

PREDICTING STUDENT SATISFACTION IN PHYSICS COURSES

FİZİK DERSİNDE ÖĞRENCİLERİN ÖĞRENME DOYUMLARININ YORDANMASI

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Abstract

The objective of this study was to investigate the predictive power of students' beliefs (i.e. enjoyment in the physics course and students' perception of their competence in learning physics) on student satisfaction towards physics courses. A total of 189 students from the five departments in the Faculty of Education at Dokuz Eylül University were asked to respond to "The Student Satisfaction Scale" and "Student Information Form". The participants were all enrolled in introductory physics courses. Data was statistically analyzed using descriptive statistics and multiple linear regression analysis. Findings indicate that student beliefs explain 29% of the total variance on student satisfaction and that student beliefs are positively correlated with student satisfaction. The results also indicate that "enjoyment in the physics course" is a more significant predictor than "student self-perception of competence in learning physics". In the paper, recommendations based on the findings of the study are highlighted.

Keywords: Teacher Education, Student Satisfaction, Physics Education, Self-Perception

Özet

Bu araştırmanın amacı, fizik dersine yönelik öğrenci doyumları üzerinde öğrencilerin inanışlarının (yani fizik dersinden hoşlanma ve fizik öğrenmeye yönelik yeterlik algıları) belirleyiciliğini incelemektir. Araştırmada Dokuz Eylül Üniversitesi Eğitim Fakültesindeki beş ayrı bölümde öğrenim gören toplam 189 öğrenciden "Öğrenci Doyum Ölçeği" ve "Öğrenci Bilgi Formu" nu cevaplandırmaları istenmiştir. Katılımcı öğrencilerin tamamı fiziğe giriş dersi almaktadırlar. Araştırmanın verileri betimsel istatistikler ve çoklu doğrusal regresyon analizi ile çözümlenmiştir. Araştırmanın bulguları öğrenci inanışlarının öğrenci doyumuna ait toplam varyansın %29'unu açıkladığını ve öğrenci inanışlarının öğrenci doyumunu ile pozitif şekilde ilişkili olduğunu göstermektedir. Bu sonuçlar aynı zamanda "fizik dersinden hoşlanmanın", "fizik öğrenmeye yönelik yeterlik algıları" na göre daha önemli bir belirleyici olduğunu ortaya çıkarmıştır. Araştırmada sonuçlara dayalı olarak öneriler vurgulanmıştır.

Anahtar Kelimeler: Öğretmen Eğitimi, Öğrenci Doyumu, Fizik Eğitimi, Yeterlik Algısı

1. INTRODUCTION

As a way of monitoring and improving the quality of teaching, student evaluations have become a part of life at universities (Kwan, 2001). According to Kwan (1999), these evaluations are used as one (sometimes the only and often the most influential) measure of teaching effectiveness. As well as the "Student evaluation of teaching" (SET)'s being helpful in improving the teaching performance of the faculty lecturers, it can be also effective at the decisions of the executives about the lecturers (e.g., promotion and tenure decisions) (Loveland, 2007; Morgan, Sneed & Swinney, 2003). Since the student evaluation of teaching dates back to old times (for example, Goodhart, 1948; Remmers, 1928; Remmers, 1930), up to now, a great number of

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studies have been done about this subject. According to many researchers student evaluations are a valid, reliable, and worthwhile means of evaluating teaching (Wachtel, 1998).

In higher education, student satisfaction is one of the important indicators of quality (Erdoğan, Uşak & Aydın, 2008). Student evaluations can be used to measure student satisfaction. Satisfaction measures include different dimensions such as instruction and instructors, courses, majors, student services, facilities, academic services and campus climate (Sezgin et al., 2000). In the present study, satisfaction is defined as the degree to which students feel satisfied with physics courses (i.e., students' overall course satisfaction concerning workload of course, level of course, teaching activities and instructors' teaching effectiveness).

The literature on student satisfaction shows that numerous studies have been done on this topic in the western countries but a little emphasis has been given to such studies in Turkey. In Turkey, limited number of studies investigating the student satisfaction with science education has been encountered (Erdoğan et al., 2008; Erdoğan & Uşak, 2004, 2006, 2007; Erdoğan, Uşak & Özel, 2009; Telli, Rakıcı & Çakıroğlu, 2003). Although student satisfaction has been amply studied, literature on satisfaction with physics education is quite limited (Sezgin et al., 2000 Sezgin Selçuk & Çalışkan 2010a; Sezgin Selçuk & Çalışkan 2010b). Therefore, the present study aims to make new contributions to the literature in the field of undergraduate level physics education.

