Original Research Article

PREDICTING MEDICAL STUDENTS' PERFORMANCE IN ANATOMY USING IN-COURSE ASSESSMENT TESTS: CASE STUDY OF A NIGERIAN MEDICAL SCHOOL

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Abstract

In an attempt to determine the correlation between performance in in-course assessments and professional examination in Anatomy for medical undergraduates, the present study examined the performances of students from a medical school in the south western part of Nigeria. 905 medical students, who sat for the professional Anatomy examination in four consecutive academic sessions (2002/2003 – 2005/2006), were studied and data analyzed for mean, standard deviation and range of scores in in-course, professional examination and overall performance for each session as well as the four sessions combined. Correlation coefficient (r) between in-course assessment, professional examination and overall score were also determined. Based on the pooled data, the following equation was derived for predicting students' overall performance in anatomy from their in-courses; $Y = 28.6 + 0.43X$ (where y = overall score % and x = in-course assessment scores %).

Keywords: Medical education, Anatomy, in-course test, progressive assessment test, professional examination

Introduction

Medical programme leading to the award of MBBS degree runs for five or six years, depending on the mode of entry, in all Nigerian Universities. Candidates are normally admitted for the six-year programme from

secondary or high school while holders of first degree may be admitted for direct entry to study for five years. Ladoke Akintola University of Technology (LAUTECH), Ogbomoso is located in the Southwestern part of Nigeria. The University runs a bi-campus system with the basic medical science faculty located at the Ogbomoso while the clinical faculty is located at Osogbo. During the first year (100 level), students receive instructions in Biology, Chemistry, Physics, Mathematics, Fine and Applied Arts, General studies, Computer science, Use of English and Library

science. Students are required to pass all courses offered in the first year before proceeding to 200 levels. During the pre-clinical years (200 - 300), students receive formal lectures and participate in practical and tutorial classes, while during the clinical years (400-600 level), they are expected to attend formal lectures, tutorial and participate in ward rounds. Anatomy is taught concurrently with medical physiology and biochemistry in 200 and 300 level classes, the traditional method of learning being adopted, as in other Medical schools in Nigeria. At the end of 300 level students write a professional end of course examination, also called the part 1 professional MBBS Anatomy examination. Questions for the professional examination is drawn from the course contents of both 200 level and 300level classes and include practical, essays, MCQs and oral examination. 200 level students normally complete lectures and in-course (continuous) assessment test in lower limb, upper limb, thorax, embryology, genetics and general histology before they take a comprehensive promotion examination to 300 levels. 300 level students normally complete lectures and in-course progressive (continuous) assessment test in abdomen, pelvis, perineum, head, neck, neuro-anatomy, systemic embryology and histology before they take the professional examination. The aggregate average of all 300 level in-course assessment scores contributes 30% while the professional examination contributes the remaining 70% to the overall score of each candidate.

A number of studies have considered the relationships between various teaching methods and medical students' academic performance (Nayak et al, 2000; Nandi et al, 2000; Hindija et al, 2005). However, very few studies have been done to examine the relationships between students' performance in final exams and their continuous assessment tests. The aim of this study therefore, is to establish a mathematical equation for predicting students' overall performance in anatomy using in-course assessment score.

Subjects and Method

The records of nine hundred and five (905) students, who wrote the part 1 professional MBBS Anatomy examinations in 2002/2003, 2003/2004, 2004/2005 and 2005/2006 sessions were evaluated in the study. Students who do not write the professional examination or any of the in-course were exempted from the study.

For each of the four sessions and all the four sessions combined, the total score of each student in all the in-course tests was computed and recorded in percentage. Score in the professional examination (essay + MCQ + practical + viva voce) and overall score (in-course + professional examination) were also computed in percentages. The pass mark is 50% while 70% and above is pass with distinction.

Data was analyzed on computer using Excel 2003 for Microsoft windows to determine the mean, standard deviation and range of in-course, overall and professional examination score for each session and all four sessions combined. Data analysis also included the distribution of scores and computation of correlated coefficients(r) in each session. Regression analysis was performed on the combined data of all four sessions to construct a regression equation between students' overall performance (y) and in-course scores (x).

Results

Table 1 shows the distribution of student's overall performance. 97.4% of medical students passed anatomy in 2005/2006 session, 94.0% in 2004/2005 session, 83.1% in 2003/2004 session and 74.2% in 2002/2003 session. 83.8% of all the students combined pass, of which 0.3% had a pass with distinction.

Table 2 shows the sessional means, standard deviations and range of scores for each session and four sessions combined.

Tables 3, 4, 5 and 6 present correlation coefficients (r) calculated between in-course,

professional examination and overall scores in the respective session. In-course is moderately correlated to the overall scores in the session considered except 2005/2006 session, where it is weakly correlated.

