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Discrimination level of students' ratio, number of students per faculty member and article scores indicators according to place of Turkish universities in international ranking systems

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The aim of this research is to determine classification in which the level of accuracy in Turkish universities rankings is detected by the international assessments according to the independent variables PhD students ratio, the number of students per faculty member and the article scores. The data of research were obtained from University Ranking by Academic Performance (URAP) in Turkey. The data were divided into three groups to international university ranking the top 500 (group A), 500 to 1000 (group B), and 1000 and 1500 (group C). Discriminant analysis was used to analyze the data. According to the findings of the study "PhD students' ratio" is variable to distinguish groups of universities who have contributed the most variable. Then "article score" and the last "the number of students per faculty member" are seen. Classification results are analyzed, a total of 10 universities in the A group, 9 (90%), a total of 15 universities in the B group, 10 (66.7%) and, finally, a total of 26 universities in the C group and 19 (73.1%) were classified correctly. The total percentage of correct classification of discriminant function is 74.5%. Classification accuracy of the discriminant analysis is higher than chance criterion (33 %). In other words, function obtained from the research makes a more accurate classification than change classification.

Key words: University ranking, Turkish higher education, PhD students' ratio, article scores, discriminant analysis.

INTRODUCTION

We can see that, in the first sentence of many books, scientific studies or articles begin with expression of globalization. Hence, as we feel the presence of the social life of globalization, it is said that a phenomenon is used to make sense of new concepts or approaches that impart on the social sciences. The phenomenon of globalization should be considered as an external frame because of the subject of this research is universities and need to compare universities national and international scale. University is a tool of globalization itself. On the

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other hand, it is generally agreed that globalization is the result of the compression of time and space that has occurred since advanced technology allows the instantaneous sharing of information around the world (Currie, 2003). Globalization and technological developments brought about by it changes taking place on the sharing of knowledge that individuals are required to be more careful in the subject requested service. In this case, the pragmatic philosophy will influence people or students selection of universities that will prepare themselves for the good life, provide the greatest benefit for her/himself after graduation; cost-benefit ratio is high and public high awareness in society. Therefore, globalization and pragmatist philosophy as the theoretical background of this research has been the subject of university ranking system

All over the world, educational systems of countries are expanding increasingly. Information age needs highly educated humans who have variety of qualifications. Students, businesses, and governments are requesting educational institutions to increase their technological infrastructure for teaching and research (Slaughter, 1990). Nowadays, the rapid technological and scientific advances have especially increased the demand for higher education institutions. The massification of higher education has been the rise of the knowledge economy and its globalization, a phenomenon that would not have been possible without a steady and substantial increase of highly educated and skilled labour (Meek, 2002). The high value assigned by individuals to their education has extensively increased the demand for information about the quality of universities and higher education systems (Docampo, 2012).

Each passing day more people have higher education graduates are entering the labor market. This situation leads to demand more qualifications by employers from people apply for a job. Students, as a customer, want to choose the correct university which can provide them better job opportunities. The rapidity of change in both student population and information production heightens this need for change in higher education (Stewart, 1997). Growth in supply and demand of higher education has increased the demands for information about the higher education service and this case has enabled to develop university ranking systems or league tables in many countries of the world (Dill and Soo, 2005). Ranking list and league tables also denominate values, allowing for a revaluing of the universities (Mittelman, 2013: 238). Therefore, the university ranking systems or league tables have become increasingly important.

Before discussing university ranking systems, it would be useful to recognize its historical development process. To examine the historical development it is necessary to recognize Carnegie Foundation, which came into existence in 1905 (Obasi, 2008). This Foundation was established as a center of independent educational research and policies. In 1967, commission was established in order to generate solutions for the problems in the American Higher Education System by Carnegie Foundation. In 1970, the Commission developed its first classification scheme of universities 'to support its program of research and policy analysis' (Obasi, 2008), which has been revised in 1976, 1897, 1994, 2000, and 2005 (Toutkoushian and Webber, 2011: 135). In subsequent years, the foundation has developed criteria to evaluate the quality used to rank universities. In other words, the criteria established to determine the quality of universities in later years was used to rank universities. As a result, the ranking of universities today, the Carnegie Foundation's efforts are based on nearly half a century (Obasi, 2006). Although Carnegie Foundation studies are the basic of university ranking systems, the structure of known today, university rankings began in 1983, when the US News and World report started to publish the annual America's best colleges review (Lukman et al., 2010).