This paper investigates the application of regression analysis to an appraisal of classroom teaching, in order to explore the key predictors of satisfaction for student teachers. In other words, the objective of this study was to investigate the predictive power of students' beliefs (i.e. enjoyment in the physics course and students' perception of their competences in learning physics) on student satisfaction towards physics courses.

In psychology literature, perception of competence or self-competence "generally refers to perceptions of ability in broad academic areas, such as how well a student is in general and may also refer to perceived ability in subject areas as a whole" (Wilkinson, 2004). In this study, self-competence concept corresponds to the students' perceptions about how well they found themselves in learning physics.

The objective of this study is to investigate the predictive power of students' beliefs (i.e. enjoyment in the physics course and students' perceptions of their competences in learning physics) on student satisfaction with the physics course overall.

2. METHOD

In this study, descriptive research method was used and the data were collected quantitatively.

2.1. Participants

The distribution of the students according to their genders and departments is presented in Table 1. Participants in this study were first year student teachers (n=189) from the five departments. The average age of the sample was 19.5 years.

Table 1. Distribution of the Participants according to their Genders and Departments

	<i>n</i>	%
Gender		
Male	82	43.4
Female	107	56.6
Department		
Physics Education	35	18.5
Chemistry Education	40	21.2
Biology Education	14	7.4
Elementary Science Education	38	20.1
Elementary Mathematics Education	62	32.8

Note: *n*: the number of the participants in groups; %: the percentage of the participants in groups

2.2. Description of Introductory Physics Courses

Physics is compulsory in these departments mentioned above, and it is offered in two successive semesters (fall and spring) as Physics I (2 or 4 credits) and Physics II (2 or 4 credits). Physics I focuses on mechanics concepts and Physics II focuses on electricity and magnetism concepts.

2.3. Data Collection Instruments

A survey method was used in this study. Data were collected using the “Student Satisfaction Scale” and “Student Information Form”. Each one was briefly described below.

The Student Satisfaction Scale

Student satisfactions in each introductory physics courses were evaluated using an adapted version of the Student Satisfaction Scale (SSS). The Student Satisfaction Scale developed by Açıkgöz et al. (1999) was modified to accommodate questions relating to physics courses. The original SSS includes 3 sub-scales in 29 items: Enjoyment for Learning (15 items), Quality of Instruction (8 items), and Teaching Methods/Activities (6 items). All items are scored on a five-point Likert-type measure: Totally Agree, Agree, Undecided, Disagree, and Totally Disagree. Satisfaction items are scored using values ranging from 1 (totally disagree) to 5 (totally agree). Negative items are inversely coded.

In order to investigate the construct validity of the scale; by applying the *varimax rotation* and the principal component analysis on the items existing at SSS, it was investigated whether

the scale preserves its original factor structure or not. Similarly, the new factor structure contains three factors (sub-scales): Enjoyment for Learning Physics, Quality of Instruction, and Teaching Methods/Activities. According to the results of the analysis, it was observed that 14 items of Enjoyment for Learning subscale, 5 items of Teaching Methods/Activities subscale, and 7 items of Quality of Teaching subscale have been preserving their original structures. One item (item 21) was removed from the scale because the item-total correlation was lower than 0.30. Moreover, two overlapping items (item 15 and 16) which have a load value difference of lower than 0,10 between two factors were removed from the scale. The factor loadings of the remaining 26 items ranged from 0.42 to 0.75 and the item-total correlations were in the 0.30 and 0.73 range. The eigen values of the three factors were above 1.00, and the total variance explained by these scales was 49.3%. Thus, the construct validity of the scale was supported. Item analysis of the SSS resulted in a 26-item scale with a coefficient of 0.92 (Cronbach's Alpha), indicating an excellent level of reliability. Reliability coefficients of the "enjoyment of learning", the "quality of teaching" and the "teaching activities" sub-scales were found to be 0.92, 0.80 and 0.67, respectively. Of the 26 items, 14 items were positive and 12 were negative. The maximum score for this scale would be 130 (at the rate of 5 scores to each of twenty-six items)

Information Form

To collect demographic data about students, we used a Student Information Form, which is composed of a list of questions such as gender, age, current university cumulative GPA, graduated high school type as well as enjoyment and competence assessment questions. Enjoyment and assessment questions included 4 (like very much, like, dislike, dislike very much) and 5 options (trust very much, trust, undecided, distrust, distrust very much) respectively.

