Entry qualifications of students as predictors of academic performance in various degree programs in distance education setting in Pakistan

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Abstract

Academic performance of students has always been the area of concern for educational institutions as it is a key indicator of institutional quality. In order to have a better quality output the higher education institutions set some admission criteria such as scores on specified international standardized tests, previous academic qualifications, and admission tests of students or a combination of such scores. Virtual University of Pakistan (VU) is a technology-based distance learning institution that facilitates students who are unable to attend traditional institutions of higher education for a variety of reasons. It was of interest to the researchers to study the entry qualifications of students i.e. the admission criteria, as predictor of their academic performance in various degree programs at VU. For that purpose, the data of 5825 graduates in different two years masters programs in 2015-16 were taken as sample. The entry qualifications of students, and cumulative scores of their previous academic qualifications were taken as predictors of their performance i.e. cumulative grade point average (CGPA,) in relevant degree program. Descriptive (range, percentage) and inferential (pearson r, multiple regression) statistics were applied after grouping the students into low, average and high achievers on cumulative scores as well as entry qualification scores. The results showed significant differences in the predictions and their implications are useful for policy makers and relevant departments of the university as well as for other distance learning educational institutions.

Keywords: Entry qualifications, academic performance, distance education, cumulative scores, Pakistan

Introduction

Quality of the graduates of an educational institution including universities is considered the most important indicator of its quality. On the basis of systems approach, input and output model, it is believed that better quality input students will perform better in terms of learning and achievement. Therefore, universities lay stress on taking those students who could perform better in relevant degree programs. For that purpose universities set certain criteria of admissions. Most common are the aptitude tests, standardized tests, and entry qualification scores, aggregate of previous academic performance scores, interviews or a combination of any or some of these. Purpose of all these criteria is to get a good input in the form students who could perform better. Teacher educators and researchers across the globe have been keen to identify the factors that predict the achievement of the students in different degree programs (e.g. see, Durotolu, 1994; Hijazi & Naqvi, 2006; Jayanthi, Balakrishnan, Ching, Abdul-Latif, & Nasirudeen, 2014; and Kasworm & Pike, 1994).

Many researchers have found significant positive correlation between the school academic performance/entry qualification and tertiary level scores of students. For example, Ogbonnaya, Okpuruka, Iheanacho, and Ndu (2014) studied the correlation between the entry qualification and academic performance of university students and found a positive significant relationship between the two scores. Kapenga and Amani (2016) studied the correlation of entry qualifications and students’ academic performance in undergraduate study programs in Tanzania and found a significant positive
correlation between the two. Chathuranga (2016) studied the previous academic qualification scores of students and their university Cumulative Grade Point Average (CGPA) in Sri Lankan context. This study did not find any correlation between the scores of primary level and university CGPA but it did find a significant positive correlation between O-level and A-level examination scores with university CGPA. Cyrenne and Chan (2010) studied the high school grades of students and their university performance in one university in Canada and found significant correlation between the two variables. Zwick (2013) in education testing service (ETS) report on high school grades and SAT tests in predicting students’ achievement at tertiary level, illustrated three large scale studies carried out in US. It was noticed that high school grade point average scores of students were predicting ($R^2$) 13% to 21% while SAT scores of students were predicting only 12-13% of their achievement at tertiary level. Combining the two types of tests i.e. high school grades and SAT scores showed prediction value of 21%-22%.

There are studies that have found low correlation values between entry qualification and university academic performance and hence low predictions from entry qualification scores. For example, Obioma and Salau (2007) have found that the entry qualifications of students measured by their grades from West African Examination Council (WAEC), National Examination Council (NECO) and Joint Admissions and Matriculation Board (JAMB) examinations had low correlation with their first and final year’s performance in the universities. House and Johnson (2002) studied the relationship of GRE scores with the students’ achievement from different disciplines (degree programs) in university and found significant correlation but value of correlation coefficient to be ranging from weak to medium strength for different degrees. The students who were high on GRE scores were also high on university scores.

