

# Predictors of Academic Performance of Medical Students of University of the Philippines College of Medicine: Class 1990 to Class 2013 Lateral Entrants

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## RESEARCH ARTICLE

### Abstract

**Background:** The criteria for admission at the University of the Philippines College of Medicine (UPCM) are 60 percent premed general weighted average grade (%PMGWAG), 30 percent National Medical Admission Test (NMAT) scores and 10 percent Interview Scores. Through the years, because of the highly competitive nature of the selection process, the admissions cut-offs in PMGWAG and average NMAT have continuously risen.

**Objectives:** This study covering a 24 year period aimed to determine the correlation and predictive value between the admissions criteria (%PMGWAG, NMAT, and Interview Score) with academic performance parameters (Percent Medical General Weighted Average Grade or %MGWAG and Class Ranking) and Board Rating.

**Methods:** The pre-admission and academic records of accepted lateral entrants from Class 1990 to Class 2013 were retrieved, reviewed and analyzed. These included the pre-med GWAG (%PMGWAG), NMAT and Interview Scores, Med GWAG (%MGWAG), Class Ranking and Board Rating. Pearsons Correlation and Multiple Linear regression analysis were done.

**Results:** All criteria (%PMGWAG, NMAT, Interview Score) for admissions were correlated with the academic performance parameters (%MGWAG, Class Rank) and Board Rating. The strongest correlation was observed in %PMGWAG with %MGWAG and Class Rank. Interview score correlated weakly with the academic performance. Strong correlations between %MGWAG, Class Rank, and Board Rating were likewise observed. Rank upon admission also correlated strongly with Class Rank upon graduation. On linear regression analysis, %PMGWAG and NMAT were more predictive of %MGWAG, Class Rank and Board Rating.

**Conclusion:** The weight distribution of the different admissions criteria should be adjusted accordingly. Interview score, a weak predictor of academic performance and a measure of non-cognitive traits, should be treated separately and independently as an admission criterion.

**Keywords:** medical college admission, admissions criteria, medical education, academic performance, UP College of Medicine

## Introduction

Annually, almost a thousand candidates apply for admission into the University of the Philippines College of Medicine (UPCM). Among these applicants, only 120 lateral entrants are accepted. They join the ranks of 40 direct entrants from the College's Intarmed Program to form a class of 160 in Learning Unit III, the equivalent of first year of medical school in other colleges. Given the massive volume of aspiring applicants and, in contrast, the very small number of students who can be accepted, there is a need to assess how well the entrants perform in medical school. This

volume compared to placements available has been cited as one of the essential reasons for having a selection procedure for medical students worldwide. The second reason being the social and professional desire to admit students who will become competent and ethical practitioners [1].

Lateral entrants of the UPCM are baccalaureate degree graduates. This is as opposed to direct entrants who are high school graduates. Direct entrants are thus screened and selected based on their performance on the UPCAT and high school academic grades, which are measured as University Predicted Grades. For the lateral entrants, current admission

criteria include Weighted Average Grade or PMGWAG, National Medical Admissions Test or NMAT and Interview Scores with respective weights of 60%, 30% and 10% each. In addition, a strict qualifier is that an applicant's NMAT must be at least at the 90th percentile. Because of the highly competitive nature of the selection process for admission, the cut-offs in the PMGWAG as well as the average NMAT of those who were accepted have continuously risen through the years [2]. To illustrate this, the average PMGWAG for the past five years was consistently pegged within the *magna cum laude* range while the average NMAT in the same period was between the 98th to 99+ percentile in more recent years [3]. Thus, having a *magna cum laude* standing does not assure admission into the list let alone a *cum laude* standing.