Significantly increased in recent years, being more preferred university for students and qualified faculties and to increase their funds and income, universities are competing with each others in order to be better place in ranking systems published in journals (Grewal et al., 2008). With simple words, universities and institutions are competing with each other in order to be more preferred. If they wish to be at high rank in ranking systems, universities need to lead in this competition. However, university ranking systems that enable comparisons with other universities have many different purposes. To understand the goals of ranking systems can be beneficial to all higher education stakeholders. The goals of the university ranking systems may be summarized as follows (Jesensek, 2006):

1. guiding students for better choice to higher education programs,
2. evaluating the place of universities in the international higher education market,
3. directing universities at national levels on market orientation,
4. providing safe and affirmative competition for students, faculties, and the funders of universities and other higher education stakeholders

Global rankings seem to be more successful for allocating limited state resources among universities, basically because these rankings tend to be recognized as 'objective', or at least 'external' (Yonezawa, 2010). The university ranking which includes various purposes is created by taking advantage of the many varieties. The proportion of graduate and undergraduate students, financial incomes and expenses, number and quality of the staff, student experiences, learning outcomes, research metrics, and academic reputation in the community are some categories of indicators that are used to classify universities (İsmail, 2010). Furthermore,

Table 1. Main global rankings and date of origins

Main Global Ranking	Date of origin
Academic Ranking of World Universities	2003
Webometrics	2003
World University Ranking	2004-2009
Performance Ranking of Scientific Papers for Research Universities	2007
Leiden Ranking	2008
World's Best Colleges and Universities	2008
SCImago Institutional Rankings	2009
Global University Rankings, RatER	2009
Top University Ranking	2010
World University Ranking	2010
U-Multirank	2011

Source: Hazelkorn (2013).

each category may have hundreds of different indicators. The methods used in the ranking systems are great differences with each others, as well as the number and nature of indicators employed (Enserik, 2007). Also, ranking systems are in need of specific definition and quality criteria for evaluating the performance of a university (Lukman et al., 2010). Due to the presence of thousands of different indicators, ranking universities to compare them with each other is quite difficult. So that, which criteria will be used to make the sort of decision-making and to determine the weights of the criteria scores affect the validity of the ranking system.

University ranking systems have been implemented a long time in the Anglo-Saxon countries at national level (Erkkilâ, 2013: 5). Some of the most well-known international ranking schemes include the Academic Ranking of World Universities by Shanghai Jiao Tong University (which was first published in 2003), the Times Higher Education Supplement-QS World University ranking (Times QS ranking- followed Shanghai by the publication ranking in 2004), the Leiden University ranking, and the Taiwan Higher Education and the Accreditation Council ranking (Shin et al., 2011; Li, Shankar and Tang, 2011). Main global rankings and date of origins are presented in Table 1.

As shown in Table 1, the number of global ranking systems has increased rapidly since 2003. Ranking universities which are quite difficult to perform is beneficial in many respects. First of all university ranking systems are important tools to prove universities' academic reputation, increase the awareness and build brand value of higher education institutions. Students and their families, especially international students use rankings to choose universities for admission. Students and their families can obtain information about transnational universities have led to increased students' mobility. Feeling themselves obliged to choose a university is a crucial decision for their future trajectories made under imperfect information regarding their own ability, university quality and the corresponding returns to a degree (Horstschräer, 2012). It reveals the need for students to be more careful choosing the correct university for themselves. As a support to the solution of this problem, ranking tables offer information about the quality and other characteristics of higher education institutions, influencing the students' choice (Lukman et al., 2010). As well as university ranking systems influence students' university choice, provide regular information to other education stakeholders.

Government, industry and businesses use rankings for deciding funding, sponsorship and employment. Political leaders can use ranking results to frame education policies in the country. University administrators can use these rankings as evidence to seek support and funding etc. (İsmail, 2010). In this regard, university ranking system has contributed to the rationality of the decision about universities. It is believed that located in the upper ranks of the university ranking system will provide higher social returns. Therefore, it is necessary to transfer greater resources to this university. Given their importance, key performance indices are significant factors in promoting quality improvement and goal fulfillment (Amiz, 2010). On the other hand, the complexity and diversified viewpoints of higher education functions, performance evaluations of higher education have always been a hot debate topic among educators, managers, and policymakers (Wu et al., 2012). To summarize, university rankings constitute a logical response to that demand, and appear to help students, country officials and the public at large in making sense of a remarkably diverse higher education landscape (Docampo, 2012).

