

## Efficiency of Colleges at Prince Sattam Bin Abdulaziz University, Al Kharj (A Comparative Study using Data Envelopment Analysis)

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**Abstract:** The well-organized university is considered as one of the main mechanisms of effective and sustainable ways to develop nation and human in all over the globe. In Saudi Arabia's context, there are limited research works regarding this field. The present study is based on primary and secondary data. This study completed into two phases. In the first phase, the study shown the application of Data Envelopment Analysis (DEA) to evaluate the efficiency of 20 colleges at Prince Sattam bin Abdulaziz University (PSAU) which is based on secondary data. The secondary data was taken from the University Statistical Department. In this study, the enrolled students and the teaching staff are the input variables and total number of graduates and total number of researches are output variables. In this phase, non-parametric approach (DEA); the scale efficiency measurement (output oriented) is used to estimate the efficiency of colleges for the session of 2014-15 and 2015-16. Also, the GAP analysis has been used to compare the efficiency of colleges for the both session. The second phase is based on primary data. The close ended questionnaire techniques used for getting information of parent's opinion regarding service quality of the university. After completion of data collection; the parametric approach have been used for data analyzing. The study provides an insight to assists the scholars and administrators in eliminating the inadequacies. Also, the study provides suggestions and recommendations to University Administrations which will help to identify the factors which stand in the way of being efficient university.

**Key words:** DEA, colleges, relative efficiency, PSAU, Al Kharj, effective

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### INTRODUCTION

University plays an important role in building the nation and developing the community. This research has been conducted to measure the efficiency of colleges at Prince Sattam bin Abdulaziz University, Al Kharj, Kingdom of Saudi Arabia. The findings of this research, worked as a guideline to improve the efficiency of the colleges.

Tzeremes and Halkos (2010) illustrated the new developments in analysis of efficiency. Shayea and Battal (2013) analyzed the efficiency of Faculties of Qassim University. Agha *et al.* (2011) evaluated the relative technical efficiencies of departments at the Islamic University in Gaza. Johnes (2006a, b) provided an overview of methods which might be used to assess efficiency in higher education.

Horn (2014) shown a method of creating a proxy for measuring efficiency which was defined as the difference between actual and expected educational expenditures. Aziz *et al.* (2013) evaluated the relative

efficiency of departments of a public university in Malaysia by using data envelopment analysis. Selima and Bursalioglu (2013) developed a DEA (2 stage) for determining impact factors of 51 public universities efficiency in Turkey. Also, many researches have been done in this area.

### MATERIALS AND METHODS

Charnes *et al.* (1978) developed a model for estimating the technical efficiency under assumption of Constant Return to Scale (CRS) and termed as  $TE_{CRS}$ . Also, Banker *et al.* (1984) developed a model for evaluating the technical efficiency under assumption of Variable Return to Scale (VRS) and termed as  $TE_{VRS}$ . According to the both models a DMU is efficient if  $TE = 1$ . If  $TE < 1$ , it means a DMU is inefficient. Scale Efficiency (SE) measurements computed by the following relationship:

$$SE = TE_{CRS} / TE_{VRS}$$

Where:

$TE_{CRS}$  = Treated as total technical efficiency

$TE_{VRS}$  = Treated as pure technical efficiency

If  $SE = 1$ , then a DMU is scale efficient, it means combination of inputs and outputs is efficient under CRS and VRS. If  $SE < 1$  then combination of inputs and outputs is inefficient under CRS and VRS.

**Data:** The sample, used in this study, covers twenty colleges of the university. The data for this study was collected for the year 2014-2015 and 2015-2016 from University Statistics Department. In this research, we used DEA Software (DEAOS) to calculate the efficiency scores of all colleges based on scale efficiency measurement (output oriented).

Further, satisfaction of parents regarding quality of the college measured by 22 statements. The five points Likert scale used in this questionnaire ranging as very dissatisfied, generally dissatisfied, generally satisfied, very satisfied and don't know. The statistical software Excel 2010 and SPSS Version 20 used to data analysis.