Agbo (2003) conducted a study on different science subjects at university level and identified low correlation between entry qualifications and students’ performance. Okonkwo (2000) discussed that there is often inconsistency in entry point and achievement score of students in tertiary institutions. He pointed out that this made it difficult to predict final performance using entry qualification grades.

Taking a sample from on-campus and distance teaching education students Wambugu and Emeke (2016) reported differences in the correlations and predictions between the entry qualification scores and student achievement scores in three different science subjects at undergraduate level. It was noted that on-campus students were performing better than distance education students in one subject only. This high performance in one subject was due to high entry qualification score of on-campus students than distance learning students. In the other two subjects there was no significant difference in the performance of on-campus and distance learning students. That study also observed slightly positive and significant but low correlation between the entry qualifications and academic achievements of both student types. This showed that previous/entry academic scores are predictors of tertiary level performance for both on-campus and distance learning students.

Ali, Haider, Munir, Khan, and Ahmed (2013) studied the factors contributing towards academic performance of students at a Pakistani university. They did not find any correlation between the previous academic scores and degree qualification scores. However, they found the role of demographic variables as significant contributors toward academic performance.

A number of studies on the relationship between entry qualification and academic performance indicate that students with high entry qualification scores often perform better than those with low entry qualification scores (Adedeji, 2001; Aderson, Benjamin & Fuss, 1994; Alias & Zain, 2006; Zezekwa & Mudavanhu, 2011).

The above-cited literature showed some inconsistency in the correlation of entry academic qualifications and academic achievement scores of students. In this paper the researchers intended
to see the predictions for academic performance of students from the admission criteria i.e. entry qualification scores, in Pakistani context.

In Pakistan, online and distance learning educational institutions are still at infancy stage and there is a vacuum of research in this mode of education. Virtual University of Pakistan (VU) is the first online technology based distance learning university in Pakistan. At VU the admission criteria for all undergraduate programs is minimum 45% marks or Cumulative Grade Point Average (CGPA) of 2.0/4.0 in the last degree. For M. Phil it is at least 2.5/4.0 CGPA in the last degree (Admission Eligibility Criteria, 2016-17). VU offers degree programs of various duration, ranging from one year (two semesters) to four years (eight semesters). Only a few certificates, however, are of 18 weeks (1 semester) duration. The assessment of the students at VU is based on the mid-term, final term, assignments, quizzes, graded discussion boards, and in some faculties, internship reports and viva voce examination. In this, information technology based education mode in Pakistan, the correlations and predictions between previous cumulative qualification scores, entry qualification scores and present academic performance of students becomes more valuable to study in order to see the trends and patterns (Alias & Zain, 2006; Mlambo, 2011).

Objectives of the Research

Based on the review of the literature, the following objectives of the present research were designed:

1. To explore the possible correlations between entry academic qualification score, cumulative score and academic performance of students in various degree programs at VU.
2. To find out the predictions made from entry academic qualification scores about academic performance of students in various degree programs at VU.

In order to achieve the above stated research objectives, these research questions were formulated:

1. Do students with different levels of cumulative scores of previous academic qualifications perform differently at VU?
2. Do students with different levels of entry qualification scores perform differently in various degree programs at VU?
3. To what extent does entry qualification and cumulative score predict the academic performance of students in various degree programs at VU?

Methodology

Using cross-sectional design, predictive correlation research method was used in this research. The academic qualification marks i.e., matriculation (10 years education), intermediate (12 years education), and CGPA/ marks of bachelors (14 and 16 years education) were cumulated and then their relationship with the CGPA of their degrees completed at VU was analyzed using pearson r product moment formula. The relationships of entry qualification scores and cumulative score of previous qualifications with VUCGPA were calculated. Multiple regression analysis was also used to see predictions from cumulative scores and entry qualification scores taken as independent variable.

The population of this study was the students who completed their 2 years master degree programs from VU in the years 2015 and 2016. The sample did not include those students who failed in these degree programs; only the data of pass students were taken. The secondary data of their complete academic record including: Matriculation, Intermediate, and Bachelors (two years, 4 years) and their CGPAs achieved in various degree programs at VU were obtained from the
VU through formal request. Degree programs were also segregated into major disciplines and
correlations between VUCGPA in those disciplines and cumulative and entry qualification scores
were also calculated. The data were further categorized into low achievers, average achievers and
high achievers separately for 1) cumulative score and 2) entry qualification score. The correlations
were seen separately for low, average and high achievers based on cumulative scores and entry
qualification scores.

