

ORIGINAL RESEARCH REPORT

Case-based learning paradigm: The role of gender program interface on knowledge acquisition process

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ABSTRACT

The effectiveness of any pedagogical method is reflected on learners perception of key elements involved in the process of knowledge acquisition. The adoption of case-based learning is asserted to deliver superior positive influence on how students perceive learning process. The current study was designed to analyze and understand how students perceive the impact of CBL on learning process. Fifty six consenting 5th year medical and dental students were randomly selected to participate in the study. The students were taught three selected topics using CBL as against the didactic lecture they were used to. At the end of the classes, the students were given a well-structured questionnaire to respond to in Likert-type of scale. Responses were analyzed with simple percentage and Mann-Whitney U test. Analyses reveal that the students rated its influence on learning process quite favorably. More than 80% of all the students agreed that CBL motivates personal study and promotes better student participation. However, while 76% ($n =$ of male students strongly agreed that CBL fosters student-teacher interaction, only 40% of their female counterparts share that opinion to the same level. Overall, the way key elements were rated by the students demonstrated strong gender-program complexity. The high ratings that the students gave CBL suggest that adoption of CBL as a mean pedagogical method will enhance student learning experience, a factor that is critical to improving student performance at examination and future practice. However, the adoption and implementation of CBL should be gender and program sensitive to maximize its benefits and as such it recommended that further studies be carried on the influence gender and program of study on the effectiveness of CBL.

Key words: Case-based learning, gender, knowledge, learning process

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INTRODUCTION

Case-based learning (CBL) is a relatively new pedagogical method within the Nigerian medical education system. Although it said to be a derivative of or similar to the little bit familiar problem-based learning.^[1] CBL is a mostly distinctive pedagogical method that presents a situation with some clinical background information on the patient. A major defining characteristic of CBL is that

students are required to draw on previous experience and knowledge to effectively handle the case at hand. This put the students at the center stage, where the teacher only guides the students to solve clinical problems using knowledge and clinical practice experience acquired in the past.^[2]

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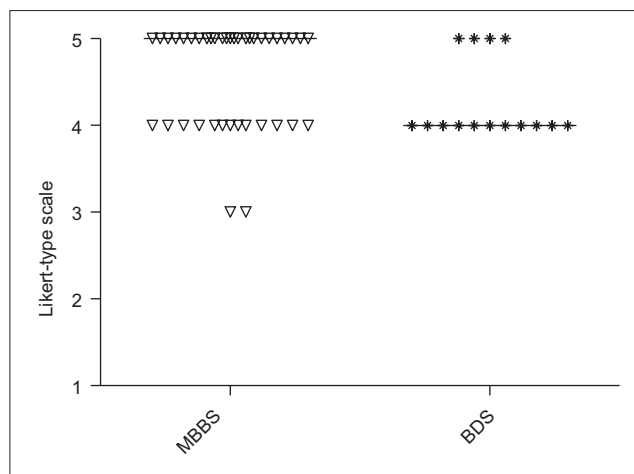


Figure 1: Program-based comparison of MBBS students' responses inquiry about CBL makes learning interesting and fun. The analysis was done by Mann–Whitney test. Mann–Whitney U = 203.50. There exists a significant difference between the median of male and female responses P (two-tailed) = 0.04

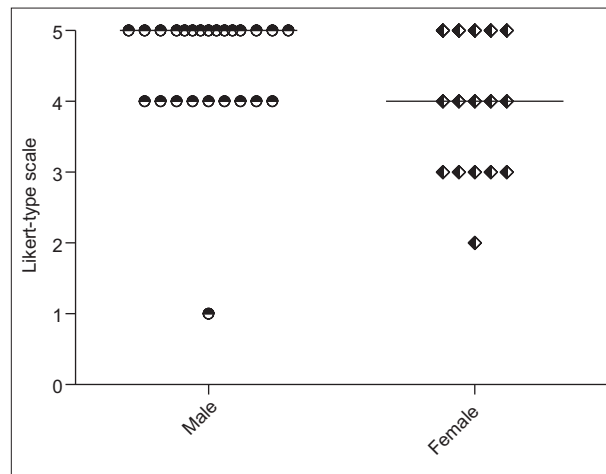


Figure 2: Gender-based comparison of MBBS students' responses inquiry about CBL fosters student–teacher interactions. The analysis was done by Mann–Whitney test. Mann–Whitney U = 121.00. There exists a significant difference between the median of male and female responses P (two-tailed) = 0.02

In general, cases are written to place events in a context or situation that promotes authentic learning.^[3] To apply CBL, a teacher must provide the students with the raw materials to work with which basically requires the teacher to write a case that provides the students with background and clinical information on the patient.^[4] With the guidance of the teacher, the students, usually in small groups, and use the previous knowledge to analyze the case and arrive at acceptable conclusions. Students invariably gain new knowledge during the guided analysis. This learning method is opposed to the traditional didactic lecture where the teacher merely informs or indoctrinates the students with what he knows or thinks.

