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# FROM INPUT TO OUTCOME: CASE-BASED LEARNING RAISES MEDICAL AND DENTAL STUDENTS EXPECTATIONS OF BETTER PERFORMANCE IN THEIR FUTURE PRACTICE

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## Abstract

**Background:** The ultimate goal of learning is to modify the behavior of which enhanced performance is a critical aspect. Studies have shown that the pedagogical method employed to instruct students is a core factor that influences students' ability to translate classroom input (that is, learning) to practice (that is, learning outcome) later in life. Medical and dental students in Nigeria are often instructed through a didactic lecture which studies have shown are mostly boring and consequently lower students' expectations about their performance later in life.

**Objective:** The current study was therefore designed to evaluate students' expectations on how they would perform in their professional pursuit later in life if they were instructed through case-based learning (CBL).

**Methods:** To accomplish our objective, 56 consenting 5<sup>th</sup> year medical and dental students were recruited to participate in the study. The students were taught two topics by cases developed by the teachers. At the end of the second class, the participants were requested to fill a structured questionnaire anonymously. On the questionnaire, the students used Likert-type of scale to respond to how they see CBL pedagogy in relation to their future practice. The responses were analyzed statistically by the simple percentage and Mann-Whitney U test.

**Results:** Over 80% of the students regardless of gender and program of study agreed that CBL integrates theory with practice and about 90% consider CBL as relevant to their future practice. Although responses vary along the lines of gender and program of study, none of the variations were significant for any of these factors.

**Conclusion:** The ability of CBL to give very high expectations to students about their future career

practice is a strong call to policymakers and teachers to make the paradigm shift to CBL in Nigeria medical education.

**Keywords:** Case-based learning, Students, Medical Education, Practice, Performance.

## Introduction

CBL is scarcely used in Nigerian medical schools despite its growing popularity worldwide. There are many reasons for this, including fact that most medical teachers are not trained in this type of pedagogy, and neither have the students been prepared for this type of learning in pre-university studies or during the first university year. Evidence from literature overwhelmingly suggests that as a whole CBL is enjoyed by both students and teachers as a pedagogical method that facilitates learners' ability to acquire and retain accurate information (1,2,3,4).

During traditional teaching, the teacher takes the center stage and plays the role of communicator and or indoctrinator; in CBL, however, the students play takes the center stage as the exert their critical thinking ability in acquiring information, analysis, and reaching a reasonable conclusion. Practically, during CBL, the teacher's role becomes that of a critical guide for the students as the students become most active in the learning process. Other advantages of CBL include developing students' personalized learning by arousing internal and external enthusiasm, encouraging self-assessment and critical thinking, integrating theory with practice, and improving learning ability and other skills (3). Besides, all of the students' conclusions have theoretical and practical supports (5). The use of CBL has been incorporated into interactive multimedia to improve to enrich this pedagogy (6). However, it not clear if what students think about their future practice

concerning the use of CBL. This study was designed to provide empirical evidence of how students think CBL, relative to traditional didactic lecture, might impact the ability to practice their profession in the future

**Materials and Methods**

This study was carried out in the College of Medicine of the University of Lagos and involved 56 (36 males and 20 females) year five medical and dental students. Having given their consent to participate in the study, the students were divided into four groups of 14 students each. They were then instructed to attend two CBL classes on an agreed date. Prior to the first class, the teachers developed two cases on topics which all the students have been taught previously by traditional didactic lecture. Each of the developed cases was a short story (referred to as the case story) that narrated an authentic clinical case in addition to clearly stating the learning objectives. This case story was then given to each of the students five days before the first CBL session. During the CBL sessions, the teachers explained to the student that they (the teachers) will only act as facilitators and that the students will be at the center of the learning process in each of their groups where they are to read

each of the case stories, discuss and arrive at informed, evidence-based conclusions that match the learning objectives.

As facilitators, the teachers motivated the students to be more focused and guiding them by helping students to carefully and systematically pinpoint the salient facts in the case stories on their own. Besides, the teachers facilitated the active participation of all the students in the group discussion. While both the facilitators and students were free to ask each other questions, the facilitators were careful not take the center stage but rather they technically lead the students back to the facts in the case story in such a way that before long the correct answers, inferences, or conclusions became apparent to the students thereby making the students themselves the discoverer. At the end of the second class, the students were requested to fill a structured questionnaire anonymously. On the questionnaire, the students used a Likert-type scale to respond to a set of questions on how they have come to view CBL pedagogy in relation to their future practice. The students' responses were analyzed using GraphPad Prism version 5 by simple percentage and Mann-Whitney U test with statistical significance set at  $p < 0.05$ .