## RESULTS AND DISCUSSION

Table 1, Fig. 1 and 2 evidently depict that the colleges achieved coefficient scores equal to 100% were

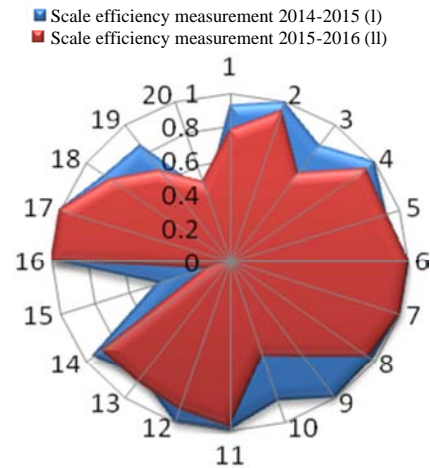


Fig. 1: Scale efficiency measurement for two sessions of 2014-2015 and 2015-2016

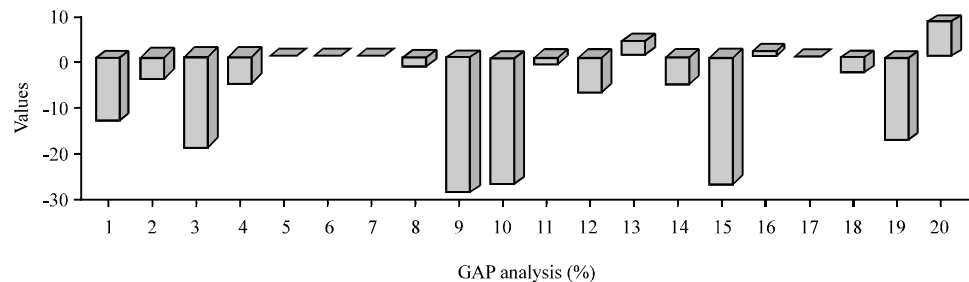


Fig. 2: GAP analysis for two sessions of 2014-2015 and 2015-2016

Table 1: Gap analysis

Colleges	DMUs	Scale efficiency measurement		GAP analysis = (II)-(I)	GAP analysis (%)
		2014-2015 (I)	2015-2016 (II)		
College of Education, Al Kharj	1	0.921	0.78	-0.141	-14
College of Business Administration, Al Kharj	2	0.989	0.94	-0.049	-5
College of Science and Humanities, Al Kharj	3	0.849	0.65	-0.199	-20
Community College, Al Kharj	4	1.000	0.94	-0.060	-6
College of Applied Medical Science, Al kharj	5	0.919	0.92	0.001	0
College of Pharmacy	6	1.000	1.00	0.000	0
College of Engineering and Computer Science, Al kharj	7	0.997	1.00	0.003	0
College of Engineering, Al Kharj	8	0.984	0.96	-0.024	-2
Medical College	9	1.000	0.70	-0.300	-30
Dental College	10	0.870	0.59	-0.280	-28
College of Education, Al Delam	11	0.998	0.98	-0.018	-2
College of Science and Humanities, Huta	12	1.000	0.92	-0.080	-8
College of Business Administration, Huta	13	0.845	0.88	0.035	4
College of Science and Humanities, Aflaj	14	0.954	0.89	-0.064	-4
Community College, Aflaj	15	0.430	0.15	-0.280	-28
College of Science and Humanities, Al Sulel	16	0.987	1.00	0.013	1
College of education, Wadi Al Dawasir	17	1.000	1.00	0.000	0
College of Arts and Science, Wadi Al Dawasir	18	0.867	0.83	-0.037	-4
College of Engineering, Wadi Al Dawasir	19	0.852	0.67	-0.182	-18
College of Applied Medical Science, Wadi Al Dawasir	20	0.425	0.50	0.075	8