However, for CBL to be effective, it must be based on real clinical problems and tailored to stimulate and underpin the acquisition of knowledge and skills.^[1] Where properly applied, reports have shown that students enjoy CBL because they perceive that it enhances their learning ability.^[5]

Medical education in many advanced countries now heavily relies on CBL as the preferred pedagogical method for its obvious advantages. For instance, it has been shown that the merits of CBL include increase in students' enthusiasm during the learning process. Besides, CBL prime students to develop critical thinking skill, perform self-assessment more accurately, personalize, and improve learning process, as they acquire competence in integrating theory with practice. Perhaps, most worthy of emphasis is the fact that evidence has shown that CBL encourages teamwork and team spirit, two critical skill sets that are becoming ever more important in multidiscipline approach to patient management.

However, it is important that the applicability of CBL be thoroughly evaluated before is wholesale adoption in any

given environment and to any given program of the study. This much-needed evaluation has not been extensively carried within the Nigerian medical and dental education system. This study was, therefore, designed to evaluate students' perception of CBL on the process of knowledge acquisition in the College of Medicine of the University of Lagos. Undertaking further research in this area is important to develop an effective pedagogical method that maximizes students' ability to attain the objectives of the curriculum that guides their undergraduate training.

METHODS

Three cases were written around relevant topics in the medical curriculum of the College of Medicine, University of Lagos. Then, the announcement was made for willing participants to indicate interest in the study. Fifty-six consenting 5th year medical and dental students were then randomly selected to participate in the study. The students were taught the three selected topics using CBL as against the didactic method of lecturing they were used to. At the end of the CBL classes, the students were given a well-structured questionnaire respond to Likert-type scale. All participants returned the questionnaire, and their responses were statistically analyzed by simple percentages and Mann–Whitney U-test using Graphpad Prism version 5.0 (Graphpad Prism Software, Inc., San Diego, CA, USA).

RESULTS

As shown in Table 1, all female MBBS student at least agree that CBL promotes team work, whereas <65% of their male counterpart shared this view. However, ≥90% of the male MBBS students as opposed to 60% of their female counterparts are of the view that CBL is interesting and fun.

Table 1: Medical students' responses transformed on Likert-type scale

Percentage	Male MBBS					Female MBBS				
	SD	D	I	A	SA	SD	D	I	A	SA
Teamwork	9.09	9.09	20.00	45.45	27.27	0.00	0.00	0.00	60.00	40.00
Personal study	0.00	18.18	18.18	36.36	27.27	0.00	0.00	20.00	40.00	40.00
Teacher-student interaction	0.00	0.00	0.00	63.63	36.36	0.00	0.00	0.00	80.00	20.00
Student participation	0.00	0.00	9.09	63.63	27.27	0.00	0.00	0.00	60.00	40.00
Interesting and fun	4.00	0.00	0.00	36.00	60.00	0.00	6.67	33.33	26.67	33.33
Look forward to next class	0.00	4.00	8.00	52.00	36.00	0.00	6.67	60.00	36.13	20.00

SD=Strongly disagree, D=Disagree, I=Indifference, A=Agree, SA=Strongly agree

Table 2: Dental students' responses transformed on Likert-type scale

Percentage	Male BDS					Female BDS				
	SD	D	I	A	SA	SD	D	I	A	SA
Teamwork	0.00	0.00	20.00	32.00	48.00	0.00	0.00	27.00	33.00	40.00
Personal study	0.00	0.00	0.00	44.00	56.00	0.00	0.00	13.30	53.3	33.30
Teacher-student interaction	0.00	0.00	0.00	24.00	76.00	0.00	0.00	13.30	46.70	40.00
Student participation	0.00	0.00	0.00	32.00	68.00	0.00	0.00	20.00	20.00	60.00
Interesting and fun	0.00	0.00	36.36	27.27	36.36	0.00	0.00	0.00	100.00	0.00
Look forward to next class	0.00	9.10	36.36	36.36	18.18	0.00	20.00	20.00	60.00	0.00

SD=Strongly disagree, D=Disagree, I=Indifference, A=Agree, SA=Strongly agree

As show in Table 2, all medical students at least agreed that CBL enhances student participation as against 80% of dental students who shared this same view. However, all dental students agreed that CBL makes interesting and fun as opposed to <65% of medical student who thought so.

