Examination of the Classification Accuracy of Music Education Special Aptitude Exams

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Abstract

It is critical both for candidates who apply for programs that require special aptitude and the professors who teach in these programs whether those students' scores on placement exams are correctly calculated. Because student's ability profile and the quality of education in these programs may be directly affected by how candidates placement scores are calculated. The purpose of this study is to determine the effect of sub-scores on students' placement scores and the accuracy of the placements in the music education program. This study is based on data of 100 candidates who took special aptitude tests offered by Music Education Program in a big University at middle Anatolia in 2010. The results of the discrimination analysis indicate that actual weights of the placement sub-scores depart from the original weights set by the Student Selection and Placement Center (SSPC). Contrary to the calculation formula in the SSPC guidelines, higher entrance exam (HES) score has been found to be the main determinant of students' placement scores. Finally, classification accuracy of the placement scores have been found to be 94%.

Key Words

Special Aptitude Tests, Music Teaching, Student Selection and Placement, Discriminant Analysis, Classification Accuracy.

Music education is defined as "a process of helping individuals to attain certain musical behaviors" (Uçan, 1997, p. 107). Karkın (1996) sees music teacher education as one of the dimensions of music education. According to Töreyin (2002), the purpose of music teacher education programs is to raise teachers who are capable of changing students' musical behaviors.

Student placement into Music Teacher Education Program and other special aptitude programs in Turkey is different from student placement into other teacher education programs in the way that they all include performance tests. These performance tests are called special aptitude tests (SATs) and administered locally by each university. Special aptitude tests are usually composed of several stages.

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In Music Teacher Education Program, for instance, SATs are usually administered in two or three stages. Although the number of stages changes from one university to another, the competencies and skills measured in SATs are almost identical. Some of these competencies include musical hearing, musical literacy, singing and playing a musical instrument.

SAT is administered in two stages in the university in which data for this study were collected. Candidates' music hearing abilities were measured in the first stage. Candidates who scored a minimum of 50 out of 100 were allowed to take the tests administered in the second stage. The second stage included musical literacy, singing and playing a musical instrument with 50%, 25%, and 25% weightings, respectively.

Higher Education Entrance Test Score (HEETS) and Weighted Middle School Achievement Score (WMSAS) are added to SATS to calculate candidates' placement score (PS). The weighting of each sub-score is determined by SSPC each year. Several studies in fine arts research indicate inconsistencies between the weighing of the sub-scores in the SSPC booklet (ÖSYM, 2010) and the profiles of candidates who are enrolled into fine arts programs. Altınkurt (2006), for instance, found that students who scored high on HEET and low on SAT were eligible to be enrolled into the program. Ece and Sazak (2006a), Atak Yayla (2006), Ünver (2003) and Atar and Yılmaz (2011) found similar findings in their studies.

Other line of fine arts research examined the relationship between the sub-scores (Atak Yayla, 2003; Ece & Sazak, 2006b) and their relationship to students' school performances (Altınkurt, 2006; Dalkıran & Şaktanlı, 2009). The relationship between HEETS and SATS have been found to be statistically insignificant (Atak Yayla, 2003). Ece and Sazak (2006b), on the other hand, found the relation to be little but positive. Altınkurt found little but positive relationship between students' SATS and their classroom performances. Finally, Dalkıran and Şaktanlı found that there were no significant relation between students' grade point averages and SATS and HEETS.

It is critical both for candidates who apply for programs that require special aptitude and the professors who teach in these programs whether those students' scores on placement exams are correctly calculated. Because student's ability profile and the quality of education in these programs may be directly affected by how candidates' placement scores are calculated. The purpose of this study is to determine the effect of sub-scores on students' placement scores and the accuracy of the placements in the Music Education Program.

Research Design

Correlational research design was used in this study since the relationship between HEETS, WMSAS, and SATS variables that were used in the calculation of placement scores of students and the validity of the classifications based on these relationships were considered in this study. In a correlational research design, the relationship between two or more variables or datasets are examined (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2010; Cohen, Manion, & Morrison, 2005; Fraenkel & Wallen, 2009; Vanderstoep & Johnston, 2009), whereas experimental research in correlational studies variables are not manipulated (Fraenkel & Wallen, 2009).

Study Group

This study was conducted with a total of 100 candidates who applied to the relevant university's Music Education Program in 2010.

Data Collection Tools

HEETS, WMSAS, and SATS that were used in calculating placement score and which was also used in this study were obtained from the relevant university's Student Affairs Head of Department dataset. HEETS and WMSAS in the dataset were obtained from SSCP dataset and SATS were calculated from the results of the special aptitude test. Special aptitude test contains five sub-dimensions as musical hearing, musical literacy, vocalization, playing instrument, and general music knowledge. These sub-tests are conducted in one step at some universities; in two even three steps in other universities. In his study, music education special aptitude test was conducted in two steps. The construction of these sub-tests and the reliability of scoring could not be reached.

Data Analysis

Discriminant analysis was conducted to analyze the data. Before conducting the discriminant analysis, data entry for HEETS, WMSAS, and SATS predictor variables, missing values and outliers in the dataset, and the assumptions of discriminant analysis were checked by SPSS. Variables for 50 students who were placed in the program and 50 students who were not were investigated separately. Discriminant analysis was preferred for this study because of small sample size. When the sample size is small, discriminant analysis provides more accurate results than logististic regression analysis (Grimm & Yarnold, 1995).