Following these developments, "university rankings" or ''league tables'', a novelty as recently as fifteen years ago, are today a standard feature in most countries with large higher education systems (Usher and Savino, 2007). The rapid increase of university ranking system in recent years and growing public interest can be

interpreted in many ways. The first of these cases is made changes in higher education management practices. As a result of liberal policies, the regulatory role of government is declining to university management and finance. Instead of the mechanisms of the government are efforts to guarantee the quality by emphasis on assessment practices. In other words, university ranking system refers to an aspect of accreditation in higher education. Secondly, universities are expected to be more accountable correspond to public resources used by them. Once and for all, universities increasingly want to be known more in the higher education market to gain an international dimension (Özkan, 2015). In this context, the ranking system has become an important mechanism for raising the university's reputation and image of the national and international level (Hägg and Wedlin, 2013)

University ranking systems come in two varieties: institutional ranking systems and sub-institutional ranking systems. Also they can be basically handled in two subtitles such as national and international ranking systems. National ranking systems evaluate higher education institutions within a country based on national priorities. On the other hand, international ranking systems make comparisons on the basis of more universal indicators. While rankings are a popular method for comparing the relative quality of higher education institutions, there is much confusion and debate over which indicators to use and how to present the information in ranked format (Clark, 2002).

There are currently more than ten lists of world universities ranking system. These are two of the best-known: The Academic Ranking of World Universities (ARWU), commonly known as the Shanghai Ranking; is a publication that was founded and compiled by the Shanghai Jiaotong University to rank universities globally. It is aimed to improving the quality of Chinese universities with ARWU. Also, ARWU was developed for purposes such as recognition and imitation of the best universities practice in the world. Accordingly, the first ranking has been a qualitative description of the factors that contribute to being a great university worldwide. The rankings have been conducted since 2003 and updated annually (Saka and Yaman, 2011). Since 2009, the rankings have been published by the Shanghai Ranking Consultancy. The Shanghai ranking focuses exclusively on research and does not rely on subjective data. All its indicators are open to public scrutiny, since they measure either scientific production or individual excellence recognized by very prestigious awards or by a high number of citations (Docampo, 2012). There is also criticism to the ARWU about results of the Shanghai ranking are irreproducible (Florian, 2007). ARWU ranks universities on a global level as compared to nearly 1,200 institutions of higher education today.

Another best-known ranking system is Webometrics. Webometrics is a large ranking system comparing the academic institutions of higher education on a global level. Webometrics ranks universities not only developed countries several hundred university but also all over the world. Webometrics is (a) a set of quantitative techniques for tracking and evaluating the impact of web sites and online ideas and (b) the information science research field that developed these ideas. Webometrics techniques include link analysis, web mention analysis, blog analysis and search engine evaluation, but from the perspective of digital library evaluation the main method is link analysis (Thelwall, 2013). Webometrics gives incentive to open access to the internet-based system in order to promote the transfer of scientific and cultural knowledge to society by universities. Therefore, the purpose of the system cannot assess universities web addresses by design, usability and the number of visitors. More than in this case It is seen that internet as a reliable mirror of the produce of the university. The Webometrics ranking table differs from the others, including indicators such as number of pages (recovered from four search engines Google, Yahoo, Live Search and Exalead), or the total number of unique external links received (inlinks) by a university site (Lukman et al., 2010). There are significant criticism to Webometrics. Although 'web presence' of universities is important in today's globalized world driven by the forces of information and communication technology, it is not however the most critical measure of institutional success in benchmarking exercises (Obasi, 2008). Out of them, Times Higher Education–QS World University Rankings, The Performance Ranking of Scientific Papers for World Universities, Leiden Ranking and Scimago are some of the best known ranking systems in the world.

The Anglo-Saxon higher education system has always been more competitive than the comparatively homogeneous continental European higher education sector (Horstschräer, 2012). Turkey is located between the developing countries, the formal higher education 35.6% in the process of transition to mass higher education enrollment rate (Tanrıkulu, 2011). The expansion of higher education in the world gained momentum especially after the 1950s like Turkish Higher Education System. Opened rapidly over the past ten years, the total universities number are reached about 184 (CoHE, 2014). Turkish universities league table is important for the college-age population in Turkey and foreign students who prefer Turkey Higher Education Institutions. Consequently, Turkey's ranking of universities that are effective in predicting the correct determination of the variables thought to be important. To the best of our knowledge, there is no such quantitative analysis in the national literature. Thus, it is considered very important to determinate the variables which is related on place of Turkish universities in world ranking.