Table 7 gives correlation coefficient calculated from the pooled scores of all four sessions. The correlation coefficient calculated between overall score and in-courses is 0.5988, while the regression coefficient and y-intercept value were 0.4290 and 28.5829 respectively. Thus simple regression analysis between in-courses (x%) and overall score

Table 1: distribution of students' overall performance

Session	Class size (n)	Fail *	Pass *	Distinction *
2002/2003	283 (100%)	73 (25.8%)	210 (74.2%)	0 (0%)
2003/2004	362 (100%)	60 (16.6%)	301 (83%)	1 (0.3%)
2004/2005	184 (100%)	11 (6.0%)	173 (94.0%)	0 (0%)
2005/2006	76 (100%)	2 (2.6%)	74 (97.4%)	0 (0%)
All four combined	905 (100%)	146 (16.1%)	758 (83.8%	1 (0.1%)

*fail =x<50%, * Pass =70% > x ≥ 50%, * Distinction = x ≥ 70% (where x is individual student's score in percentage)

Table 2: Sessional mean scores for in-course, professional examination (essay + MCQ + practical + viva voce) and overall score (in-course + professional examination)

Session		In-course	Professional examination	Overall score
2002/2003	Mean ± SD range	52.95 ± 7.20 22.00- 90.33	50.44 ± 6.29 34.29-65.43	51.14±5.73 31.20 -65.90
2003/2004	Mean ±SD range	59.42 ± 7.26 16.67 -77.10	51.59 ±6.32 31.10-69.70	53.95 ±5.67 36.58-71.72
2004/2005	Mean ±SD range	59.40 ±5.23 46.53 -76.50	54.70 ±5.64 35.70 -70.60	56.08 ± 4.67 43.80 -67.67
2005/2006	Mean ±SD range	66.79 ±6.92 51.70 -81.13	47.18 ±7.59 24.69 -60.20	53.21 ±4.00 39.24 -60.52
All four combined	Mean ± SD range	57.96 ±7.88 16.67 -90.33	51.44 ±6.55 24.69 -70.60	53.39 ± 5.64 31.20 -71.72

Table 3: Correlation coefficient (r) for 2002/2003 session

	In-course	Professional examination	Overall
In course	1.00	0.5113	0.7192
Professional examination	0.5113	1.00	0.9221
Overall	0.7192	0.9221	1.00

$P < 0.05$

Table 4: Correlation coefficient (r) for 2003/2004 session

	In-course	Professional examination	Overall
In course	1.00	0.3512	0.6484
Professional examination	0.3512	1.00	0.9062
Overall	0.6404	0.9062	1.00

$P < 0.05$

Table 5: Correlation coefficient (r) for 2004/2005 session

	In- course	Professional examination	Overall
In-course	1.00	0.3031	0.5687
Professional examination	0.3031	1.00	0.9326
Overall	0.5687	0.4326	1.00

$P < 0.05$

Table 6: Correlation coefficient (r) for 2005/2006 session

	In-course	Professional examination	Overall
In-course	1.00	0.6858	0.3320
Professional examination	0.6858	1.00	0.8798
Overall	0.3320	0.8798	1.00

$P < 0.05$

Table 7: Correlation coefficient (r) for the 4 sessions combined

	In-course	Professional examination	Overall
In-course	**1.00**	**0.2377**	**0.59988**
Professional examination	**0.2377**	**1.00**	**0.8874**
Overall	**0.5988**	**0.8874**	**1.00**

Discussion

Progressive assessment tests In-course assessments have become a useful tool in monitoring and evaluating students' understanding and grasp of a subject (Ashiru et. al, 1989; Jaja and Adigun 1988). In this study, the overall performance in Anatomy appears to have been affected by students' population. Notwithstanding the exceptional performance in the session with highest student intake, performance is better on average in the academic sessions with lower students' population. Thus we suggest a greater competition for available resources at the medical school might contribute in the diminishing trend of students' performance. In-course assessment is one of the valuable direct measures for evaluating student's performance in medical schools (Pettingale et. al, 2009)

The mean score for in-course assessments in the second and third academic years under study (2003/2004 and 2004/2005 sessions) are similar, while the mean score for in-course assessments is lower in the first year (2002/2003 session) and higher in (2005/2006 session). Mean score in the professional examination is similar for 2002/2003 and 2003/2004 sessions. The overall scores in all four sessions appear to be similar. These observations may be due to inconsistencies in the quality of students admitted, learning ability of students or staff's teaching ability. Jaja and Adigun (1998) had suggested that similarity between mean scores for in-course assessments, professional examination and overall score show a consistent teaching ability of staff, learning ability of students and similar quality of admitted students.

From the prediction equation derived; overall performance (%) = 28.6 + 0.43 (in-course score). Suppose two students A and B participated in all in-courses and scored an aggregate of 45% and 68.4% respectively, it follows from the equation that their overall scores would be 47.95% for student A and 58.01% for student B. Thus, the prediction equation, which is specific for the institution under study, might become valuable in the event both students becomes inadvertently absent from the final professional examination in Anatomy. The prediction equation might be helpful in planning for future training, admission selection and postgraduate slots availability requirements.

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