Assessment in Human Anatomy and Students Performance- A Case Study of University of The Gambia, West Africa

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ABSTRACT

The decision to predict students' performance in a course creates an opportunity to improve educational outcome. This present study was aimed to derive an equation (if any) for predicting the professional examination performance in Anatomy of students' from their continuous assessment scores. One hundred and thirty five students (135) were registered for medical programme in the 2016/2017, 2017/2018 and 2018/2019 sessions in the University of The Gambia, out of which only one hundred and thirty two (132) students who sat for the professional examination participated in this study, the remaining three could not continue the programme. Students' scores were obtained from record sheets for continuous assessment and professional examinations and were analyzed by SPSS version 20.0 for the mean, standard deviation and range for both continuous assessment and professional examinations. The three sessional results pooled together showed that 18.2% of students obtained distinction (score > 70%), 75.7% obtained pass (score = 50-69%), and 6.1% obtained fail (score <50%). The professional examination significantly correlated with the continuous assessment (r = 0.766, p< 0.05). Based on the pooled data, an equation was deduced for predicting students' performance in Human Anatomy professional examination from their continuous assessment, $y=14.47+2.35x$ where x is overall continuous assessment score. This equation will help to predict students' performance in professional examination if they have only continuous assessment result and it can also identify weak students that may need extra effort to pass professional examination.

Keywords: Professional examination, Continuous assessment, Human Anatomy, Gambia, MBChB.

INTRODUCTION

Learning outcome is indeed key to a meaningful education, and focusing on learning outcomes is essential to inform diagnosis and improve teaching processes and student learning, [1]. There has been increase attention to assessment in higher education with various attempts to inform professional discourse on the sector [2]. Assessment can be continuous, final examination or a combination of both, [3]. Continuous assessment refers to the use of one or several assessments during the course period, instead of a single final exam in the last weeks of the semester [4]. Assessment is used to find out how much students has acquired in terms of knowledge and learning skills [5]. Various assessment methods have been developed and employed [6], however, the application of these methods in anatomy has been reported by very few [7,8].

Broadly, assessment methods are categorized as oral examinations (viva), written examinations (paper based or online), and practical examinations [6]. Brown and Glasner [9] posited that assessment is the most influential factor in relation to how students' learn, this was supported by Habeshaw *et al.,* [10] that students'

learning is assessment driven. Anatomical knowledge is crucial for developing a working diagnosis, and for carrying out many clinical procedures safely and effectively [11]. Junior doctors routinely use their anatomical knowledge during physical examination of a patient [12] and for interpreting radiological images [13].

Programme leading to award of MBChB in The University of The Gambia runs for five or six years depending on the mode of entry. Students are normally admitted for a six year programme after successful completion of secondary or high school while holders of first degree (B.Sc) in related disciplines or Advanced level certificate who performed brilliantly are admitted for direct entry to study for five years.

University of The Gambia is the only national university in the Republic of Gambia and runs a multi-campus system with campuses situated in Kanifing, Banjul and Faraba. The Kanifing campus houses the Central Administration Block, Faculties of Law, Arts, Social Sciences and Postgraduate school while the Banjul campus houses the School of Medicine and Allied Health Sciences and Edward Francis Small Teaching Hospital

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(EFSTH) and Faraba campus is for Agricultural related courses.

During the first year (pre-med class), students receive instructions in Physics, Chemistry, Biology, Mathematics, Use of English and French and the students are required to pass all the courses offered at a grade of 50% and above before proceeding to pre-clinical class (200Level).

In pre-clinical years (200-300Levels), students receive formal lectures, tutorials, seminars and participate in practical sessions while during clinical years (400-600Levels) they are expected to attend formal lectures, seminars and participate in ward rounds.

The courses offered in 200Level includes: Human Anatomy, Medical Biochemistry, Human Physiology, Statistics, Community Health and French. These courses are taught pari-passu throughout the year, at the end of which they write a sessional examination to the next class (300Level). At the end of the 300Level class, the students will write the first professional MBChB examination. Successful students will proceed to the Teaching Hospital for clinical classes.

Questions for the professional examination are drawn from the course contents of both 200 and 300Levels courses which includes Essays, Multiple choice questions, Practicals and Oral examinations.

200Level student usually complete lectures and continuous assessment in Lower and Upper limbs, Thorax, Abdomen, Pelvis and Perineum, General Embryology and General histology before taking the sessional examination to 300Level. The 300Level students will take lectures and continuous assessment in Head and Neck, Neuroanatomy, Systemic Embryology and Histology before they take the professional examination. The continuous assessment scores includes, scores from practical, seminar, mid-term test and end of course tests in both 200L and 300L, these scores will be scaled down to constitute 30% of the total mark while the main professional examination constitutes the remaining 70% of the total mark for each candidate and the addition will give the final score of the candidate in 100% which will constitute the first professional MBChB score.