2.4. Data Collection and Analysis

The data of the study were collected towards the end of the 2008-2009 spring semester. SSS and SIF were administered to the student teachers in group sessions at classrooms by a research assistant out of regular classroom hours. Instructors were not present during the data collection. Students responded anonymously to the instruments. Descriptive statistics (mean, standart deviation, frequency and percentage) were used to report the independent variables and demographic characteristics of the target sample. The data obtained from SSS was analyzed by means of Multiple Linear Regression (MLR) analysis. The alpha level of significance was 0.05.

3. RESULTS

Mean scores and standard deviations for the overall student satisfaction, enjoyment and self-competence were calculated (see Table 2). In order to investigate the relationships between dependent (students' satisfaction in introductory physics courses) and independent variables (enjoyment in the physics course and students' perception of their competency in learning physics) Multiple Linear Regression (MLR) analysis was executed. The results of the multiple linear regression analysis related to the prediction of the student satisfaction according to the enjoyment and self-competence variables were given at Table 3.

Table 2. Descriptive Statistics for Dependent and Independent Variables

	n	M	SD
Student Satisfaction	189	82.10	15.54
Enjoyment	189	2.87	0.74
Self-competence	189	3.54	0.86

Table 3. Pearson's Correlation Coefficients

	Student Satisfaction	Enjoyment	Self-competence
Student Satisfaction	1.00		
Enjoyment	0.52*	1.00	
Self-competence	0.45*	0.57*	1.00

*Correlation is significant at the 0.01 level (2-tailed).

Results of MLR analysis indicated significant relationships among the three variables investigated.

Table 4. Multiple Linear Regression Analysis Results with Satisfaction as Dependent Variable

Variable	B	Standart Error	β	t	p	Zero-order r	Partial r
Constant	44.352	4.359		10.176	0.000		
Enjoyment	8.063	1.555	0.388	5.186	0.000	0.519	0.355
Self-competence	4.120	1.341	0.229	3.071	0.002	0.452	0.220

F(2,186)=40.835

It is seen that there is a positive and middle level correlation between enjoyment and satisfaction ($r=0.52$), and there is a positive and weak correlation between self-competence and satisfaction ($r=0.45$). The enjoyment and self-competence variables together have a middle level and significant correlation with the satisfaction scores of the students ($R=0.552$, $R^2=0.305$ $p<0.01$). Aforementioned two variables together explain approximately 30% of the total variance of the student satisfaction. According to the standardized regression coefficient (β), the predictor variables' relative order of importance on the satisfaction is liking and trusting. When the t-test results related to the significance of the regression coefficients are investigated, it is seen that both the enjoyment and the self-competence variables are significant predictors on the satisfaction.

4. FINDINGS AND CONCLUSIONS

This study investigates the relationship of introductory level physics students' course satisfaction with their perception of liking physics course and competence toward learning physics and the effects of these variables on student satisfaction. Major findings of the current study are as follows:

1. There were statistically significant relationships among the student satisfaction, enjoyment in the physics course and students' perception of their competence in learning physics.
2. The result showed moderate positive correlation between enjoyment and student satisfaction of student teachers.
3. The result showed low positive correlation between students' perception of their competence in learning physics and satisfaction with physics courses.
4. Enjoyment is an important statistically significant predictor of student satisfaction than self-competence.

The findings support the work of Greenland (2005) who found that enjoyment is an important variable influencing student satisfaction. When the competence-related literature (at various researches ranging from education to professional life) was investigated, it has been seen that the competence was one of the significant determinants of the satisfaction (Shih, 2006). At this research, it has been found just for this sampling that the self-competence had a weak correlation with the satisfaction. Therefore, it should be useful to do new researches about the same subject with larger samplings (by using similar groups).

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