The PMGWAG and NMAT cut-offs are cognitive criteria. The PMGWAG aims to select students based on prior academic achievement while the NMAT is a written test that supplements assessment of academic suitability. On the other hand, the structured interview is a non-cognitive parameter for selection. It focuses on the non-academic attributes of the aspirants. The UPCM specifies particular traits, skills, and behaviors important for admission into the college. These include interpersonal skills like communication abilities; personal factors, such as self-awareness, honesty, and stress tolerance; and finally, work factors, such as discipline, problem-solving, leadership, and social responsibility. The structured interview, thus, assures that those accepted into the program are psychologically sound and emotionally fit to undergo the rigors of medical education as well as training.

With this seemingly stringent and highly selective procedure for the screening of applicants, it is easy to assume that UPCM students will eventually perform well and graduate with good academic records in medical school. However, it should be noted that the respective weights given to each criterion were set arbitrarily and no follow-up studies have been conducted to validate them. Furthermore, the criteria have not been updated. It is, thus, relevant to determine if the above criteria indeed predict a student's performance in the medical education program. Would a higher PMGWAG predict a high Medical General Weighted Average Grade? Similarly, would those with a higher NMAT score project a better performance in the Medical Licensure Examination? Taking it a step further, the particular weights of each criterion should be assessed to answer whether the current system is supported by scientific and statistical analyses. The existing distribution of weights given to the different criteria should be optimized based on their accuracy in predicting good academic performance.

There are several studies in literature on predictors of future academic performance in medical education. Various predictors have been studied and these include undergraduate grade point averages, school exit examinations, and medical college admission scores. Though proven of value in their respective medical schools, it is recommended that each medical school assess the predictive value of its selection criteria for its own applicants [4].

This study aimed to evaluate predictors of academic performance of UPCM lateral entrants based on existing admission criteria. The study analyzed which among the current admission criteria were correlated well with the eventual educational achievement students attained in the long run. Furthermore, it aimed to determine whether the respective weights given to the admission criteria were sufficient, rational, and justifiable in selecting entrants who would perform well in medical school.

The study assessed the correlations of the current criteria namely PMGWAG, NMAT and Interview Scores with the accepted measures of academic performance namely MGWAG, Board Rating, and Class Ranking. Linear regression analysis was done in order to establish statistical significance and validate the current admission criteria in predicting academic performance. Furthermore, through the same analysis, the study provided a framework for a more predictive combination of the same set of criteria with their corresponding weights.

The information derived from this study may show evidence of the effectiveness of selection criteria. Its results may be utilized as bases for admission policy revisions and amendments. The data may also serve as future reference in decision-making and in the development of institutional policy.

## Methodology

The study was part of an ongoing review and evaluation of the admissions policies commissioned by the University of the Philippines College of Medicine. This study has a descriptive design utilizing records and documentary review. All students accepted into the College as lateral entrants for the study period of 1985 to 2010 who graduated from 1990 to 2013 served as study subjects. No sampling was performed.

The records of the study subjects from Student Records Office were retrieved and reviewed. Their academic records were gathered and their medical general weighted average grades (MGWAG) Physician Licensure Examination (Board

Rating) scores, and Class ranks (in percentile) upon graduation, entry scores and entry ranks were obtained and analyzed.

The MGWAG follows the university (UP) grading system where the highest is 1.0 and lowest is 5.0. To facilitate computation and for clearer comparison, MGWAG was converted into percentage (%MGWAG) using the equation below:

$$\%MGWAG = 25 \times (5 - MGWAG)$$

The records on Board Rating were available only for the past 14 years.

The records of the abovementioned lateral entrants were retrieved from the archives of the Admissions Office. Parameters pertaining to %PMGWAG, NMAT scores and Interview Scores were likewise obtained.

Similarly, %PMGWAG, the Pre-med general weighted average grade in percentage, was derived using the equation as below:

$$\%PMGWAG = 25 \times (5 - PMGWAG)$$

The Entry score is a summed up score of the applicant's PMGWAG, NMAT and Interview scores with weights, as per UPCM policy of 60% for PMGWAG, 30% for NMAT and 10% for the interview score. From the Entry scores, the Entry rank in percentile was determined.