Purpose of the study

The purpose of study is to determine classification in which the level of accuracy in Turkish universities

Table 2. Indicators and descriptions.

Indicators	Source	Description of Indicator
PhD students' ratio	ÖSYM (2013)	The number of doctoral students of the 2012-2013 academic year/ The total number of students in the same year
The number of students per faculty member	ÖSYM (2013)	The total number of students of the 2012-2013 academic year/ The number of faculty members for the year 2012
Article scores	WoS2	Number of article entering into screening SCI, SSSC and AHCI for the year 2013

rankings detected by the international assessments according to the independent variables PhD students ratio, the number of students per faculty member and the article scores.

For this purpose, the study was expected to answer the following research questions:

1- What are the distribution of independent variables PhD student ratio, number of students per faculty and article scores according to groups of dependent variable?
2- What are the effect of PhD student ratio, number of students per faculty and article scores on group classification?
3- What is the total correct classification percentage of discriminant function?

METHODS

Research model

The research was conducted according to correlational research. In correlational design, the investigators use the correlational statistic to describe and measure the degree of association (or relationship) between two or more variables or sets of scores (Creswell, 2012: 338) that might suggest further investigation using the experimental strategy to determine cause-and-effect relationships (Gravetter and Forzano, 2012: 355). With its ability to predict, correlational research gives the researcher a powerful tool (Goodwin, 2010: 339).

Population and sample

There are 193 higher education institutions in Turkey for from 109 state universities, 76 foundation university and foundation vocational high schools. The majority of these universities are the new university established after the years of 2000. In universities, the first 1500 entrants in the international ranking systems are determined by URAP. In this study, ranking is created by URAP. Due to these reasons, the sample of the research consists of 51 university institution from Higher Education System of Turkey. In this context, all universities in the world universities ranking first in 1500 were the study sample. Therefore, the entire population has been reached. The universities in study were divided into three groups to university ranking the top 500 (group A), 500 to 1000 (group B), and 1000 and 1500 (group C). 10 universities in A group, 15 universities in B group and 26 universities in C group are in sample.

Data collection

The data of research were obtained from University Ranking by Academic Performance Turkey. University Ranking by Academic Performance (URAP) Research Laboratory was established at Informatics Institute of Middle East Technical University in 2009. URAP is primarily focused on the ranking of Turkish universities; it made this ranking based on the data obtained through different international ranking systems for the first year. URAP conducted the national university rankings by creating its own indicators. The indicators that URAP used to create universities ranking in 2014 was used as data. It is shown in Table 2.

Table 2 indicates three indicators as independent variables in the study. First indicator is PhD student's ratio obtained from ÖSYM statistics. It said to be an important variable of the number of doctoral students in the university quality, when thought that there is a positive relationship between PhD training and institutionalization of university history. Second indicator is the number of students per faculty member obtained from likewise ÖSYM statistics. The number of students per faculty ratio is an indicator of the share of teaching resources available for students in tertiary education (Lukman et al., 2010). Student-staff ratio generally provides an overall indication of the effort made by universities to ensure that their students receive more personal provision (Eurydice, 2014). THE-QS, QS and U-Multirank use faculty/student ratio as a proxy for teaching quality (Hazelkorn, 2013). And lastly indicator is article scores obtained from WoS2. Academic publishing performance is an indication of the quality of academic human resources. Therefore the number of articles is an indicator of current scientific knowledge conductivity.

Data analysis

Data were analyzed by discriminant analysis. Discriminant analysis is used to classify cases into values of a categorical dependent (Garson, 2012: 7) and a statistical technique which allows the researcher to study the differences between two or more groups of objects with respect to several variables simultaneously (Klecka, 1980). The goal of discriminant analysis is to predict group membership from a set of predictors (Tabachnick and Fidell, 2001:496). In this study discriminant analysis was performed using three variables as predictors of membership in three groups. The universities were divided into three groups to university ranking the top 500 (group A), 500 to 1000 (group B), and 1000 and 1500 (group C). Predictors were PhD students' ratio, the number of students per faculty member and the article scores. This technique may be useful in the social sciences.