DISCUSSION

The traditional mode of teaching requires the teacher to labor to indoctrinate the students with the contents of academic syllabus.^[6] The traditional method of teaching is a teacher-dominated activity, where the teacher is the center of the interaction and the students are required to passively assimilate the knowledge being communicated by the teacher. In worse cases, the learner is expected to memorize that is being taught without questioning the rationale and implication. The deficiency of this method of learning should ordinarily be apparent to all as it runs contrary to ethos of science, but the fact that it still dominates medical education in Nigeria is a testimony to human's reluctance to up familiar methods for unfamiliar one independent of benefit factor.^[7,8]

Although most medical schools have more male students, no clear cut evidence of gender differences in cognitive capacity has been reported. The way students perceive a learning methods directly impact on their ability to maximally benefit from it. Although medicine and dentistry are tough courses, it does not mean that learning them should be irritating and burdensome. When student perceives classroom activity as fun rather than boring, it will certainly enhance their ability to understand and recollect what is being learned later.^[7]

Our study did not gather data that could convincingly explain the factor(s) underlining the differences seen along

the line of gender and program of the study. However, the observed responses sufficiently hint that although CBL may generally be considered more advantageous, not every learner is going to perceive it so and it may even work better in some disciplines than others as shown in Figure 1. This study has also demonstrated that not only program of study, but gender (as shown in Figure 2) may also influence how students perceive the merits of CBL. It remains to be seen, through future studies, if these observations are group-specific and/or time-specific. However, based on these observations, it is sufficient to point the need for teachers to be sensitive to the possibility of gender differences in students' response to and perception of CBL.

There is a dearth of adequate reports on gender differences in students' perception about CBL. Peplow^[4] demonstrated the existence of gender differences in students' perception of and achievement in CBL program. In particular, Peplow^[4] showed that the undergraduate female anatomy students in the study viewed the construct of CBL better than their male counterparts. The study further revealed that female students performed better than male students under CBL pedagogical methods. Overall, the implication our study is clear and suggests the need to take gender into consideration in medical and dental pedagogy.

In the current study, there were similarities between the responses of male and female students; however, the differences observed warrant careful scrutiny. When students do not look forward to the next class, any excuse is as good as another to be absent. The adoption of CBL, therefore, requires that teachers pay particular attention to any set of students who suddenly engage in truancy. The lack of motivation to attend classes may be a manifestation of deeper reasons, which CBL may inadvertently or

inevitably brings to the surface. For instance, students who are shy at the beginning find the need to interact with classmates and the teacher intimidating and consequently become demotivated to attend the next class.^[9-12] While this should not discourage the adoption of CBL, any teacher will do good to notice such students and help them to take advantage of CBL. However, it is difficult, based on the results of the present study, to conclude that female medical students are shyer than their male counterparts. However, the fact that they rated CBL low on being interesting, fun, and less likely to motivate them to look forward to the next class requires particular attention. Compounding this is the fact that this set of students are unanimous on the fact that CBL encourages teamwork, enhances student-teacher interaction, and promotes student participation.

With the opportunity to engage in teamwork and interact with one's teacher, it would have been expected that the students would consider that experience interesting and fun and then eagerly look forward to the next class.^[13] Why this was not so with the female medical students is a matter for speculation requiring further studies for clarifications. Tentatively, however, this should alert the teacher to the nature of teamwork that subsists among the students. Where teamwork is dominated by a student with a strong personality, others may quietly resent the experience while not directly denying the existence of teamwork.^[14] This means that in CBL sessions, the teacher should endeavor to guide the student in such a way that no single student dominates the group to the resentment and discouragement of others. This must be particularly taken seriously as a matter of gender equality to ensure that male students do not suppress or ridicule their female counterparts as the female students volunteer their opinions during the analysis of the case at hand. If this is being carefully considered, it is likely that the teacher will be to come up with the real reason why a set of students could not adjudicate CBL as making learning interesting and fun. The goal is to make sure that no set of students have to learn anything the hard way or get discouraged from attending classes.

Based on the program of the study, the dental students are significantly indifferent to CBL as making learning interesting and fun. As noted for the female medical students, the possibility of domination of one set of students over another during group discussion may cause the dominated group to rate CBL poorly as a pedagogical method that makes learning interesting and fun. Future studies that separately apply CBL to each program of the study are needed to truly elucidate how both medical and dental students perceive CBL in the process of acquiring relevant knowledge of their discipline.

CONCLUSION

The way male and female students, as well as the medical and dental students, rated the effect CBL on learning

process differ significantly in this study. This suggests that gender and program of the study are critical factors to be conscious in implementing CBL. Since the learner's need is the central factor in the choice of pedagogy to adopt, it is imperative that teachers carefully consider which gender or program is responding well to which teaching method. This means that adaptability and flexibility on the part of the teacher is necessary to effectively carry all students along in the classroom. Teachers are responsible to devise specific adaptations and modifications that are gender program sensitive as far as learning is concerned.

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Conflicts of interest

There are no conflicts of interest.

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