers' perceptions of taking responsibility for students' success and self-efficacy related to teaching process, to the best knowledge of authors, there is not any study conducted that evaluates both these affective qualifications interacting with each other and investigates them through variables of gender and experiences that are among the demographic characteristics of Biology teachers. Yet, perceptions of taking responsibility for students' success and self-efficacy related to teaching process are closely related issues since, in any case, teachers with high levels of self-efficacy will also act based on their perceptions of taking responsibility for their students' success. Teaching activities are directly related to students' success-failure (Erdle, Murray & Rushton, 1985). Therefore, considering that teachers with high levels of locus of self-control also have high levels of professional efficacy, that they take responsibility for students' success, and that all these have a great effect on many issues such as teachers' in-class behavior, planning and applying teaching, motivation, effective classroom management skills, and ensuring student participation (Adu & Olantundun, 2007; Akiri & Ugborugbo, 2009; Guskey, 1981b; Hoy & Spero, 2005; Woolfolk, Rosoff & Hoy, 1990), it is believed that the investigation of the relationships between these concepts and the results obtained through the participation of Biology teachers that are one of the important science groups of the study will contribute significantly to the literature.

The Aim of the Study

The current study aims to investigate the relationships between Biology teachers' perceptions of both self-efficacies related to teaching process and taking responsibility for students' success, and gender and experiences. In this vein, the following research questions were investigated:

1. What are Biology teachers' perceptions of self-efficacy related to teaching process?
2. What are Biology teachers' perceptions of taking responsibility for students' success?
3. Is there a relationship between Biology teachers' perceptions of self-efficacy and taking responsibility for students' success considering their gender and experience?
4. Do Biology teachers' gender and experience predict their perceptions of self-efficacy related to teaching process?
5. Do Biology teachers' gender and experience predict their perceptions of taking responsibility for students' success?

METHODOLOGY

Descriptive survey model was used in the study. The survey model is a research approach that aims to describe, picture, or explain any current or past situations, groups, objects and features as they are (Ekiz, 2003; Karasar, 2006).

Participants

The participants were 82 Biology teachers working in the central districts of Ankara during the second semester of 2011-2012 academic year. These teachers volunteered to participate in the activity.

Data Collection Instrument

The *Scale of Teacher Candidates' Self-Efficacy Beliefs of Teaching Process* and the *Scale of Teachers' Perceptions of Responsibility for Students' Success* were used as the data collection instruments. In this regards, the properties of the scales are as follows:

The Scale of Teacher Candidates' Self-Efficacy Beliefs of Teaching Process: The scale was developed by Özdemir (2008). The scale is composed of 3 dimensions: Planning teaching process (8 items), application (19 items) and evaluation (13 items). The scale includes 40 items based on 5-point Likert style. The expected responses are scaled as 1 "totally disagree", 2 "disagree", 3 "neutral", 4 "agree", and 5 "totally agree" (Özdemir, 2008). In the current study, for the whole of the scale Cronbach Alpha Reliability Coefficient was determined as .930, for the dimension of planning teaching process as .814, for the dimension of application as .821, and for the evaluation as .789.

The Scale of Teachers' Beliefs of Responsibility for Students' Success: The scale adapted into Turkish by Ekici (2012a) was originally developed by Guskey (1981a). The scale includes two sub-dimensions, namely, responsibility for success and responsibility for failure. The scale includes 30 items. Two options are provided as (a) and (b) related to both dimensions in each item. The total score that can be obtained from both options in each item can be 100 at maximum. Therefore, in this context, while an option of a dimension is given 99 points, the option of the other dimension can be given 1 point at most. While Cronbach's Alpha reliability coefficient was determined .900 for the overall score, for the dimension of responsibility for success, it was determined as .814 and for the dimension of responsibility for failure, as .856.

Data Analysis

In addition to the descriptive statistics used in data analysis in line with the aims of the study, Pearson correlation coefficient was used to calculate the relationships between the variables and simple linear regression analysis was calculated to determine the levels of independent variables at predicting depending variables.

FINDINGS

In this section, the findings obtained in line with the sub-aims of the study are presented in tables.

The descriptive statistics on Biology teachers' self-efficacy related to teaching process and their perceptions of responsibility for students' success are provided in Table 1.

Table 1: Biology Teachers' Score Distribution in Their Perceptions of Self-Efficacy Related to Teaching Process and Their Perceptions of Responsibility for Students' Success

The dimensions of the scales	N	Mean	SD
<i>The overall consideration of the scale of self-efficacy</i>	82	112.41	11.13
Planning teaching process	82	23.34	2.85
Applying teaching process	82	49.11	6.45
Evaluating teaching process	82	37.42	4.36
<i>The overall consideration of the scale of responsibility for students' success</i>	82	52.71	6.24
The perception of responsibility for students' success	82	46.12	9.45
The perception of responsibility for students' failure	82	44.15	7.23

As Table 1 indicates, Biology teachers' scores in perceptions of self-efficacy related to teaching process is found to be $X=112.41$ in the overall consideration of the scale. This score is at a moderate level considering that the maximum score that can be obtained on the scale is $X=200.00$. It is also determined that Biology teachers' scores in perceptions of self-efficacy related to teaching process are at moderate levels in the dimensions of the scale.