**Results**

**Table 1: Response of Medical Students Rated on Likert-type Scale**

%	MALE MBBS					FEMALE MBBS				
	SD	D	UD	A	SA	SD	D	UD	A	SA
<b>Future practice</b>	0.00	0.00	1.00	24.00	79.00	0.00	1.00	6.00	51.00	42.00
<b>Skills Acquisition</b>	0.00	10.00	9.00	46.00	31.00	6.70	0.00	26.7	46.70	20.00

From table 1, nearly all the students (99%) at least agree that CBL is relevant to their future practice. As for skill acquisition, about 46% of male and female MBBS students agree that it enhances their skill acquisition. SD= strongly disagree, D= disagree, UD= Undecided, A= Agree, SD= strongly agree

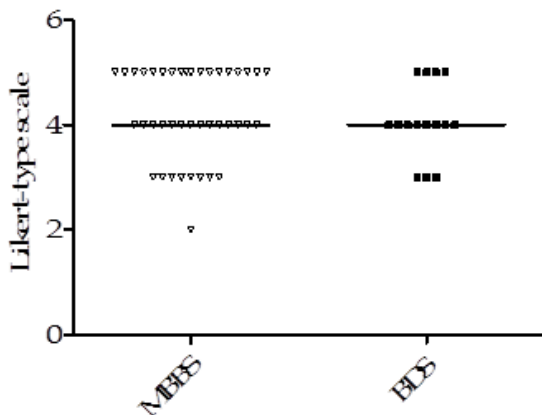


Figure 1: Program-based Comparison of MBBS and BDS Students' Responses Inquiry about CBL relative to their future Practice. Analysis by Mann-Whitney test with Mann-Whitney U = 271.0. No significant difference exists between male and female responses. P= 0.48.

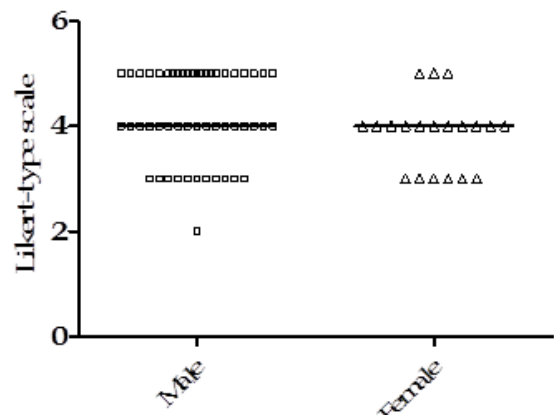


Figure 2: Gender-based Comparison of both MBBS and BDS Students' Responses Inquiry about CBL relative to their future Practice. Analysis by Mann-Whitney test with Mann-Whitney U = 384.5. The difference between male and female responses narrowly missed the significance level set to this analysis. P= 0.09.

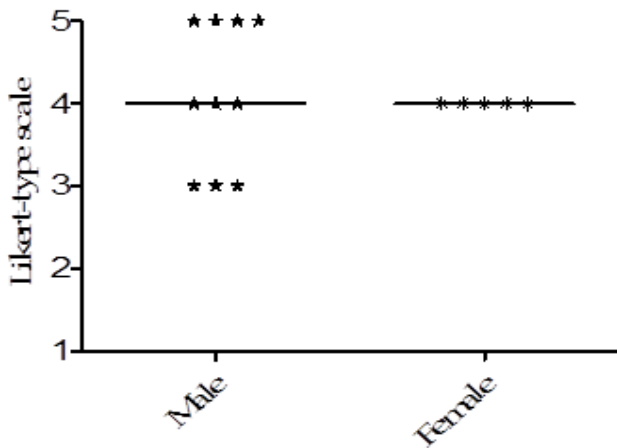


Figure 3: Gender-based Comparison of BDS Students' Responses Inquiry about CBL relative to their future Practice. The analysis was by the Wilcoxon test because the female column has only one repeated value. Which makes it unsuitable for Mann-Whitney analysis. No significant difference exists between male and female responses. P= 0.77.