Continuous assessments as a method of assessment are used to identify weak students who may need further attention, guidance orientation and also to identify badly taught areas. So the relationship between the performance of each students in human anatomy at continuous assessment and professional examination as it is taught in the school remains to be established.

Several studies have considered the relationship between various teaching methods and medical students' academic performance, (14, 15). However, there is limited literature that examined the relationship between students' performance in continuous assessment and professional examination in Human Anatomy; hence the aim of this study is to establish a relationship (if any) between students' performance in professional examination and continuous assessment.

Subjects and Method: One hundred and thirty five students (n=135) were registered for the medical programme in 2016/2017, 2017/2018, and 2018/2019 sessions, out of which only one hundred and thirty two students (n=132) who wrote the professional examinations were evaluated in this study. Three students could not continue the programme and were exempted from the study because they did not complete the in-course assessment or write the professional examination. Forty six (46), Forty two (42) and Forty four (44) students' respectively participated in the professional examination in the above mentioned sessions.

Scores of 132 students' who sat for the continuous assessment and professional examination with their overall scores (CA+professional exam) were used in this study. All the scores were rounded up to 100% to give each parameter the same weight. Pass mark is 50% ,less than 50% is fail, while score of 70% and above is considered pass with distinction.

For each of the three sessions pooled together, the continuous assessment and professional examination scores were computed for each student and each of these were recorded as a percentage .The data were analyzed with statistical package for social sciences (SPSS) version 20.0 and values were expressed as mean+/-SD and percentages. Pearson's correlation coefficient (r) was calculated to determine the correlation between continuous assessment and professional examination in Anatomy examination. Regression analysis was used to determine the best predictor of overall performance and the level of significance was 95% with $p < 0.05$ being considered as significant.

Inclusion criteria: Students who participated in the Continuous assessment and/or Professional examinations
Exclusion criteria: Students who missed the continuous assessment and/or professional examinations

RESULTS
Results of the 132 students who sat for Anatomy examinations are presented in Table 1
Table 1b showed the distribution of student's performance, 97.8% of the students passed Anatomy in 2016/2017, and 95.4% passed in 2018/2019 while 88.1% passed in 2017/2018. For the pooled sessions 93.9% passed out of which 18.2% had distinction and 6.1% failed, this suggests Anatomy is being taught well in this school.
Table 2 showed the mean and standard deviation for continuous assessments, professional examinations and overall scores in all the sessions

Table 3 showed the correlation coefficient for the continuous assessments, professional examinations and the overall scores for the three sessions. In all, there was strong correlation between the continuous assessment and the professional examination. The calculated value for the correlation coefficient between the professional examination and continuous assessment was 0.766 which suggested a positive association in all the three sessions.

Table 1.0 : Analysis of Students' Result for the Three Sessions.

Session	Class Size (n)	Fail Freq (%)	Pass Freq (%)	Credit Freq (%)	Distinction Freq (%)
2016/2017	46	1(2.2)	18(39.1)	22(47.8)	5(10.9)
2017/2018	42	5(11.9)	11(26.2)	11(26.2)	15(35.7)
2018/2019	44	2(4.5)	17(38.6)	21(47.7)	4(9.1)
Combined Sessions	132	8(6.1)	46(34.8)	54(40.9)	24(18.2)

Grade boundaries: Distinction = 70% and above , Credit = 60-69%,   Pass = 50-59%,   Fail =<50%

Table 1.0 b: Further Analysis of Students' Result for the Three Sessions.

Session	Class Size (n)	Fail Freq (%)	Pass Freq (%)	Distinction Freq (%)
2016/2017	46	1(2.2)	45(97.8)	5(10.9)
2017/2018	42	5(11.9)	37(88.1)	15(35.7)
2018/2019	44	2(4.5)	42(95.4)	4(9.1)
Combined Sessions	132	8(6.1)	124(93.9)	24(18.2)

Grade Boundary: Distinction = 70% and above   Pass = 50-69%   Fail =<50%,

Table 2.0 Sessional Mean Scores for Continuous Assessment, Professional Examination and Overall Score (Continuous Assessment + Professional Examination).

Sessions	Descriptives Statistics	Continuous Assessment	Professional Examination	Overall Scores (CA+Prof.Exam).)
2016/2017	Mean +/- SD	19.30 +/- 2.60	40.87 +/-5.48	60.17 +/ - 6.94
2017/2018	Mean +/- SD	20.48 +/- 3.26	44.48 +/- 9.10	64.95 +/- 12.08
2018/2019	Mean +/- SD	20.91 +/- 2.73	40.25 +/- 5.39	61.16 +/- 6.67

Table 3.0 Pearson's Correlation Matrices for the Sessional Continuous Assessment and Professional Examinations

Sessions	Continuous Assessment	Professional Examinations	Overall Scores (CA + Prof. Exam.)
2016/2017	0.667 (p < 0.01)	0.672 (p < 0.05)	1.000 (p < 0.05)
2017/2018	0.932 (p < 0.01)	0.861 (p <0.05)	1.000 (p <0.05)
2018/2019	0.629 (p < 0.01)	0.644 (p <0.05)	1.000 (p < 0.05)
Combined session	0.7666 (p < 0.01)	0.760 (p <0.05)	1.000 (p < 0.05)

Correlation is significant at 0.05 (2-tailed)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.474	3.540		4.089	0.000
	CA	2.353	0.173	0.766	13.573	0.000

Dependable variable: Total

You are able to make predictions with this model and obtain the possible y value take into consideration the equation of regression $y=14.474+ 2.353x$ where y is the total mark in percentage in the final examination and x is the overall continuous assessment.