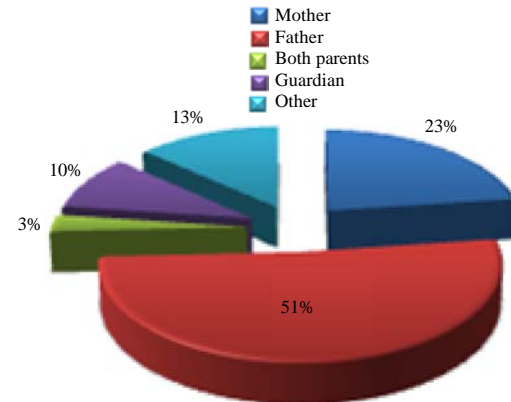
**Table 2: Demographics data of parents/guardians**

Demographics	Frequencies	Percentage
<b>The questionnaire filled by</b>		
Mother	24	22.9
Father	54	51.4
Both parents	3	2.9
Guardian	10	9.5
Other	14	13.3
<b>Year of study of the child in the college</b>		
1st	3	2.9
2nd	43	41.0
3rd	44	41.9
4th	9	8.6
Other	6	5.7
<b>The highest qualification of the parents</b>		
Elementary school	10	9.5
High school	18	17.1
College	45	42.9
Graduate degree	28	26.7
PhD	4	3.8
<b>The age of parents/guardians (years)</b>		
40-50	25	23.8
50-60	30	28.6
60-70	49	46.7
70-80	1	1.0
≥80	0	0.0
<b>The occupation of parents/guardians</b>		
Business	8	7.6
Government job	68	64.8
Private job	5	4.8
Farming	2	1.9
Other	22	21.0

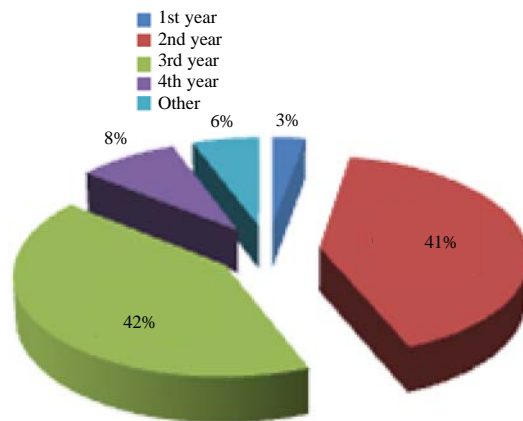
considered as well-organized. The results showed that out of 20 colleges 5 colleges were identified as efficient during the session 2014-15 as well as 4 colleges were identified as efficient during the session 2015-16. It is evident from the analysis that maximum number of the colleges existed in the range between 90-100% scores during both sessions. It is revealed that some colleges are inefficient during both sessions. From the analysis it is also revealed that the >6 colleges decreased in their efficiency in the range between 14-30% scores during the session 2015-16 as compared to session 2014-15 (Table 1).

The afore mentioned table and figures illustrates that the most of the questionnaire were filled by fathers and majority of the respondents are having the college level qualification. Also, most of the respondents were of age group between 50-60 and 60-70. It is evident from the analysis that most respondents were from government employees (Table 2 and Fig. 3-7).

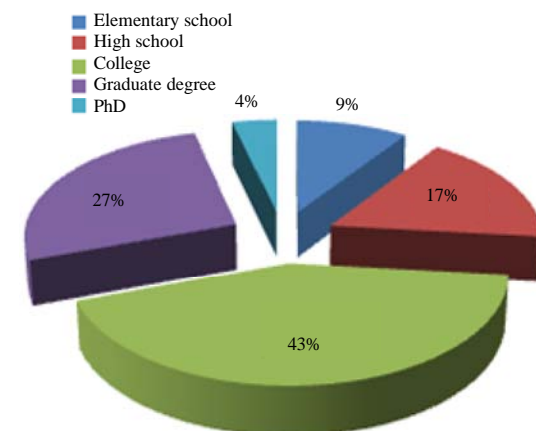
Table 3 and Fig. 8 evidently depict that the most of the respondents are satisfied with the overall quality of the college and point number two. It is also concluded that the most of the respondents are satisfied with the facilities of quality of academic advising, academic helps, undergraduate research opportunities and contact with faculty members. However, few respondents are dissatisfied with the facilities of student housing.