RESULTS

In this section, firstly descriptive statistics then the analysis findings made for the purposes of research is given. Table 3 presents descriptive of scores from independent variables that PhD Student Ratio Number of Students per Faculty and The Article Score.

Table 3. Descriptive statistics of PhD student ratio number of students per faculty and the article scores of groups with university ranking the top 500, 500 to 1000 and 1000 and 1500.

	The location of the university	N	$\bar{x}$	S
PhD Student Ratio	1-500	10	0.65	0.02
	501-1000	15	0.33	0.01
	1001-1500	26	0.17	0.03
Number of Students per Faculty	1-500	10	28.39	4.60
	501-1000	15	33.70	9.43
	1001-1500	26	38.57	10.79
The Article Score	1-500	10	162.39	14.35
	501-1000	15	130.56	16.00
	1001-1500	26	110.67	21.90

Table 4. Eigenvalues.

Function	Eigenvalue	Variance	Canonical Correlation
1	2.468	99.8	.894
2	.006	100	.077

It is seen from Table 3 that A group of universities on the average rate of doctoral students is 0.65, the average of Group B universities is 0.33, the average of Group C universities is 0.17. PhD Student ratio in Group A is higher than those of students in Group B and Group C. Analyzed the number of students per faculty member, the average of Group A universities is 28.39, the average of Group B universities is 33.70, the average of Group C universities is 38.57. The mean score of the article is examined, the average of Group A universities is 162.39, the average of Group B universities is 130.56, the average of Group C universities is 110.67. As shown in, PhD student ratio and the article scores of universities' averages decrease from Group A to Group C. On the other hand, the number of students per faculty member universities' averages increase from Group A to Group C universities.

One should test the assumptions used in discriminant analysis before interpreting this analysis results. For determining of one of the discriminant assumptions homogeneity of variance- covariance matrix should be assessed. Discriminant analysis is very sensitive to heterogeneity of variance-covariance matrices. Before accepting final conclusions for an important study, it is a good idea to review the within-groups variances and correlation matrices. Homoscedasticity is evaluated through scatter plots and corrected by transformation of variables (Poulsen and French, 2008).

The homogeneity of a variance-covariance matrix is assessed using Box-M statistics (Büyüköztürk and Çokluk-Bökeoğlu, 2008; Verma, 2013). Box- M statistics was not significiant. This finding shows that a variance-covariance matrix of groups is homogeneous (Çokluk et al., 2010: 121). Another assumption is data representing a sample from a multivariate normal distribution. The assumption of multivariate normality is scores on predictors are independently and randomly sampled from a population (Tabachnick and Fidell, 2001:462). As a result of the analysis, it is found that the data have normal distribution. The significance value indicates that the data are homogeneous and multivariate normal. This means one can proceed with the discriminant analysis. Eigenvalue, % variance and cumulative % of variance which indicates the proportion of variance explained (Tabachnick and Fidell, 2001:469) as shown in Table 4.

The produced two functions and eigenvalues are analyzed in Table 4. It is seen that eigenvalues for these functions are in the order of 2.468 to 0.06. As seen, .894 canonical correlation functions for the first and the second canonical correlation of .077 are determined as function. An eigenvalue indicates the proportion of variance explained. Although there is a limit on the eigenvalues of 0.40 higher eigenvalues from "good" is considered as (Kalaycı, 2005). However, as in the above Table 3 if there are multiple discriminant functions, the first function has the power of the largest and most important differential. Also other functions continue decreasing importance and power. When examining eigenvalues the first function is highly effective to separate groups.

The greater the canonical correlation coefficient of the relationship between the dependent is variable, the higher the discriminant function groups are. Dependent variable is the square of the canonical correlation

Table 5. Wilks' Lambda Statistics.

Function	Wilks' Lambda	Ki-square	Sd	p
1 to 2	.287	58.730	6	.000
2	.994	.278	2	.870

Table 6. Wilks' Lambda test of equality of group means.

Indicators	Wilks' Lambda	F	Sd_1	Sd_2	p
PhD Student Ratio	.360	42.628	2	48	.000
Number of Students per Faculty	.846	4.378	2	48	.018
The Article Score	.470	27.055	2	48	.000

Table 7. On the standardized discriminant function coefficients.

