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Original Article

Comparison of Open Book Test and Closed Book Test for Its Impact on Summative Assessment

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Abstract

Objective: 1. To assess impact of open book and closed book assessment on summative assessment. 2.To know the perception of students on open book and closed book assessment. ***Design:*** Analytical observational study. ***Subjects/Patients:*** Students of MBBS Phase III, Part 1. ***Methods:*** The study is an analytical observational study conducted among MBBS Phase 3 Part 1 students of a Medical College. Total students enrolled in the study were 140. Enrolled students were divided into two groups (OBT & CBT). Comparison of score of summative assessment is compared with the method of assessment in formative. ***Results:*** The mean formative score for the OBT group was higher (31.15) compared to CBT (28.43). It shows OBT group achieved a higher mean score compared to the CBT group's. Significant association was found between test score and test group with t value of 2.2613. ***Conclusion:*** The findings suggests that OBT has better impact on summative assessment compared to CBT.

Keywords: ***Assessment, Closed book test, formative assessment, Open book test, Summative assessment.***

Introduction

One fundamental component of existing education system is the approach through which we test our students. Based on the choice of assessment we choose that will allow examiner to assess higher-level cognitive skills where multiple-choice questions (MCQs) are adopted, short answer questions (SAQs) tests lower-level cognitive skills such as factual recall etc irrespective of the type of assessment adopted i.e open book test (OBT) or closed book test (CBT) based on if students were allowed to bring their study materials, textbooks or notes into examination. The tradition CBT that are administered currently assesses nothing more than whether they have been are able memorize or not.

CBT said to be not a valid method of assessments as it mainly assesses retention, recall or short term memory and it does not accurately replicate the exact abilities of students [1].

One of the important disadvantages of closed-book examinations is that Students often feel pressured to engage in rote memorization solely for the purpose of reproducing information during examinations. This approach tends to result in "fragile knowledge"-a superficial understanding that quickly fades if its not consistently applied or critically reflected upon in real-world contexts [2-4].

OBT is been suggested as one of the suitable alternate method because it said to have various advantages like:

It is found to reduce anxiety in students and they feel less pressured by the prerequisite of memorizing information

It encourages students to use the learnt knowledge and apply it solve realistic problems that they overcome in real life.

Motivates students in wider reading on a particular subject from multiple sources

Facilitate critical thinking at higher cognitive levels which help in problem solving and reasoning in real life scenarios [5].

OBT is been largely described and analysed (Feller,1994). OBT is said to favor deep learning strategies and could be adopted as method to evaluate how students utilize available information rather than just memorizing huge amount of data. Hence OBT can be an approach that is low cost to investigate deeper cognitive strategies. Adopting OBT has previously showed a trend of better outcome for all or most of the students [6].

Though closed book assessment is the routinely followed method (for both formative and summative assessment) it has less role in motivating students in self-directed leaning and in depth learning. Open book test may motivate the students to be life long learners by enabling in depth learning and may have better out in summative assessment. This study was intended to investigate potential impact of open-book and closed-book tests on summative assessment.

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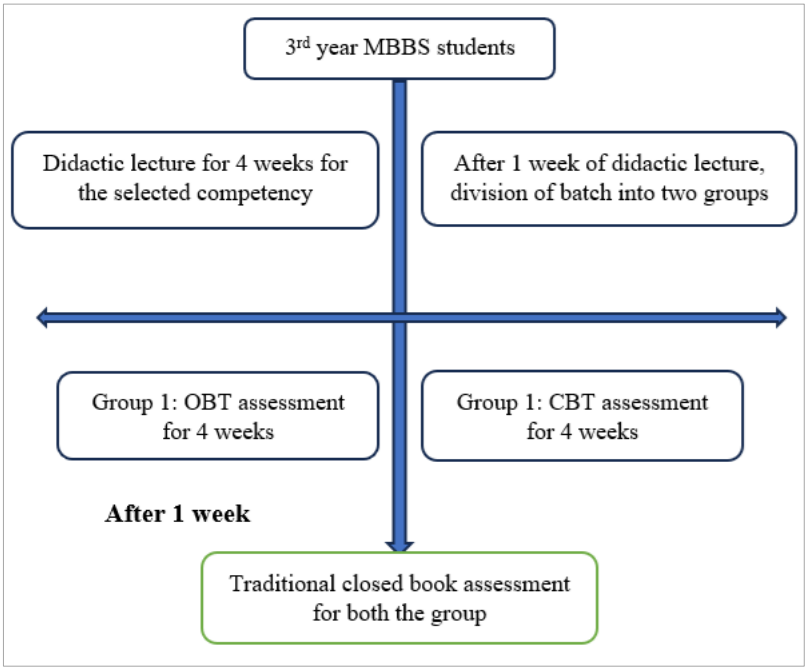
Methods