**Ethical Considerations**

Ethical considerations in data collection were followed. Formal requests to the examination,
administration and networking department were made duly channelized and following the university
protocols. Anonymity of the data was also assured and ensured by the researchers.

**Significance of the Research**

The results of this research are significant in predicting the student performance based on their entry
qualifications. Other studies may be conducted based on the recommendations of this research to
expand the empirical evidence on students’ achievement in distance learning education. This research
can be important for the university administration for revisiting admission policy. It may also suggest
providing individualized support to students with different academic performance backgrounds.

**Delimitation of the Research**

The researchers delimited the current research to measure the predictions of academic achievement
score based on entry qualification scores and cumulative scores only. There was no cause and effect
relation established in this research. It was further delimited to the students who passed different
masters’ degree programs in the years 2015 and 2016.

**Results**

The descriptive and inferential statistical analysis is explained as under. For clarity and better
understanding the results of masters’ program are presented in a sequence of cumulative scores’
correlation with VUCGPA, predictions from cumulative scores, subject wise correlation between
VUCGPA and cumulative scores, entry qualification score and their correlation with VUCGPA,
predictions from entry qualification scores, and subject wise correlation between VUCGPA and entry
qualification scores separately.

When Pearson r was applied to see the correlation between VU CGPA and cumulative score of all
previous academic degrees of the students, it was found that significant positive correlation existed
in the two scores. Correlations between VU CGPA and previous academic qualification scores were
also calculated separately. All values of correlation coefficient presented in table 1 were significant
at p< 0.01.

| Table 1: Correlation of matric, intermediate, bachelors, and cumulative scores with VU CGPA |
|---------------------------------|----------------|----------------|----------------|----------------|
|                                 | VU CGPA | Matric | Inter | Bachelors | Cumulative |
| VU CGPA                        | 1.000   | .300** | .271**| .222**    | .340**     |

**p<0.01
Multiple regression analysis was used to determine the predictions of matric, inter, and bachelors scores taken as independent variable for VU CGPA taken as dependent variable. The predictions made were 11.8% significant and significant contributions to this prediction were from all the previous qualification scores. However, this prediction of 11.8% does not establish that VU CGPA can be predicted only through previous academic scores. There could be some other factors along with the previous academic qualification scores that contribute in the CGPA of VU students. The standardized beta coefficients and t-values can be seen in table 2.

| Table 2: Multiple regression by taking matric, inter, bachelors as independent variables and masters CGPA as dependent variable |
|---------------------------------------------------------------|------------------|----------------|-------------|
| **Adjusted R Square** | **Standardized Coefficients** | **t** | **p** |
| constant | .118 | 37.707 | .000 |
| Matric | .204 | 14.330 | .000 |
| Inter | .131 | 8.822 | .000 |
| Bachelors | .097 | 7.002 | .000 |

To further probe into the data the students were categorized into low achievers, average achievers, and high achievers based on their cumulative scores. The cumulative scores were calculated by adding the scores of students for their matric, intermediate and graduation external examination. The baseline or standard marks for matric were 850, for intermediate were 1100, and for bachelors were 800. By adding these three scores the sum gets 2750. Out of this total 2750 score of the last three academic qualifications the highest marks obtained score was 2421 and the lowest was 821. These cumulative scores of students were divided into 3 sets of almost equal range to categorize the students into high, average and low achievers. This categorization was made after dividing the number of students (5825) by three; it gives 1941.67. Approximately, 1942 students were included in each of the three categories (low, average, and high). The small variation present in the number of students in different categories each category is due to including the students with same scores in one category.

| Table 3: Categorization of students on the basis of cumulative achievement scores |
|-----------------------------------|--------|-------|
| Category             | Marks Range | N    |
| Low Achievers        | 821-1515  | 1941  |
| Average Achievers    | 1516-1683 | 1946  |
| High Achievers       | 1684-2421 | 1938  |
| All                  | 821-2421  | 5825  |

In table 4 the correlations of VU CGPA was calculated with the previous academic qualification scores in terms of low achievers, average achievers, and high achievers categories as made in table 3. It was observed that high achievers based on cumulative scores were showing significantly
higher correlation with the VU CGPA followed by average achievers and the lowest correlation was found for low achievers. These results lead to infer that those who were high achievers in the cumulative scores were also performing high at the VU. The values were significant at p < 0.01 as seen in table 4.