Indicators	Coefficients
PhD Student Ratio	.744
Number of Students per Faculty	-.086
The Article Score	.512

Table 8. The matrix coefficients of the structure.

Indicators	Coefficients
PhD Student Ratio	.848
Number of Students per Faculty	-.269
The Article Score	.675

coefficient of classification gives the percentage of how much disclosed by the independent variables. Accordingly, the dependent variable be grouped $(.894)^2$=0.80 primary function is explained by the variables forming (Garson, 2008).

Generally, we are only interested in disciriminant functions that discriminate between the groups at a level greater than chance. The procedure for doing this is to determine if all the discriminant functions taken together are significant (Cramer, 2003: 209). Testing the significance of the discriminant function Wilks' Lambda statistics are given in Table 5.

The value of Wilks' lambda provides the proportion of total variability not explained by discriminant model (Verma, 2013:394). Table 4 significance of the test are the eigenvalues of the discriminant functions. Wilks' Lambda value relates to the model, and discriminant function is used to determine the number of statistically significant. Wilks' Lambda is the ratio of within-groups sums of squares to the total sums of squares. A small lambda indicates that group means appear to differ. The associated significance value indicates whether the difference is significant. Here, the Lambda of .287 has a significant value. Because of that the group means appear to differ. In other words, Wilks' lambda indicates that first discriminant function is significant and that groups means appear to differ.

According to Table 5, the first and second functions are given in the table when testing the first test; the second test is only the second function test. According to this, in Table 5 together with the two functions Wilks' Lambda statistics, chi-square value of [$X^2_{(6)}$ = 58.730; p<.01] is significant. This finding suggests that the function has a high strength of allocation. In other words, the function creates independent (predictor) variables to distinguish groups of dependent variable having a significant effect.

In Table 6, levels of significance of each independent variable are examined, PhD Student Ratio [F(2, 48) = 42.628, p<.01], Number of Students per Faculty [F(2, 48) = 4.378, p<.01] and The Article Score [F(2, 48) = 27.055, p<.01] appears to be no significant differences between the groups in the average of all. In other words, to separate groups of universities, all the variables included in the analysis have a significant effect (p<.01). On the standardized discriminant function coefficients are presented in Table 7.

As it is clear in Table 7, "PhD Student ratio (.744)" is the most contributive independent variable to group classification. It is seen that "the article score (.512)" is ranked as second, and "the number of students per faculty member (- .086)" is the third. The matrix coefficients of the structure are presented in Table 8.

The structure coefficients of the matrix presented in Table 8 are analyzed; it is clearly seen that "PhD Student Ratio (.848)" has the highest correlation with the discriminant function, and "Number of Students per Faculty (- .269)" has the lowest correlation. On the other hand, while "PhD Student Ratio" and "The Article Score" have positive correlation values, "The Number of Students per Faculty Member" has a negative correlation.

Classification results obtained from discriminant analysis are presented in Table 9.

Table 9. The classification results.

	A Group Universities		B Group Universities		C Group Universities		Total	
	F	%	F	%	f	%	f	%
A Group Uni.	9	90.0	1	10.0	0	-	10	100.0
B Group Uni.	1	6.7	10	66.7	4	26.7	15	100.0
C Group Uni.	0	-	7	26.9	19	73.1	26	100.0

Total Percentage of correct classification = 74.5%.

Classification results are simple summary of number and percent of subjects classified correctly and incorrectly. The 'leave-one out classification' is a cross-validation method, of which the results are also presented. Analyzing the results of the classification presented in Tables 8, 9 of 10 A group universities (90%), 10 of 15 B group universities (66.7%) and 19 of 26 C group universities (73.1%) are classified correctly. The total correct classification percentage of discriminant function is 74.5%.

If discriminant function analysis is effective for a set of data, the classification table of correct and incorrect estimate will come up with a high percentage (Garson, 2012: 7). Due to their position in world universities ranking, the universities included in research are allocated in three groups. Therefore, the ratio of finding in which group a university is by chance is 33%. The total correct classification percentage of discriminant function is 74.5%, and it is higher than chance criteria.