The averages of the abovementioned parameters were computed per class, per course, per school and per admissions category. Pearson's correlation study and Multiple Linear Regression Analysis were done on those parameters.

## Results

Pearson's correlation was done to determine the association of the following predicting and outcome variables namely %PMGWAG, NMAT, Interview Score, Entry Rank, %MGWAG, Graduation Rank and Board Rating. The strength of correlations was established relative to the absolute value of their individual Pearson's Coefficient. Among the predicting variables, %PMGWAG (Table 1) relatively had the strongest association with the outcome variables, %MGWAG (0.487), Board Rating (0.353) and Graduation Rank (0.496).

On the other hand, the Interview Score had the weakest correlation (Table 1) in relation to the %MGWAG (0.236), Board Rating (0.086) and Graduation Rank (0.066) ( $p < 0.0001$ ).

The NMAT (Table 1) as predicting variable had a moderate correlation with %MGWAG (0.275), Board Rating (0.373) and Graduation Rank (0.284). All of these correlations were statistically significant ( $p < 0.0001$ ).

Furthermore, Entry Rank (Table 2) was strongly correlated with Graduation Rank (0.527) while among the predicting variables, %PMGWAG was moderately associated with NMAT (0.275) and weakly related with Interview Score (0.142). Likewise, NMAT (Table 2) was weakly associated with Interview Score (0.52) ( $p < 0.0001$ ).

All outcome variables, %MGWAG, Board Rating, and Graduation Rank manifested strong correlation with each other (Table 2): between %MGWAG and Board Rating (0.734), between Graduation Rank and Board Rating (0.613), between %MGWAG and Graduation Rank (0.761) ( $p < 0.0001$ ).

**Table 1.** Pearson's Correlation Matrix (Zero Order) Predicting and Outcome variables

	%MGWAG	Grad % tile Rank	Board Rating
%PMGWAG	0.487	0.496	0.353
NMAT	0.275	0.373	0.284
Interview Score	0.236	0.066	0.086

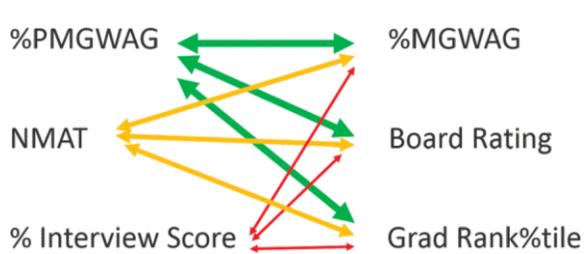
All of these correlations and strength of associations are depicted in Figures 1 and 2, with colored arrows. Green arrows denote strong association, orange arrows moderate association, and red arrows, weak association. All the aforementioned correlations were statistically significant at the 0.01 level (2-tailed).

### The Multiple Linear Regression Analysis:

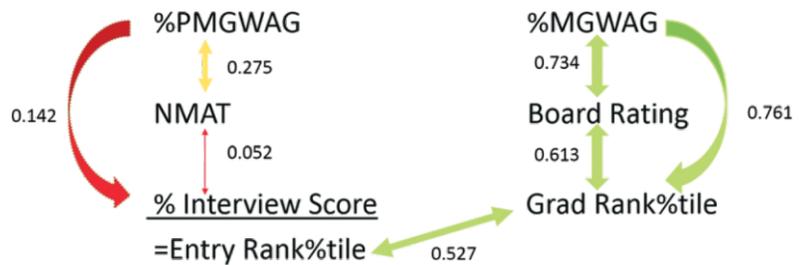
Multiple Linear Regression was likewise done as part of the inferential analysis. Model or equation for predicting the outcome (dependent) variable, %MGWAG from the three proposed predictors, %PMGWAG, NMAT and Interview Score was derived (Table3).