The study is an analytical observational study conducted among MBBS Phase 3 Part 1 students of Shri Atal Bihari Vajpayee Medical College, Bengaluru after obtaining approval from institutional ethical committee. All the 150 students of the particular batch were invited to participate in the study. Study was conducted among 3rd year MBBS students. Total students enrolled in the study were 140. Particular competency from community medicine was selected and the topic was taught to them as didactic lectures over period of 2 weeks. Students were divided into two equal groups with 70 students in each group. After 1 week of completion of didactic lecture, assessment was planned. Assessment date and method of assessment for both groups was announced to students 1 week prior. Group 1 was first exposed to traditional closed book assessment and group 2 took open book exam (date of exam was announced prior). Assessment questions were consisted of MCQs and short essay questions to ensure assessment of higher order thinking and lower cognitive skills. Assessment was conducted every week, consequently for four weeks. After one week of completion of formative OBT and CBT, summative (traditional closed book test) assessment was conducted for both the groups. To collect data on perception of students on OBT from both the groups, as group 1 was exposed to CBT, they were given OBT after completion of summative assessment. Students who remained absent for either one of the assessments were excluded during final analyses of the data. Perception of students on OBT & CBT was collected using three point Likert's scale.

Data was entered in MS excel and analysed for descriptive statistics and to assess significant difference in test score between the two group independent t test was applied and p value is significant at value <0.1.



Results

Table 1: This table summarizes the performance of students from the OBT and CBT groups (n=40 each) in both formative and summative assessments. The OBT group demonstrated higher average scores than the CBT group across both assessment types. The mean formative score for the OBT group was higher (31.15) compared to CBT (28.43). The findings showed similar trend even in summative assessment. The range of scores indicates a broader spread in the CBT summative group, with a minimum score of 26 and a maximum of 31, compared to a range of 21 to 35 in the OBT summative group.

Graph 1: This box plot compares summative assessment performance of students between OBT and CBT conditions. It shows OBT group achieved a higher mean score of 29.53 compared to the CBT group's mean of 26.43, representing a 3.1-point advantage (11.7% improvement). The OBT group demonstrated lower variability (SD = 2.10) compared to the CBT group (SD = 2.97), indicating more consistent performance across participants in the open book condition. Both groups show relatively normal distributions with the OBT scores clustered more tightly around the median, while CBT scores exhibit greater spread.

Table 2: This table compares summative assessment outcomes between the two groups using inferential statistics applying independent t test to determine the association between the mode of assessment and student performance. The **mean summative score** in the OBT group was **29.53** (SD = 2.10), while the CBT group had a lower mean of **28.43** (SD = 2.97) with median scores of 29 and 28 for the OBT group and CBT group respectively. The p-value is **considered significant at p < 0.1**. Significant association was found between test score and test group with t value of 2.2613. This suggests a **potential positive effect of open book assessments** on students' summative performance

Table 3: This table presents student perceptions on various aspects of the open book examination format. Positive learning outcomes were reported by many students. More than half of the students (62%) agreed that open book exams changed their learning behaviour, believed it improved conceptual understanding (59%), and it enhanced critical thinking and higher-order skills (53%). Participants also felt OBT reduces stress and anxiety and it contributes to improve focus and concentration.

A majority (84%) of the participants considered open book exams to be easier compared to closed book tests and more than 2/3rd believed that scoring good marks was very common in OBT assessments.

More than 2/3rd (79%) of the students acknowledged that OBTs required more time to write adequate answers based on the available material. Interestingly very few (12%) had prior experience with OBTs, but more than half of them (71%) expressed the need for more frequent implementation of this format before summative assessments.

Opinions were divided on whether OBTs reflect real-life scenarios better than closed book exams, with only 37% agreeing and 48% disagreeing. These findings highlight a generally favourable perception of open book assessments among students, with specific advantages in stress reduction, deeper understanding, and critical thinking. However, logistical concerns such as time management and lack of prior exposure remain areas for improvement.

Table I: Descriptive statistics of study participants in OBT and CBT

Statistic	OBT group formative score (n=40)	OBT group Summative score (n=40)	CBT group Formative score (n=40)	CBT group Summative score (n=40)
Mean	31.15	29.53	28.43	26.43
Minimum	24	21	22	2
Maximum	37	35	35	31
Median (50th %)	31	29	28	27
Standard Deviation	3.20	2.10	2.97	3.75