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Pearson's coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	14.474	3.540		4.089	0.000
	CA	2.353	0.173	0.766	13.573	0.000

Dependable variable: Total

We are able to make predictions with this model and obtain the possible y value taking into consideration the equation of regression y=14.474+ 2.353x where y is the total mark in percentage in the final examination and x is the overall continuous assessment.

Graph
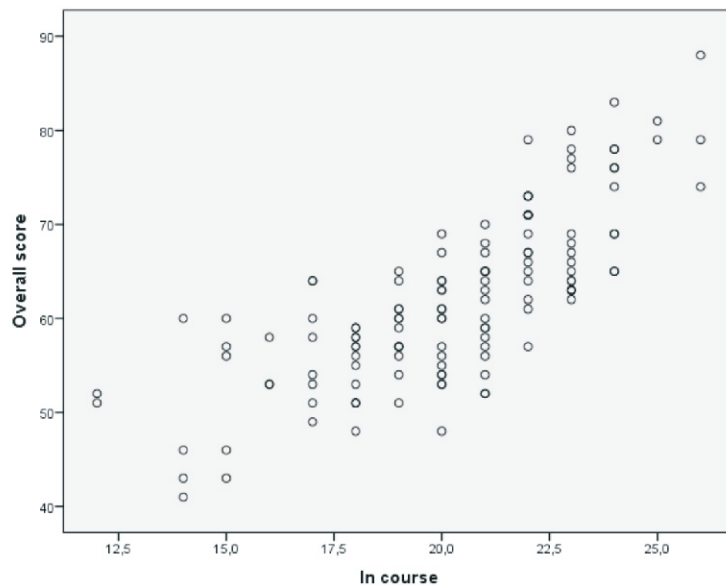
Figure 1 Overall score being plotted against In course (continuous assessment).

DISCUSSION

Continuous assessment is to enhance quality of education by ensuring students do not wait for final examination before reading. It is aimed to sustain quality of learning throughout a period of term or session. Continuous assessment is more important than final examination as it keeps students learning as an on-going process and helps retrieval of knowledge [16,17]. Pettingale et al.,[18] reported that continuous assessment is one of the valuable direct measures for evaluating student's performance in medical school.

In this study, it appears Anatomy is well taught in this school but it was observed that there was high performance with more student population from Table 1 and this contradicts the study by Ajayi et al.,[15] where high performance was recorded in low student population. Students with high class population were observed to have the highest score in Anatomy, which might mean the students were more serious with the course for fear of being dropped to another department thus implying they have a vision of becoming a medical doctor, also it was observed that in the lower population class those that passed pass very well with distinction.

The trend of the mean scores in Table 2 were similar for all the three sessions while the mean score for continuous assessment in 2016/2017 was the lowest and highest in 2018/2019 sessions. Mean scores for professional examination was similar in 2016/2017 and 2018/2019 but higher in 2017/2018 sessions which is due to the fact that the few that passed the examination passed very well with distinction grade as can be seen in the Table. This may mean their low performance in continuous assessment made the teachers did extra work on teaching them as was revealed in their performance in the Professional examination which ultimately affects their final result.

Mean overall score for the examinations (continuous assessment and professional examination) was higher in 2017/2018 and lower in 2016/2017 and 2018/2019; this corroborated the fact that the teachers did extra work on the 2017/2018 sessional students to improve them.
Van der Vleuten and Schuwirth [3] with Rezigalla et al.,[18]

reported that high performance in continuous assessment will lead to high performance in final examination; this is in tandem with this study except for the 2017/2018 session where lower performance in continuous assessment lead to high overall score performance. The strong correlation between continuous assessment and professional examination result is justified since both are included in the overall score. High level of correlation in continuous assessment demonstrates a greater impact on the final examination result. This is in tandem with previous studies by Adeniyi *et al.,* [20,21.]

CONCLUSION

Continuous assessment has an impact on the students' results and their methodology of learning. More attention should be directed towards tools used in continuous assessment. The finding of this study suggests that continuous assessment can be used to predict performance in professional examination as can be seen in the positive correlation.

RECOMMENDATION

Training of teachers in setting of questions and its implementation is important for more objectivity.

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SOURCE OF SUPPORT
Nil.

CONFLICT OF INTEREST
Nil

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