**Fig. 3: Questionnaire filled by**



**Fig. 4: Year of study of the student**



**Fig. 5: Qualification of the parents**

It is also concluded that the most of the respondents are satisfied with the facilities of career counseling and placement, security in the campus, psychological

counseling services and financial aid office for students but few respondents are not satisfied with the facilities like medical/health services and financial award for distinguished students.

Also, it is evident from the analysis that the most of the respondents are satisfied with the facilities of social

life on campus, community development programs in campus, child's safety in campus, intellectual atmosphere outside the classroom, extent of ethnic and racial diversity and location of the college but some respondents are not satisfied with point number fifteen.

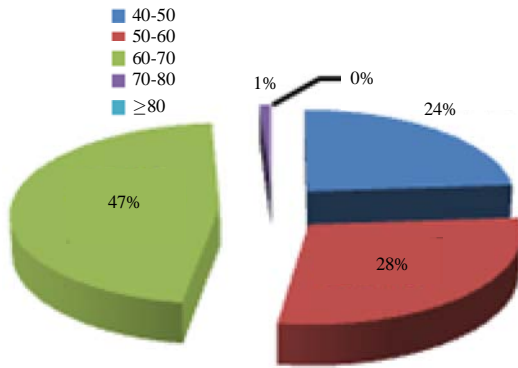


Fig. 6: Age of parents (years)