**Table 2.** Pearson's Correlation Matrix II (Zero Order): Other Correlations of Variables

	%PMGWAG	NMAT	Interview Score	Entry Rank (%tile)	%MGWAG	Board Rating	Grad Rank (%tile)
%PMGWAG	1.000	0.275	0.142	---	---	---	---
NMAT	0.275	1.000	0.052	---	---	---	---
Interview Score	0.142	0.052	1.000	---	---	---	---
Entry Rank (%tile)	---	---	---	1.000	---	---	0.527
%MGWAG	---	---	---	---	1.000	0.734	0.761
Board Rating	---	---	---	---	0.734	1.000	0.613
Grad Rank (%tile)	---	---	---	0.527	0.761	0.613	1.000



**Figure 1.** Summary of Correlations I



**Figure 2 .** Summary of Correlations II

**Table 3.** Multiple Linear Regression : Predicting %MGWAG

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.207	2.325		2.669	.008
%PMGWAG	.431	.017	.429	24.741	.000
NMAT	.193	.021	.155	8.993	.000
%Interview Score	.121	.012	.170	10.120	.000

a. Dependent Variable: %MGWAG

All of these predictors were statistically significant with the following Beta- Coefficients, 0.431 for %PMGWAG, 0.193 for NMAT, 0.121 for the Interview Score with a constant of 6.207. Thus, the equation (model to predict %MGWAG) below was derived accordingly:

From this model, the relative impact or contribution of each of the predicting variables, %PMGWAG, NMAT and Interview Score on determining %MGWAG were 65%, 25%, and 15% respectively.

$$\%MGWAG = 0.431 * \%PMGWAG + 0.193 * NMAT + 0.121 * \%Interview + 6.2$$

**Table 4. Multiple Linear Regression: Predicting Board Rating**

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	50.974	1.553		32.815	.000
%PMGWAG	.130	.011	.271	11.754	.000
NMAT	.192	.015	.298	12.965	.000
%Interview Score	.011	.008	.031	1.376	.169

a. Dependent Variable: Board Rating

On the other hand, the Multiple Linear Regression on the Board Rating as the dependent variable with the same set of predictor variables revealed statistical insignificance with the Interview Score (Table 4).

$$\text{Board Rating} = 0.130 * \%PMGWAG + 0.194 * NMAT + 51.7$$

Thus, the said variable was removed, and the linear regression data revealed Beta- coefficients for % PGWAG and NMAT were 0.130 and 0.194 respectively.

The relative impact or contribution of %PMGWAG and NMAT in predicting the Board Rating were 40% and 60%, respectively.

These two predictor variables, %PMGWAG and NMAT, as well as the constant (51.7), were all statistically significant thus, the model or equation below was derived accordingly:

The same process was also applied to the third dependent variable, Graduation Rank. Similarly, on the linear regression with the three predicting variables, only PMGWAG and NMAT were statistically significant (Table 5).

**Table 5. Multiple Linear Regression: Predicting Graduation Rank**

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-198.802	10.375		-19.162	.000
%PMGWAG	1.978	.078	.449	25.428	.000
NMAT	.911	.096	.167	9.533	.000
%Interview Score	-.004	.053	-.001	-.083	.934

a. Dependent Variable: Grad Rank %tile

Since Interview Score was not significant in predicting Graduation Rank, the same variable was removed and the result of the linear regression revealed statistical significance in the remaining two variables and in the constant. Thus, the model or equation below was derived accordingly:

$$\text{Grad Rank \%tile} = 1.980 * \%PMGWAG + 0.934 \text{NMAT} - 202$$

The relative impact and contribution of %PMGWAG and NMAT in predicting Graduation Rank as outcome measure were 70% and 30% respectively.