**Table 4: Correlation of VU CGPA with previous academic performance scores - cumulative and by categories—low, average, high achievers**

<table>
<thead>
<tr>
<th>Category by Cumulative scores</th>
<th>Matric</th>
<th>Inter</th>
<th>Bachelors</th>
<th>VUCGPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low achievers</td>
<td>.065**</td>
<td>.019</td>
<td>.028</td>
<td>.077**</td>
</tr>
<tr>
<td>Average achievers</td>
<td>0.124**</td>
<td>-.042</td>
<td>.020</td>
<td>.121**</td>
</tr>
<tr>
<td>High achievers</td>
<td>.182**</td>
<td>.193**</td>
<td>.110**</td>
<td>.256**</td>
</tr>
</tbody>
</table>

**p < 0.01

The table 5 depicts the subject wise correlations between VUCGPA and cumulative scores. The masters' degree programs were segregated into different disciplines. The four major disciplines in the masters’ degree programs were: business administration; commerce; computer science (CS) and Information technology (IT); and social and behavioural science. The correlations between VUCGPA of business administration discipline and previous academic cumulative scores were highest among the disciplines followed by social and behavioural science discipline and CS & IT. The correlation between VUCGPA of commerce discipline and cumulative score was the least among these disciplines. The correlation coefficient values presented in the table 5 were significant at p < 0.01.

**Table 5: Discipline wise correlation between VUCGPA and cumulative scores of previous academic qualifications**

<table>
<thead>
<tr>
<th>Subject wise VUCGPA</th>
<th>N</th>
<th>Cumulative score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Administration</td>
<td>2895</td>
<td>.359**</td>
</tr>
<tr>
<td>Commerce</td>
<td>520</td>
<td>.305**</td>
</tr>
<tr>
<td>CS &amp; IT</td>
<td>2172</td>
<td>.309**</td>
</tr>
<tr>
<td>Social &amp; Behavioural Sciences</td>
<td>238</td>
<td>.352**</td>
</tr>
</tbody>
</table>

**p < 0.01

The table 6 categorizes the students in to low, average, and high achievers on the basis of their entry qualification scores. The criteria of categorizing the students into three groups were the cut point marks of 1st division (high achievers), 2nd division (average achievers) and 3rd division (low achievers).

Table 7 demonstrates the correlation values of low, average, and high achievers based on the entry qualification scores were showing higher correlation of average achievers with VU CGPA than the high achievers. However, the difference in the correlation values was very small. The correlation of bachelor degree low achiever scores was negative with the VU CGPA. It meant that entry qualification low achievers scores do not have any relationship with how these students

perform in VU. The reasons could be, either the number of students in the low achievers category was less, or it could be the equal learning opportunity and fair assessment at VU that it boosted their performances in VU. The predictions made from entry qualification were only amounting to 4.9%.

Table 6: Low, average, and high achievers on the basis of their entry qualification scores

<table>
<thead>
<tr>
<th>Categories</th>
<th>Range</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low achievers (3rd Division)</td>
<td>Up to 359</td>
<td>280</td>
</tr>
<tr>
<td>Average achievers (2nd division)</td>
<td>360-479</td>
<td>4093</td>
</tr>
<tr>
<td>High Achievers (1st Division)</td>
<td>480 and above</td>
<td>1566</td>
</tr>
<tr>
<td>All</td>
<td>288-796</td>
<td>5825</td>
</tr>
</tbody>
</table>

Table 7: Correlation of (low, average, high achievers on the basis of entry qualification scores [bachelors]), and predict of entry qualification score with VU CGPA