Abbreviation 1: OBT: open book test; 2: Closed book test

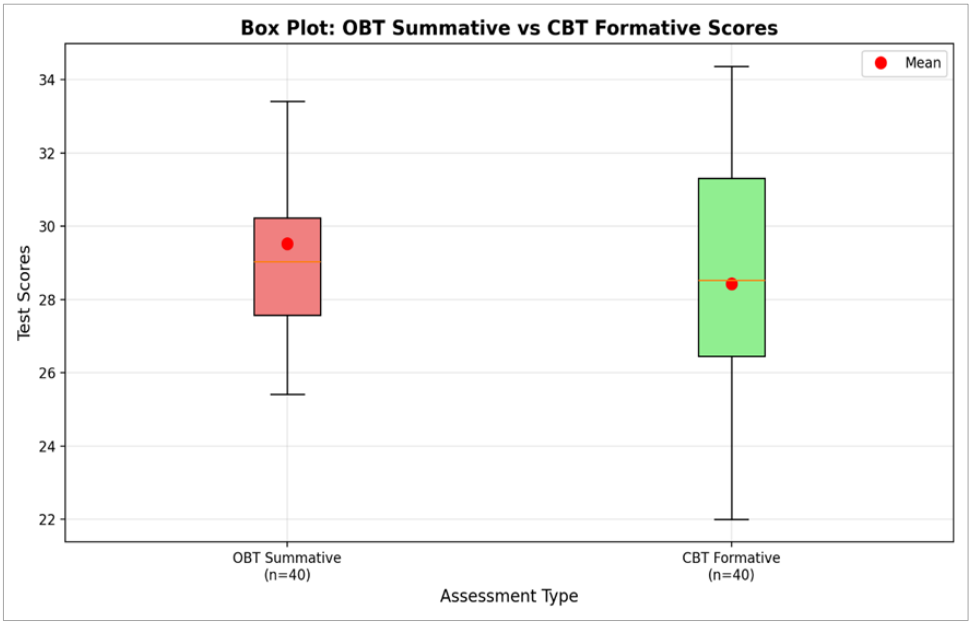


Fig. 1: Box plot showing summative assessment comparison between OBT and CBT

Table II: Association between type of assessment and the students score in summative assessment

	Open Book Test Group Summative Score (n=40)	Closed Book Test Group Summative Score (n=40)	*p value- 0.0761
Mean	29.53	28.43	
Median	29	28	
Standard deviation	2.10	2.97	

**p value considered significant for value < 0.1, t value- 2.26126*

Table III: Distribution of students based on perceptions on open book exam

Perception of participants	Agree (%)	Neutral (%)	Disagree (%)
Do you prefer open book test than conventional closed book test	47	19	34
Open book exam wastes lot of time	30	23	47
Impact of open book test changes learning behaviour	62	15	23
Open book test promotes critical thinking and enhances higher-order skills	53	11	36
Open book test avoids stress and anxiety of examination	57	6	37
Open book test is better for the concepts and understanding of the subject	59	11	30
Scoring good marks in open book exam is common	78	5	17
Open book exam is easier compared to closed book	84	03	13
Open book exam is good for application of knowledge in real life scenarios	53	0	47
Open book exam reflects real life situations compared to closed book exam	37	15	48
Time required is more for open book exam to write adequate and appropriate answer	79	02	19
Open book exam enhances focus and concentration for grasping the content	61	07	32

I felt adequately prepared for the open book exam	67	09	24
Open book exam allowed me to demonstrate my understanding of the subject	63	0	37
Do you have previous experience of Open book exam	12	0	88
Are frequent Open book exam needed before summative exams?	71	06	23

Discussion

This study compared the impact of open book tests (OBT) and closed book tests (CBT) on summative assessment performance and student perceptions among third-year MBBS students. The findings of our study adds on to the ongoing argument on the most impactful assessment strategies in medical education.

Assessment of Cognitive Skills

Traditional CBTs mainly assess students ability to recall information, which mainly encourages students in rote memorization of information and short-term retention of information instead of deep understanding or knowledge application. Previous available literature emphasises that assessments that assess mainly recall may only lead to "fragile knowledge," which will be easily forgotten if its not regularly applied or critically assessed in real-world scenarios [7].

CBT in comparison to OBTs are intended to evaluate higher-order cognitive skills which includes critical thinking problem-solving, and knowledge application which facilitates in aligning the competencies more closely required in medical practice [7].

Student Performance and Outcomes

Results of the study signify that students who are exposed to OBTs had better performance in summative assessments conducted subsequently in comparison to the students who were assessed mainly with CBTs. The finding in this study aligns with previous research findings indicating that OBTs encourages deeper learning strategies and has better long-term retention.

Conversely, closed-book practice tests correlated with better performance on related exam questions in non-medical settings, highlighting discipline-specific variability. Hybrid approaches may balance these effects, as open-book formats reduce anxiety without compromising question difficulty.

Exposures of students to frequent OBT offers an opportunity for students to explore the available resources may in turn contribute to reduce assessment anxiety, which motivate students to focus on in-depth learning of concepts and its application instead of memorization. Further, exposure to OBTs may have promoted students to develop effective study habits and develop the skill of self-directed learning, which are critical components that are vital for becoming a lifelong learner for medical students.