## Discussion

### *The Correlation Study*

The Pearson's correlation (Table 1 Fig 1 ) between the predicting variables (Admissions Criteria) and the outcome variables (Academic Performance) were established and were all statistically significant ( $p < 0.001$ ). Of the three predicting variables/admissions criteria, it was the %PMWAG that correlated strongly with the outcome variables/academic performance parameters namely %MGWAG, Graduation Rank and Board rating. The weakest correlation among the admissions criteria with the outcome variables/academic performance parameters was the Interview Score. And in between in terms of strength of correlation was that of NMAT. These findings imply the potentials and the strength of the individual admissions criterion in predicting the academic performance. The same observation was also established in the study of Valbuena *et al.* [5].

The above findings were also consistent with international studies that have investigated the predictive validity of undergraduate grade point average on school performance. Past academic achievement was found several times to be significantly correlated with future academic performance [6, 7,8,9]. Bore *et al.* [1] explained this by stating that the best predictor of future behavior is past behavior. This result validates the place of the %PMWAG in the selection criterion.

Furthermore, Pearson's correlation (Table 2 Fig 2) between the individual predicting variables and between outcome variables were likewise established and within statistical significance ( $p < 0.001$ ). It was observed that the correlations between the different outcome variables (academic performance parameters) were much stronger compared to the correlations between the predicting

variables. In fact, the Pearson's correlation between the different combinations of the predicting variables were all weak (Fig 2) but nonetheless statistically significant. A possible explanation as to why the Pearson's correlation between the different predictive variables was weak may be due to the differing nature of the variables. NMAT and %PMWAG are cognitive measures whereas the Interview Score is a non-cognitive measure. Meanwhile, the outcome variables are all cognitive measures hence reflecting a much stronger Pearson's correlation between them. A strong correlation was likewise observed between Entry Rank and Graduation Rank. This result could be interpreted to mean that the existing admission criteria have predictive validity in academic performance. From another perspective, the current set of criterion generally predict who may perform better academically and finish or survive the rigors of the medical education program.

### *The Multiple Linear Regression Analysis*

Furthermore, as expected, the predicting variables, through linear regression can be utilized to determine the different academic performance parameters. The %MGWAG can be predicted, with statistical significance through a linear regression model below:

$$\%MGWAG = 0.431 * \%PMGWAG + 0.193 * \text{NMAT} + 0.121 * \% \text{Interview} + 6.2$$

The model above implies that the individual contribution of the criteria, %PMGWAG, NMAT, and Interview Scores in predicting %MGWAG were 60%, 25% and 15% respectively. This further implies that the criterion with the most impact on the %MGWAG was the %PMGWAG. The reason behind this high impact could be attributed to the huge similarity between %PMGWAG and %MGWAG. Both are mainly measures of cognitive skills and are computed from all the various subjects taken through a long period of time (3 ½ to 4 years). These are very much unlike the NMAT which is a one-time examination taken in a short duration of time (hours). As in other medical schools, academic qualification is based on undergraduate grade point averages. Standardized admission tests, such as the NMAT are used as supplements in discriminating applicants further based on their advanced scientific knowledge and cognitive skills [10]. In our setting, the Center for Educational Measurement was authorized to develop and administer the NMAT arising from the clamor to screen qualified candidates aspiring for a medical degree. The NMAT is described as an instrument designed to upgrade

the selection of applicants seeking admission to Philippine medical schools [11].

The criterion with the least impact or contribution to outcome variables was the Interview Score. This is expected as the Interview measures totally different attributes of the applicant and is not meant to gauge one's cognitive skill. Interview factors include interpersonal and personal clusters, such as respect for others, communication skills, self-awareness, spirituality, honesty, stress tolerance, and loyalty. Work factor clusters in the interview consist of discipline, problem-solving, leadership, social responsibility, high work standards, flexibility, and career motivation. Applicants are also assessed in terms of appearance, verbal and written fluency, mental alertness, poise-stability and enthusiasm or drive. Accordingly, while cognitive measures like previous academic performance (%PMGWAG) and NMAT predicts the likelihood of surviving the medical course, a non-cognitive measure like interview predicts likelihood of becoming a "good" physician [12].