<table>
<thead>
<tr>
<th>Bachelors</th>
<th>VU CGPA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low achievers</td>
<td>−.070</td>
<td></td>
</tr>
<tr>
<td>Average achievers</td>
<td>.136**</td>
<td></td>
</tr>
<tr>
<td>High achievers</td>
<td>.109**</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.049</td>
<td></td>
</tr>
</tbody>
</table>

**p< 0.01

Table 8 reflects the correlations between VUCGPA of different disciplines and entry qualification scores of students. The highest correlation coefficient value was for commerce discipline followed by social & behavioural science and business administration disciplines. The lowest value of correlation was for CS & IT discipline. The values given in table 8 were significant at $p < 0.01$.

Table 8: Disciplines wise correlation between VUCGPA and entry qualifications scores

<table>
<thead>
<tr>
<th>Subject wise VUCGPA</th>
<th>N</th>
<th>Entry qualification score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business administration</td>
<td>2895</td>
<td>.235**</td>
</tr>
<tr>
<td>Commerce</td>
<td>520</td>
<td>.290**</td>
</tr>
<tr>
<td>CS &amp; IT</td>
<td>2172</td>
<td>.219**</td>
</tr>
<tr>
<td>Social &amp; Behavioural Sciences</td>
<td>238</td>
<td>.245**</td>
</tr>
</tbody>
</table>

**p < 0.01

Discussion

This research strived to achieve two objectives. The researchers applied various descriptive and inferential statistical analyses on the data to address those questions.

Research objective 1. To explore the possible correlation between entry academic qualification score, cumulative score and academic performance of students in various degree programs at VU.
In order to achieve this objective, researchers designed these two research questions. (1). Do students with different levels of cumulative scores of previous academic qualifications perform differently at VU? (2). Do students with different levels of entry qualification scores perform differently in various degree programs at VU?

To address the first research question, the researchers grouped the previous academic qualifications of students of masters' program students. After cumulating their previous academic scores the researchers categorized students in low, average and high achievers category. The correlations of cumulative scores and VUCGPA were determined in terms of coefficient of correlation of pearson r product moment. For masters' students the overall correlation of cumulative scores with VUCGPA was 0.340, which was considered as significant positive. The correlations of low, average and high achievers on the basis of cumulative scores displayed high achievers to be correlating higher with the VUCGPA than the average achievers, and average achievers showed higher values than low achievers. This was consistent with the literature; we see many studies in conventional educational institutions that report to have such correlations (Aidoo-Buameh & Ayagre, 2013; Alias & Zain, 2006; Braunstein, 2002; Dalziel, & Peat, 1998). To dig further in the data, the masters’ degree programs were segregated into different disciplines. The discipline wise correlations of four major disciplines were also calculated between cumulative scores and VUCGPA. VUCGPA of Students in business administration discipline was showing the highest correlation with the cumulative scores. Then correlation of social science discipline was higher than that of CS & It discipline VUCGPA and cumulative scores. The lowest of all correlation was between commerce discipline VUCGPA and cumulative scores. This was another limitation of this research, as it did not evaluate the variation in the correlation values among different disciplines. However, this is not uncommon in such research (e.g. see, Wambugu & Emeke, 2016). The researchers recommend a research to find variations in the correlation values of cumulative scores and their VUCGPA in different discipline students. This was how first research question was answered.

Second research question was to see these relations with entry qualifications. For that purpose the researchers categorized the data into low, average, and high achievers on the basis of their last degree scores. The criteria were discussed in the results section of this paper. For masters' students, the scores of the students categorized as low achievers were showing negative relationship with VUCGPA. This could be attributed to a variety of reasons. For one, the students who were categorized as low achievers got third division in entry qualifications. VU usually do not offer admissions to students with third division degree but when they do they require the students to enroll in a zero semester. Once the students get passed with at least 2.0 CGPA in the zero semester then only they can proceed with the degree. Therefore, this zero semester already enables the students to get familiar with the VU system and mode of education. This could be why they perform better in the VU. Another reason could be the fair assessment system of VU that eliminated all biases of the teachers that might prevail in conventional educational systems. In VU the teachers are unable to identify the students and they can only mark the items randomly without knowing who the student actually is. Because the papers are computer generated and every student gets a different question out of the item bank. Along with this, the papers of students are also marked in terms of items only. A teacher only gets to check the items with no identification of student name or student number, not even a complete paper of any student. The papers are marked in terms of items only and then the examination centre compiles the results of the students. This makes the examination system of VU fair hence eliminating any or all biases. Third reason could be the less number of students in the low achievers category. This is for a fact that when pearson r has lesser values as input it shows insignificant results.