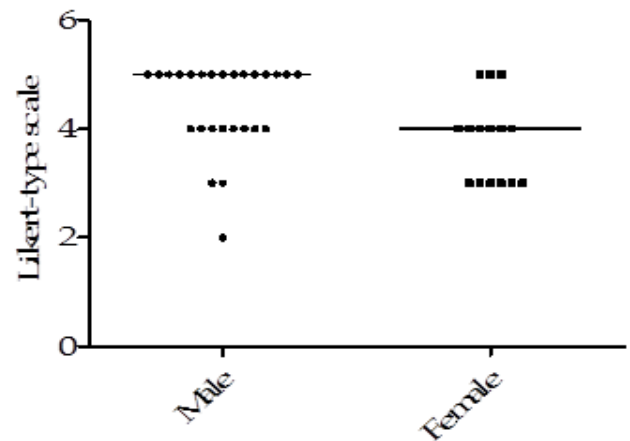


Figure 4: Gender-based Comparison of MBBS Students' Responses to inquiry about CBL relative to their future Practice. The analysis was by Mann Whitney test. Mann-Whitney U = 109.5. There exists a significant difference between the responses of the male and female students P= 0.0.1

**Discussion**

In clinical training, CBL often takes place in the discourse surrounding clinical cases. Practically, students take on the learning responsibility, while the teacher's role is mainly to develop cases and guide students. Although it has long been documented that students have preferences for CBL (7) and that this pedagogical method is becoming popular in medical education (3), studies attempting to find out how students perceive it in relation to their future practice are rare in literature. Core to the aim of medical education is to produce professionals whose clinical practices are of expected standards; and evidence exists that CBL helps in the realization of this aim. (8). Base on the analysis of students' responses, the program of study did not influence students' perception of CBL in relation to their future practice. Very importantly, however, analysis of the results indicates that gender plays a subtle influence on how students perceive CBL concerning their future practice. Taken down the gender divide across the two disciplines, the differences between male and female students' perceptions narrowly missed the predetermined significant point set for the analysis. On a program basis, female MBBS students are significantly less optimistic in their perception of CBL in relation to their future practice. The reason for this gender difference cannot be directly deduced from the available data and will require future study to understand it. However, an early investigation has shown the possibility and existence of difference in the attitudes and examination performance of female and male medical students in an active, case-based learning program in anatomy (9). The motivation behind the students' expectation that their future practice would benefit from CBL needs to be further examined. As in the current study, a properly implemented CBL pedagogy immediately allows the differences between CBL and traditional didactic lecture to manifest in some major areas, which are knowledge and information management;

human resources management; and interpersonal relationship management (10). These three key elements are essential to successful future career performance. One, students who realize that their ability to use the knowledge they already have to source for relevant information and analysis of cases are very likely to have the impression that their future practice will be better off if their medical or dental training is structured around CBL (11). Two, CBL is known to be less boring and therefore, students who received their training with the impression that their teachers have adopted a pedagogical method that enable them (the students) to put their time into good use will very likely expect that their future practice will be better off with such pedagogical method. Finally, CBL-stimulated cooperative interaction among student to solve cases, this prepares such students for teamwork in their future practice which now demand a multidiscipline approach to patient care (12). Since CBL equally deepens the interpersonal relationship between a learner and a teacher, the possibility of a lifelong professional relationship can raise the learner's hope of successful future practice. The high positive rating that the students gave to CBL in relation to skill acquisition and their future practice suggests their satisfaction with the pedagogical method and this is in agreement with previous works reporting student satisfaction and perceptions of CBL inter-professional learning (14, 15).

**Conclusion**

This study provides empirical evidence to prove that CBL raises students' hope of becoming better practitioners in the future. The ability of CBL pedagogy to induce high expectations to students about their future career practice is a strong call to policymakers and medical teachers to make the paradigm shift to CBL in Nigeria medical education. As clearly demonstrated in this study, students' positive expectation following the use of CBL derives from some of its advantages. In particular, students

are likely to expect that CBL will enhance their future practice because of its integrative nature. Besides, our results indicate that students considered CBL as an effective method to improve their skill acquisition which includes clinical reasoning, diagnosis, and logical thinking. Taken together, our data suggest that medical teachers should endeavor to adopt pedagogical methods that empower students to become better practitioners at the end of their training.

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