One of the major limitations of the study was that the outcome variables measured solely academic performance and did not include any non-academic parameters. This limitation could explain why the predictive value of the Interview Scores showed such poor correlation with the outcome variables. According to Adam *et al.* [9], cognitive outcomes are seldom reflective of students' non-cognitive and behavioral attributes. Other studies have even found an inverse correlation with undergraduate school performance and non-cognitive qualities as practitioners. Cognitive variables alone do not predict clinical or professional quality. In other words, being smart or intelligent does not equate to being a good doctor [10]. Measures of academic achievement, though correlated strongly with future academic performance, may not sufficiently discriminate between applicants, especially if the scores are very near each other [9]. Thus, in an attempt to differentiate applicants, medical schools use other non-cognitive parameters, such as cognitive skills tests, personal statements, reports, personality measures, and panel interviews [10].

The UPCM structured interview instrument referred to in this study has been in use for decades. There have been no recent studies done to test its validity in the current setting. It is in dire need of revisions and updates to ensure its relevance, validity and materiality. This is especially important now that there are more highly intellectually qualified applicants vying for medical education. The Interview could potentially discriminate those who would

have the necessary aptitude and character in a medical career [10]. Since it is a non-cognitive criteria, it should also be compared against a non-cognitive outcome measure. Examples of non-cognitive outcome measures include behavioral assessment tools and ratings of behavior by supervisors [13]. Conversely, it would be essential to find out whether non-academic outcomes, such as workplace performance, have significant correlation with both cognitive and non-cognitive predictors.

Furthermore, the model below that predicts the Board Rating shows that only %PMGWAG and NMAT had statistically significant impact and contribution at 40% and 60% respectively. Thus, Interview Score was removed from the model.

$$\text{Board Rating} = 0.130 * \%PMGWAG + 0.194 * NMAT + 51.7$$

The reason behind the higher contribution of NMAT than %PMGWAG in predicting Board Rating, likewise, could be attributed to their similarities (NMAT and Board Exam). NMAT and Medical Licensure or Medical Board Examination are both nationally administered examinations and both measure cognitive skills only. Both are sit-down multiple choice examinations. Unlike %PMGWAG, both the NMAT and Board examination are short-period examinations taken over hours and rated according to the scores in the different topics. It is worth mentioning that the MCAT (Medical College Admission Test), the counterpart of the NMAT in US and Canada, likewise, correlates consistently with and has good predictive validity on the performance in their physician licensure examination [14]. In a meta-analysis of the post-1991 version of the MCAT, the MCAT total score was found to have a large validity coefficient effect size for USMLE Step 1 and medium validity coefficients for USMLE Steps 2 and 3 [14].

On the other hand, the %PMGWAG, unlike the NMAT and the medical board examination, is measured and computed throughout the entirety of the course program. This takes a long period of three and a half years and is based on the ratings of the different subjects of a particular course. Although %PMGWAG is mainly a measure of cognitive skill, it may also reflect non-cognitive behavior and skills of students. Studies that investigated the predictive validity of personality traits on academic achievement showed that GPA was correlated with conscientiousness and internal motivation [15]. Hassenbeigi *et al.* [16] also found in their study that scores in study skills of university students were

shown to be statistically higher in students with higher GPAs. These study skills included time management, concentration, test strategies, organization, motivation, and attitude.

On the other hand, UPCM's Structured Interview measures totally different domains as follows: Family and School or Work Life, Social Interaction, and Interests and Aspirations. It focuses on an individual's non-cognitive traits specifically Self Awareness, Honesty, Stress Tolerance, Discipline, Problem Solving, Work Standards, Flexibility, Motivation, Respect, and Concern for Others [17]. Thus, not only would the scores in the Structured Interview not be expected to correlate strongly with measures of cognitive skills like %MGWAG and Board Rating, but they would also not be expected to predict them.