This is in line with the results from the studies of Jansen (2004), McCarey, Barr and Rattray (2007), McKenzie and Schweitzer (2001). As mentioned previously, the master degree programs were segregated into four major disciplines and correlations between VUCGPA of such disciplines and entry qualification scores were also calculated. The correlations were highest between commerce discipline VUCGPA and entry qualification score. After commerce discipline the second highest value of correlation was of social & behavioural science disciplines followed by the correlation value of business administration disciplines and the lowest among these disciplines was the correlation between VUCGPA of CS & IT discipline students and their entry qualification scores. The reasons for this variation of correlations among different disciplines were not addressed in this research. Not only this variation in the correlation but also the variation in the correlation values of disciplines on the basis of cumulative scores and entry qualification scores was also asymmetrical. Researchers suggest a separate study to find such irregularities in the patterns of correlation in the disciplines. In this way, the researchers had addressed the two research questions. Hence, the first objective of this study was achieved.

**Research objective 2.** To find out the predictions made from entry academic qualification scores about academic performance of students in various degree programs at VU.

To achieve this objective the researchers pursued with this research questions. To what extent does entry qualification score of different levels predict the academic performance of students in various degree programs at VU? To answer this question, multiple regression analysis was run on the data. For masters’ students the predictions from the cumulative scores were amounting only to 11.8% with significant contributions from matriculation, intermediate and bachelors’ scores. The study of Dalziel and Peat (1998) in University of Sydney found that first semester high CGPA of the students was predicted by their high grades in secondary school. The prediction for VUCGPA made from the entry qualification scores was only 4.9% reflecting other unstudied factors to be considerable in predicting VUCGPA. This is how objective number to was achieved for this study.

**Conclusions and Recommendations**

Based on the analysis done above, it is concluded that in distance education setting in Pakistan, the students in masters are performing in the same pattern as mostly found in the literature about conventional education students. This is concluded based on the result that students with high marks on cumulative scores performed better than those with low and average marks in the cumulative scores. Some coarse patterns were seen in the relationship of entry qualification scores with the recent CGPAs in master degree programs. When the students were categorized into low, average and high achievers on the basis of their performances in the entry qualifications the correlations were weak and could not establish any considerable relationship with their performances in different masters’ program at VU. Predictions from cumulative scores were also not very encouraging as it amounted to only 11.8% for masters programs. Across different disciplines in masters’ degree program there were variations in the correlations. Researchers conclude that this uneven correlation patterns were because the mode of education of previous degrees was not similar, it could be regular or it could be distance education. Therefore, the researchers recommend to identify the previous mode of education of students and then to compare their correlations and predictions in different disciplines. That correlation comparison should be based on two patterns i.e. a) students who had previous education in regular setup—their correlations with their different degree programs at VU and b) students who had previous qualifications through distance education—their correlation with their performance in different degree programs at VU. Identifying the correlations and predictions on such patterns may help the university in any reconsideration of the admission policy.
Limitations of the Research

This research had certain limitations. The researchers could only access the previous academic marks of the students and not the mode of education and institution type from which the students had completed those degree programs. The researchers considered this a limitation because the present academic achievement of students is measured in a distance-learning mode of education. For better prediction of their performances the researchers assume that previous modes of education of students should have been mentioned in the research. In low achievers on entry qualification scores, the correlation with VUCGPA was negative and insignificant. Another study is suggested here by the researchers to dig further into the data to explore reasons of this variation and to find how these average achievers and low achievers in the above-mentioned programs have actually performed in VU.

References