Furthermore, in Table 1, Biology teachers' scores in perceptions of responsibility for students' success is found to be $X=52.71$ in the overall consideration of the scale. This score is close to 50.00, the average of the scale. Therefore, it was determined that Biology teachers' scores in perceptions of responsibility for students' success were close to the overall average of the scale and the scores in perceptions of responsibility for students' failure and success were found to be at moderate levels. Furthermore, the scores in the perceptions of responsibility for success were determined to be higher than those in the perceptions of responsibility for failure.

The findings on the relationship between Biology teachers' perceptions of self-efficacy and taking responsibility for students' success considering their gender and experience

Table 2: Pearson Correlation Coefficient Test Results between Biology Teachers' Perceptions of Self-efficacy and Taking Responsibility for Students' Success Considering Their Gender and Experience

The dimensions of the scales	Gender	Experience
<i>The overall consideration of the scale of self-efficacy related to teaching process</i>	.427*	.718**
The dimension of planning teaching process		
The dimension of applying teaching process		
The dimension of evaluating teaching process	.273*	
<i>The overall consideration of the scale of responsibility for students' success</i>	.709**	.743**
The dimension of perception of responsibility for students' success	.487*	.478*
The dimension of perception of responsibility for students' failure	.516*	.326**

* $p < 0.05$ and ** $p < 0.01$

Correlation coefficient is calculated to find and interpret the degree of relationship between two variables. The absolute value of correlation coefficient between 0.70-1.00 can be defined as high; between 0.70-0.30 as medium, and between 0.30-0.00 low level relationships (Büyüköztürk, 2002).

As can be seen in Table 2, low and moderate levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of self-efficacy perceptions related to teaching process ($r = .273$ and $r = .427$, $p < 0.05$). On the other hand, moderate and high levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of responsibility perceptions for students' success ($r = .487$, $r = .516$ and $r = .709$, $p < 0.05$ and $p < 0.01$).

A high level of positive relationship was determined between Biology teachers' experience and the overall consideration of the scale of self-efficacy perceptions related to teaching process ($r = .718$, $p < 0.01$). On the other hand, moderate and high levels of relationships were determined between Biology teachers' experience and the overall consideration and the dimensions of the scale of responsibility perceptions for students' success ($r = .326$, $r = .478$ and $r = .743$, $p < 0.05$ and $p < 0.01$).

The findings on Biology teachers' perceptions of self-efficacy related to teaching process as predicted by variables of gender and experience

Table 3: The Results of Simple Linear Regression Analysis Conducted on Predicting Self-Efficacy Perceptions Related to Teaching Process Based on Gender

Variables	B	Standard Error	β	t	p
Constant	6.752	2.235		3.325	.000
Gender	-.365	.785	.074	-2.258	.023

$F = 1.235$, $p < 0.01$, $R = .162$, $R^2 = .114$

Considering Table 3, it is seen that of the variables in the study, gender provides a significant relationship with the perceptions of self-efficacy related to teaching process ($R = .162$, $p < 0.01$). This finding is found to indicate those teachers' gender accounts for 11.4% of the total variance in teachers' perceptions of self-efficacy related to teaching process.

Table 4: The Results of Simple Linear Regression Analysis Conducted on Predicting Self-Efficacy Perceptions Related to Teaching Process Based on Experience

Variables	B	Standard Error	β	t	p
Constant	8.541	2.524		2.245	.000
Experience	.157	.324	-.065	-.452	.001

$F = 2.154$, $p < 0.01$, $R = .247$, $R^2 = .136$

Considering Table 4, it is seen that of the variables in the study, experience provides a significant relationship with the perceptions of self-efficacy related to teaching process ($R = .247$, $p < 0.01$). This finding is found to indicate those teachers' experience accounts for 13.6 % of the total variance in teachers' perceptions of self-efficacy related to teaching process.

The findings on Biology teachers' perceptions of responsibility for students' success as predicted by variables of gender and experience

Table 5: The Results of Simple Linear Regression Analysis Conducted on Predicting Perceptions of Responsibility for Students' Success Related to Teaching Process Based on Gender

Variables	B	Standard Error	β	t	p
Constant	5.758	2.035		1.524	.000
Gender	.658	.751	.365	1.004	.007

F=3.462, $p < 0.01$ - R=.632, $R^2 = .091$

Considering Table 5, it is seen that of the variables in the study, gender provides a significant relationship with the perceptions of responsibility for students' success ($R=.632$, $p < 0.01$). This finding is found to indicate those teachers' gender accounts for 9.1% of the total variance in teachers' perceptions of self-efficacy related to teaching process.