Discriminant analysis has assumptions as multivariate normality, homogeneity of variances, multicollinearity (Tabachnick & Fidell, 2007). In this study, it was investigated whether each predictor variable was normally distributed; however, it was not checked whether predictor variables were multivariate normally distributed. If the violation of multivariate normality assumption is because of skewness and not because of outliers, discriminant analysis is robust to the violation of normality assumption (Tabachnick & Fidell). Furthermore, it is expected that the discriminant analysis is robust to the violation of the normality assumption when the number of individuals in the smallest group is more than 20 under the 5 or less predictor variables in the study condition (Tabachnick & Fidell). Since the number of students in each group is 50, the sample sizes of the groups are equal and there are not any outliers in the dataset, it can be said that the violation of the normality assumption is not a threat for the results of the analysis.

Other important assumption of discriminant analysis is the equality of within-group variance-covariance matrices. Discriminant analysis is robust to the violation of this assumption when the sample sizes of the groups are equal or the sample sizes is large enough. The equality of variance-covariance matrices should be tested if a classification is going to be made following the discriminant analysis and it can be tested with Box's M test.

Another important assumption of discriminant analysis is multicollinearity assumption. This assumption was checked by examining the correlations between the variables.

After the preliminary analyses were completed, discriminant analysis was run to classify the students as the ones who are eligible for enrolling to the program and ones who are ineligible using HEETS, WMSAS, and SATS variables. Discriminant analysis was implemented by SPSS program.

Results

The assumptions of discriminant analysis were checked as the preliminary analyses. Assumption of the equality of within-group variance-covariance matrices was checked by Box's M test. The hypothesis of the equality of population variance-covariance matrices was accepted since the p-value was equal to 0,057 and larger than 0,05. It was concluded that the assumption of the equality of variance-covariance matrices in the dataset was met. The correlation coefficients between variables were examined to

check the multicollinearity assumption and it was concluded that multicollinearity does not exist among variables.

The canonical correlation coefficient of discriminant function was calculated as 0,798. This value indicates that the discriminating power of discriminant function in classifying the students as the ones who are eligible for enrolling to the program and the ones who are ineligible for enrolling to the program is good. The null hypothesis that the canonical correlation of discriminant function is equal to zero, in other words, the discriminant function does not have any discriminating power was rejected ($p < 0,001$) and the resulting canonical correlation coefficient was found to be statistically significant ($p < 0,001$). Therefore, it can be said that HEETS, WMSAS, and SATS variables are effective in classifying students and there are significant differences in the mean sub-scores of the students who are eligible for enrolling to the program and the ones who are ineligible. By taking the square of the canonical correlation coefficient, value of 0,637 was obtained. This value indicates that approximately 63,7% of the variance in discriminant scores is because of between-group variability, and approximately 36,4 % of variance (Wilk's lambda value = 0.364) is because of within-group variability.

When the standardized canonical discriminant function coefficients were investigated, the effects of HEETS, WMSAS, and SATS sub-scores on group membership was found to be as 0,851, 0,654, and 0,747, respectively. In this case, the most effective sub-score in determining group membership is HEETS, followed by SATS and WMSAS sub-scores, respectively. The effects of these sub-scores in predicting group membership is much different from the values that were projected as 75% (SATS), 9% (WMSAS), and 16% (HEETS) in the guide.

As the result of the discriminant analysis, it was estimated that 45 out of 50 students who are eligible for enrolling to the program were correctly classified and 5 students were incorrectly classified. In this case, the correct classification for the students who are eligible for enrolling to the program is 90%. Similarly, it was estimated that 49 out of 50 students who are ineligible for enrolling to the program were correctly classified and 1 student was incorrectly classified. In this case, the correct classification for the students who are ineligible for enrolling to the program is 98%. In the whole group, the percentage of correct classification is 94%, 94 out of 100 students who applied for the program were correctly classified.

When the correct classification percentages in this study were compared with the percentages in Atar's (2012) study with fine art students, the percentages in this study was found to be better. In his study, Atar, calculated the correct classification percentage for the fine art students as 89.5%. The higher correct classification percentages for the music students may be because of the smaller sample size, differences in the distribution of the sub-scores, and the difference in the statistical analysis procedure.

Discussion

This study examined the accuracy of the placement score calculation method that is used by the Student Selection and Placement Center (SSPC) to place students into music teacher education programs in Turkey. Also it examined the contribution of each sub-score in the prediction of the placement scores and in discriminating between the candidates who were eligible to be placed in the program and those who were not. Similar to Atar's (2012) finding it has been found that students who were not placed in the Music Teacher Education Program were classified more accurately. This indicates that candidates who could be placed in the Music Teacher Education Program are more negatively affected by the current student selection method used by SSPC.

It was found that the real effect of the sub-scores on the placement score was different from the ones indicated on SSPC guidelines. According to the SSPC guidelines Special Aptitude Test Score (SATS) effects the placement score the most followed by the effect of the Higher Education Entrance Test Score (HEETS), and Middle Weighted School Achievement Score (WMSAS), respectively. However, HEETS was found to be the main determinant of the placement score in this study followed by SATS and WMSAS, respectively. This finding supports the findings of other studies in that compared to students' SATS, HEETS contribute more to students' placement scores (Altınkurt, 2006; Atak Yayla, 2006; Atar, 2012; Ece & Sazak, 2006a; Ünver, 2003). Atar, for instance, found that HEETS had effected students' placement score the most and stated that it was due differences in the scales of the sub-scores.

Finally, there are many studies in the literature that examined the problems faced in the selection of students in the programs that require special aptitudes. One of the common findings of these studies is that some of the students who are enrolled in these programs are far from meeting the expectations of faculty in these programs. In this regard, it is important that the guidelines that are specified by SSPC for the selection of students into these programs are strictly followed. Otherwise student profiles in these programs would change in time and this would cause many other problems.

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