DISCUSSION AND CONCLUSION

The aim of this research is to determine classification in which the level of accuracy in Turkish universities rankings is detected by the international assessments according to the independent variables PhD students' ratio, the number of students per faculty member and the article scores. The total accurate classification of the discriminant function was 74.5%. As a result of the research, all the variables (PhD students' ratio, number of students per faculty and the article score) included in the analysis to separate groups of universities have a significant effect. According to this finding, the world ranking place of Turkish higher education institutions should be paid attention in terms of these variables can be said to raise. PhD Student ratio" is the most contributive independent variable to group classification; "The article score" is ranked as second, and "the number of students per faculty member" is the third.

The "PhD Student ratio" is the most important variable for ranking university. If it is considered that the annual number of doctoral graduates in Turkey is relatively low compared with other developed countries (CoHE, 2014); it can be said that Turkey needs to develop policies to increase the number of doctoral graduates. It is possible to say that there is a positive relationship between doctoral education and the institutionalization history of the university. In other words, PhD student ratio is an indicator of the university's research capacity. Thus, policies should be developed to encourage research for Turkish Higher Education Institutions. In this sense, having a research-centered body can move the universities upwards in world university rankings.

Universities specializing in specific programs should be encouraged to further accept doctoral students. Waldinger (2010) says that faculty quality is a very important determinant of short- and long-run PhD student outcomes. Therefore, doctoral students determine the quality of the faculty, and the university's doctoral student ratio is universal indicator of quality.

In fact, the criteria of opening up the program to have a PhD in itself is a quality indicator. Doctoral programmes, which started to spread in the second half of the 20th century, have been established by and large among existing top universities (Ogawa, 2002). Therefore, the universities which have a rooted history are expected to be at the top of ranking lists. On the contrary of world universities, Turkish universities relatively have recent history. According to the 2012-2013 academic year data the number of doctoral students in Turkey is about 60,000 (ÖSYM, 2013). Turkish Higher Education system has a group of students. This number seems inadequate, and PhD student ratio is expected to increase in the future. Therefore, it can be said that Turkish universities placed in the world ranking could be better in the future.

Article score is second variable to distinguish groups of universities for this research. As a result of this, the number of articles produced by faculty members of universities affects the location of the university in world ranking list. In this mean, academic staff should be evaluated according to the performance. These performance criteria must be included in academic publications. When compared with other countries in terms of Turkey's population and economic size about academic publishing performance, it is understood that is not where it should be (SCImago, 2014). Turkey, having a continuously growing university system, is expected to improve its performance with the number of publications and citations in the coming years. Preparing publications by academics are associated with factors such as academics adequate research funding and research time. This situation is closely associated with factors such as

the financing of research, course load on the faculty, time allocated to research, the existence of different incentive structures on weight on research activities (CoHE, 2014).

Contrary to what was predicted, "the number of students per faculty member" is the last independent variable to group classification. Rankings concentrate mainly on research outcomes of leading research universities and the quality of teaching plays a minor role in them (Berndtson, 2013: 180). However, the small number of students is an important variable. A smaller number of students per faculty are viewed as equivalent to better teaching on the basis that small classes create the optimum learning environment (Hazelkorn, 2013). According to data from the year 2011,the number of students per faculty member is quite above average which is 15.6 of OECD countries in Turkey Although the increase in teaching staff in Turkey, the rapid increase in the number of students has resulted in a higher ratio. As the number of students per faculty is low, faculty can make much more and effective researches. This case enables faculty to educate more PhD students.

With university rankings gaining both in popularity and influence, universities develop strategies to improve their rankings (Grewal et al., 2008). The poor ranking performance of a country's universities may show deficient human capital accumulation and knowledge creation in need in the future (Hazelkorn, 2013). On the other hand, university ranking provides data to student for choosing the college, university administrators for better leadership, government and industry for investing, stakeholder for quality of the educational product. For this reason, by taking the determining variables that came up in the research into account, Turkish universities should aim the top ranks in the world university ranks, and should share their position in the ranking with the public permanently.

Recommendations for future research

In recent years, there have been rapid quantitative improvements in Turkish Higher Education. These quantitative developments are needed to support qualitative applications. To accomplish this, there should be scientific evidence and international different applications. In this context, it is suggested international comparative study may contribute to qualitative development of higher education. On the other hand, research is reproducible, different from variables considered under this study, with more qualitative data such as the quality of teaching, student and graduate satisfaction, employability. To bring a different approach, researchers can do a study, taking into account local culture, to determine the recognition of university ranking system by the public.

Conflict of Interests

The author has not declared any conflicts of interest.

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