Table 6: The Results of Simple Linear Regression Analysis Conducted on Predicting Perceptions of Responsibility for Students' Success Related to Teaching Process Based on Experience

Variables	B	Standard Error	β	t	p
Constant	7.211	2.574		1.862	.000
Experience	.568	.841	.850	1.421	.031

F=1.254, $p < 0.01$, R=.758, $R^2 = .087$

Considering Table 6, it is seen that of the variables in the study, gender provides a significant relationship with the perceptions of responsibility for students' success ($R=.758$, $p < 0.01$). This finding is found to indicate those teachers' experience accounts for 13.6 % of the total variance in teachers' perceptions of self-efficacy related to teaching process.

DISCUSSION AND CONCLUSION

The current study conducted to investigate the relationships between Biology teachers' perceptions of both self-efficacy related to teaching process and taking responsibility for students' success, and gender and experiences provides results obtained through conducting appropriate statistical analyses in line with the sub-aims. In this vein, Biology teachers' levels of perceptions of self-efficacy related to teaching process and perceptions of responsibility for students' success were found to be moderate. Their levels of perceptions of self-efficacy related to teaching process were found to be high in some depending on the quality of their work (Çoklar & Odabaşı, 2009; Gökmen, Ekici, Çimen & Altunsoy, 2011; Oğuz, 2009; Özdemir, 2008). On the other hand, considering the related literature, teacher candidates were found to take more responsibility for success than failure (Ekici, 2012a; Ekici, 2012b; Guskey, 1987; Güvenç, 2011; Pratt, 1985; Sherman & Giles, 1981). Moreover, according to the results obtained through the current study, Biology teachers were found to take more responsibility for success than failure. Accordingly, this results obtained from the study prove similar to those of the studies in the related literature. On the other hand, in other studies conducted, it is stated that the education provided to teachers/teacher candidates are effective in their adopting positive perceptions of taking responsibility for students' success and failure (Castellini, 1986; Guskey, 1984; Rosenshine, 1986). In this regard, it is possible to help Biology teachers adopt more positive perceptions of taking responsibility for students' success and failure through future in-service training.

Through another result obtained, low and moderate levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of self-efficacy related to teaching process. This finding can be interpreted as the indication that Biology teachers' perceptions of self-efficacy related to teaching process do not differ much based on the gender variable. Although there are various studies conducted to determine how perceptions of self-efficacy related to teaching process based on gender (Çoklar & Odabaşı, 2009; Özdemir, 2008), there is not any study that investigates the correlation and that is similar to the current study.

One of the important results is that moderate and high levels of positive relationships were determined between Biology teachers' gender and the overall consideration and the dimensions of the scale of responsibility perceptions for students' success. In the related literature review, while Güvenç (2011), Guskey (1981a) and Pratt (1985) investigate whether perceptions of responsibility for students' success differ based on gender, there is not any study conducted to investigate the level of correlation between gender and perceptions of responsibility for students' success and failure. Accordingly, these results will contribute significantly to the literature.

On the other hand, while a high level of positive relationship was determined between Biology teachers' experience and the overall consideration of the scale of perceptions of self-efficacy related to teaching process, moderate and high levels of relationships were determined between Biology teachers' experience and the overall consideration and the dimensions of the responsibility perceptions for students' success. Regarding the high level of relationship between teachers' experience and students' success (Evans, 1992; Gibbons, Kimmel & O'Shea, 1997), if it is thought that experienced teachers will take more responsibility for students' success and failure, the results obtained from this study prove similar to those in the related literature.

The results of the regression analyses put forward that the variables of both gender and experience predict positively and significantly the perceptions of self-efficacy related to teaching process and the perceptions of responsibility for students' success. While it was determined that gender accounted for 11.4% of the total variance in the perceptions of self-efficacy related to teaching process and 9.1% of the total variance in the perceptions of responsibility for students' success, experience was found to account for 13.6% of the total variance in the perceptions of self-efficacy related to teaching and 8.7% of the total variance in the perceptions of responsibility for students' success. As indicated in these results, gender and experience are among the important variables that predict both the perceptions of self-efficacy related to teaching process and the perceptions of responsibility for students' success.

Consequently, the fact that Biology teachers have high levels of perceptions of self-efficacy and responsibility can be interpreted as just a few of the important factors considering that they can be quality teachers. However, many factors may affect one another while becoming a quality teacher. Perceptions of self-efficacy and responsibility are among the important factors that affect each other. In the studies conducted in line with this, it is stated that teachers with high levels of perceptions of self-efficacy and professional responsibility are more successful in and ambitious for issues such as choosing appropriate teaching techniques, ensuring higher students' success, effective communication with students (Anderson, Dragsted, Evans & Sorensen, 2004; Appleton & Kindt, 2002; Guskey, 1988). Accordingly, the fact that teachers have high levels of perceptions of self-efficacy related to teaching process and responsibility indicates that there might be more successful students during teaching and learning process and quality individuals who have sufficient biological knowledge and can apply this knowledge in their daily lives in the society. In this regard, Biology teachers lack in related issues can be compensated through in-service training activities.

IJONTE's Note: This article was presented at 4th International Conference on New Trends in Education and Their Implications - ICONTE, 25-27 April, 2013, Antalya-Turkey and was selected for publication for Volume 4 Number 2 of IJONTE 2013 by IJONTE Scientific Committee.

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