In predicting the Graduating Rank, which is the third academic performance parameter or outcome variable, only %PMGWAG and NMAT were statistically significant and represented by the model below:

$$\text{Grad Rank \%tile} = 1.980 * \%PMGWAG + 0.934 NMAT - 202$$

The model proposes relative contributions of %PMGWAG and NMAT at 60% and 40% respectively in predicting Graduation Rank. Like the model that predicts the %MGWAG, the %PMGWAG is the biggest contributor. This is attributable to the fact that Graduation Rank is mainly derived from the %MGWAG. Furthermore, Graduation Rank and %MGWAG are both parameters that measure cognitive abilities on a long term basis just like the %PMGWAG. They are measured throughout the entirety of the course program.

## Conclusion and Recommendations

In light of the above findings and with due consideration of the inferential implications of this study, the following conclusions can be drawn:

### *I. The Weight Distributions of the Individual Admissions Criteria*

The conclusion from examining the strengths of correlations between the predicting variables and outcome variables for academic performance is that from highest to lowest predictive value or power, the admission criteria can be ranked as such: %PMGWAG, which has the strongest correlation, followed by NMAT Score, and finally the Interview Score. This is further

reinforced and substantiated by the models in the linear regression analysis in terms of individual criterion weight, contribution and impact in predicting academic performance, namely the %MGWAG, Board Rating, and Graduation Rank. Furthermore, it was found that the average weight distributions of the existing admissions criterion, namely the %PMGWAG, NMAT, and Interview Score, were 55%:40%:5%, respectively, in predicting academic performance. Based on this result, it is recommended that a policy change be instituted towards readjusting the current weight distribution of 60%:30%:10% which, as mentioned previously, was arbitrarily set and devoid of scientific or evidential bases. This percentage distribution should be updated to more closely reflect the findings of the current study. It must be kept in mind, however, that the current study looked only at cognitive or academic outcomes.

### *II. The Interview: The Instrument and the Process*

The interview, an instrument that measures non-cognitive traits and other non-academic attributes of applicants, was proven to be a very weak predictor of the academic performance of LU3 students of UPCM. It correlated poorly with the measures of academic performance like %MGWAG and Board Rating. However, being a non-cognitive measure, it must be treated differently and separately from other admission criteria (%PMGWAG and NMAT). The %PMGWAG and NMAT are measures of cognitive skills and academic performance. The Interview should instead be analyzed as a separate screening category and not lumped together with %PMGWAG and NMAT in computations. Its predictive value can be analyzed against non-cognitive outcomes like behavioral assessment tools and supervisor ratings. However, if this is not feasible policy-wise and if cognitive measures alone are used as variables to predict academic performance, the Interview Score's weight criterion may need adjustment from 10% to 5%. However, there is a danger with this suggested readjustment. Although smarter applicants are accepted, they may not necessarily make for more competent doctors with the desired qualities, traits, and behaviors stated in the interview's objectives.

Moreover, the interview instrument and conduct of its administration necessitate a second look and a thorough evaluation. The instrument having a weak correlative strength and poor predicting power demands an exhaustive validation and relevant updating as well as revision if necessary.

### *III. Further Studies*

It is highly recommended that follow-up studies be done on the interview instrument and process to determine its

predictive value on non-cognitive variables or outcomes. In a similar manner, non-academic outcomes, such as workplace performance may also be analyzed for correlation with both cognitive and non-cognitive predictors. The current study only assessed three cognitive outcome variables, namely %MGWAG, Graduation Rank, and Board Rating. Future studies can also look into other outcome variables. For example, analyzing integrated, comprehensive examination scores (COMPRES) in the different year levels may give a picture of academic performance at various time points. Another outcome variable that could be used is performance in objective structured clinical examinations (OSCEs).

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