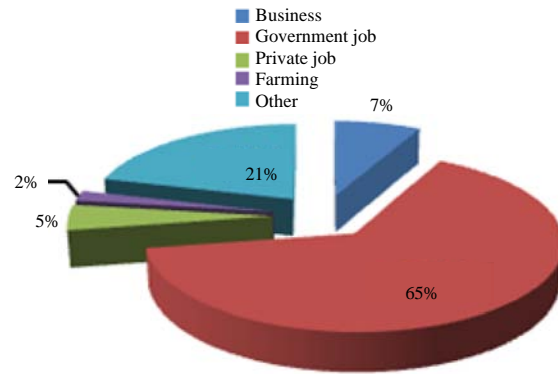


Fig. 7: Occupation of parents

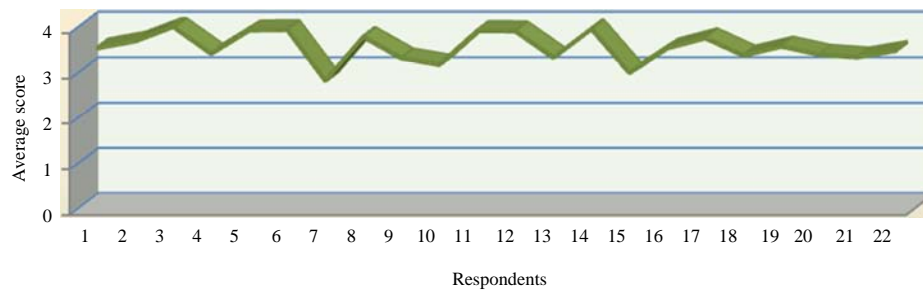


Fig. 8: Average score of respondents

Table 3: Satisfaction of parents towards service quality

Statements	Mean	SD	Range	Min.	Max.
Overall quality of the college	3.53	0.94	4	1	5
Emphasis on undergraduate education	3.69	0.80	4	1	5
Quality of academic advising	4.00	1.29	4	1	5
Academic helps	3.41	1.26	4	1	5
Undergraduate research opportunities	3.92	1.39	4	1	5
Contact with faculty	3.93	1.09	4	1	5
Student housing	2.82	1.59	4	1	5
Career counseling and placement	3.78	1.29	4	1	5
Security in the campus	3.31	1.15	4	1	5
Medical/health services	3.17	1.38	4	1	5
Psychological counseling services	3.91	1.37	4	1	5
Financial aid office for students	3.90	1.32	4	1	5
Financial award for distinguished students	3.32	1.34	4	1	5
Financial services (bursar, student accounts, etc.,)	3.95	1.15	4	1	5
The administration's responsiveness to parent concerns	2.99	1.50	4	1	5
Social life on campus	3.53	1.19	4	1	5
Community development programs in campus	3.75	1.25	4	1	5
Your child's safety in campus	3.37	0.99	4	1	5
Intellectual atmosphere outside the classroom	3.57	1.28	4	1	5
Extent of ethnic and racial diversity	3.39	1.14	4	1	5
Location of the college	3.33	0.95	4	1	5
Infrastructure of the college	3.48	1.26	4	1	5

## CONCLUSION

The Ministry of Education, Kingdom of Saudi Arabia is making all efforts towards the growth of the Nation regarding education and producing the best qualified cadres who can contribute to the development of the country and can compete successfully in this era of the competitive environment.

In this study, DEA techniques are used to evaluate the efficiency of 20 colleges at Prince Sattam bin Abdulaziz University for the academic year 2014-2015 and 2015-2016. It is revealed that the growth rate decrease in efficiency score in 2015-2016 compared to the session 2014-2015 in few decision making units.

Also, it reveals that most of the colleges either efficient or closer to efficient during the both sessions in term of scale efficiency measurement (output oriented) models and we conclude that the decision making units are efficient in consuming their resources to produce all the defined outputs. The efficiency scores indicate that which college needs improvement.

From the analysis, it is evident that the some decision making units are inefficient during the both sessions. Since, some colleges are inefficient, the university administration is advised to be focused on them and develop the strategies to minimize their inadequacies. Despite the PSAU is a recently established university, it is growing and developing very fast. From the analysis, it was observed that the PSAU administrators are capable to identify the colleges that are inefficient in utilizing their resources. Also, it is recommended to reallocation of resources as it can increase the average efficiency score of the colleges. Overall, we conclude that PSAU is growing rapidly in terms of production of graduates, teaching excellency, scientific research, efficiency of employees and infrastructure.

## RECOMMENDATIONS

It is worth mentioning that Price Sattam bin Abdulaziz University, Al Kharj is a new established University but in spite of this, it is growing rapidly in terms of education, research and community services which is evident from the analysis.

The present research makes some important recommendations which will help the University Administrators to develop the strategies to improve the efficiency and quality of the colleges existed in the Prince Sattam bin Abdulaziz University, Al Kharj. The recommendations are made in the light of analysis as: it is recommended to give more emphasize on undergraduate education as well as there is need to introduce PG and Doctorate courses at every college. It is strongly

recommended to established a scientific research committee at every college for maintaining the record of scientific publication as well as motivating and appreciating the researchers.

It is strongly recommended to University Administration for maintaining the sanctity of the transparency and more focus on teaching, research and services. Since, the student's housing in the campus is of vital importance for any university as it helps the students to save time and focus more on study instead of wasting time in travelling from their residence to the university. Therefore, it is strongly recommended to provide the facilities of student's housing in the campus.

The guardian/parents of students have important role to play in taking care of their children in terms of developing their ethical values as well as providing peaceful environment so that their attention cannot be detracted and they can concentrate on their study. The present study recommends that there should be more meetings of parents/guardians with the college administration as well as faculty members with the aim to listen to their concerns and grievances and making all efforts to address them.

Provide career counselors who can offer the students and advises latest information on the educational and career opportunities including industrial visits and summer trainings. Also, it is recommended to update and more focus on the facilities of security in the campus, medical/health services, psychological counseling services, Financial aid office for students, financial award for distinguished students, financial services (bursar, student accounts, etc.) community development programs in campus, intellectual atmosphere outside the classrooms, extent of ethnic and racial diversity, location of the college and infrastructure of the college.

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