Student Perceptions

Student perception collected using Likert scale showed a generally positive perception on OBTs method of assessment. Study participants reported experiencing less anxiousness and were more motivated to involve themselves in depth reading and critical analysis of the problem given. These findings were found to be consistent with the study results by Dale et al. (2009).

Similar findings in postgraduate courses noted improved engagement with materials during open-book assessments. However, some students perceive OBTs as more challenging due to higher-order questions, which may inadvertently increase cognitive load [13,14].

The students perceived that OBTs encourages application of learned information to realistic situations which suggests that exposure to such assessments may facilitate in better preparing the students in clinical practice.

Implications for Medical Education

The findings of the study support that by integrating OBTs in formative assessment into medical curricula may encourage students in in depth learning of the subject and also facilitate in critical thinking. Though CBTs is the standard tool adopted for both formative and summative assessments, it has less role in promoting in-depth understanding and motivating students in self-directed learning are distinct. Incorporating frequent OBTs along with CBTs may assist students in cultivating habit of self-directed, in-depth and lifelong learners which in turn may make medical students capable of adapting to the emerging needs and challenges of healthcare [15].

Conclusion

The comparison of OBT and CBT in this study exhibits that OBTs can positively impact performance of students. The findings of the suggests that when a balanced approach of OBT and CBT is, incorporated in formative assessment, may contribute to prepare medical students effectively for summative assessment and may also motivate by changing the learner behaviour to be a lifelong learning

Limitations

- This study was conducted including small portion of syllabus, focused on a specific competency in community medicine, which may limit the generalizability of the results.
- Short duration of the intervention may have impacted the results in summative assessment

Declarations

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Conflict of interest

None

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Nil

Ethical Clearance

Ethical approval obtained from institutional ethical committee

References

[1] Morris Feller Phoenix OPEN-BOOK TESTING AND EDUCATION FOR THE FUTURE. Studies in Educational Evaluation, Vol. 20, pp. 235-238, 1994)

[2] Entwistle NJ. Understanding Student Learning. London: Croom Helm, 1983.

[3] Ramsden P. Learning to Teach in Higher Education,2d ed. New York: RoutledgeFalmer, 2003.

[4] Wakeford R. Principles of assessment. In Fry H, Ketteridge S, Marshall S, eds. A Handbook for Teaching and Learning in Higher Education: Enhancing Academic Practice. London: Kogan Page, 1999:58–69.

[5] Vicki H.M. Dale n Barbara Wieland n Birgit Pirkelbauer n Amanda Nevel. Value and Benefits of Open-Book Examinations as Assessment for Deep Learning in a Post-graduate Animal Health Course. JVME 36(4) 6 2009 AAVM: 404-410

[6] Charline Cade, Jérémie Riou, Isabelle Richard, Catherine Passirani, Elisabeth Letertre, Anne-Victoire Fayolle. Comparison of open and closed book test for admission in medical school. MedEdPublish (2016). 2018 Jan 25;7:25.

[7] Noel Entwistle. Understanding Student Learning. British Journal of Educational Studies. jan 1983; 32(3)

[8] Tarrant, M., Dazeley, S., & Cottom, T. (2009). Social categorization and empathy for outgroup members. British Journal of Social Psychology, 48(3), 427–446.

[9] Heijne-Penninga, Marjolein; Kuks, Jan B. M.; Hofman, W. H. Adriaan; Cohen-Schotanus, Janke. Influences of deep learning, need for cognition and preparation time on open- and closed book test performance. Medical education.2010:884-89

[10] Green SG, Ferrante CJ, Heppard KA. Using Open-Book Exams to Enhance Student Learning, Performance, and Motivation. J Eff Teach. 2016;16(1):19-35.

[11] Sam AH, Reid MD, Amin A. Assessing open-book examination in medical education. Med Educ. 2020;54(12):1123-1124.

[12] Gharib A, Phillips W. Cheat Sheet or Open-Book? A Comparison of the Effects of Exam Types on Performance, Retention, and Anxiety. Psychology. 2012;2(8):469-478

[13] Dermo, J. (2009). Open-book, open-web online examinations: Student perceptions. Assessment & Evaluation in Higher Education, 34(5), 565–579

[14] Dale, V. H. M., Wieland, B., Pirkelbauer, B., & Nevel, A. (2009). Value and Benefits of Open-Book Examinations as Assessment for Deep Learning in a Postgraduate Animal Health Course. Journal of Veterinary Medical Education, 36(4), 403–410.

[15] Ali G Alghamdi. Assessing Medical Student Perceptions of Open-Book Exams for Self-Directed Learning. Cureu. 2024 Apr 28;16(4):e59218