Perceptions of Undergraduate Medical Students Regarding the Written Exam System Used for Cognitive Assessment at Suez University

Hosam Hefny*

Department of Medical Education, Faculty of Medicine, Suez University, Suez, Egypt.

Abstract

Background: **Multiple Choice Questions (MCQs) and Modified Essay Questions (MEQs) are used at Faculty of Medicine, Suez University (FOMSU). They are significant due to their structured approach to testing wide areas of knowledge.** *Aim:* **To assess undergraduate medical students' perception regarding the written exam system that has been used at the Faculty of Medicine, Suez University (FOMSU), in order to recommend a plan for improvement.** *Methodology:* **cross-sectional study composed of 73 students, conducted at FOMSU; the participants were selected by comprehensive sample. the study was applied using two types of self-administrated anonymous questionnaires.** *Results:* **More than half of the students agreed that it took a lot of time to comprehend the stem of the MCQs to the extent of affecting the time consumed in responding to questions. Around 60% of the students agreed that the questions might have explicit answers that can be found in the stem of the MCQs without any necessity of its analysis. Approximately 47.9% of the students concurred that simple answers could be obtained for the questions in the problem of MEQs exams without having to analyze it.** *Conclusion:* **The perception of undergraduate medical students towards both types of written examinations was positive, though there were several areas that were recommended for change, such as clarity of questions and format. Several changes could be contemplated as reformulating the wording of MCQ stems to avoid unwarranted complication, ensuring MEQ questions are not too time-consuming and not too trivial, and adjusting time allocation to yield a better match between the needs of the examinations and the intellectual abilities of the students.**

Key words: MCQ, MEQ, knowledge, cognitive, assessment, written exam

Introduction

Assessment plays a very important role in medical education. It's not just about exams and grades, but more about understanding where students stand in their learning journey. [1] George E. Miller once pointed out that the way we assess students shapes how they learn. [2] There are different kinds of assessments, each serving its own purpose. Some help track progress along the way, while others measure what someone has learned by the end. Then there are diagnostic checks to see where gaps might be, and ongoing evaluations that keep tabs on improvement. It's not always straightforward, but it matters. [3] Medical school written exams come in different shapes and sizes, all trying to measure how much students really understand. There are basically two main ways they do this. One is the constructed response where you have to write out answers yourself - like with essay questions, or short written responses. The other way is the selected response as multiple choice, where you pick the right answer from options, they give you. At Faculty of Medicine, Suez University (FOMSU), they mostly use

*Corresponding Author: hosamhefny@gmail.com

multiple choice questions (MCQ) and modified essay questions (MEQ). These test formats work because they can check different kinds of knowledge in an organized way. The whole point is to see if students can think critically and apply what they've learned, not just memorize facts. [4]

Multiple-choice questions (MCQs) are very common in tests. They usually have a stem followed by a few possible answers, with only one being right. They can check a lot of material quickly. [5] These questions can test simple facts, but if they're written well, they can also see if students really understand and can apply what they've learned. One good thing about MCQs is that they save time you can test a lot of topics in one go. [4] Grading is also straightforward since answers are clear-cut, which helps avoid unfairness. [6] Sometimes, they don't really measure deep thinking unless they're made carefully. And let's be honest, some students just memorize answers without actually getting the concepts. That's always been a bit of a problem with this format [7]. Modified essay questions (MEQs), on the other hand, work differently from other test formats. They give students clinical scenarios and ask for open-ended answers. You have to show how you can take what you've learned and use it in situations that feel real. [6] What's good about MEQs is they check how you think through problems, not just what you remember. They mimic actual medical cases, so they see if you can make good decisions like a physician would. It pushes you to think deeply and apply knowledge in new ways. [4] Plus, since the answers are longer, teachers get a better sense of how

your brain works when solving tough problems [7]. Grading can sometimes feel subjective since different examiners might see things differently [6]. These kinds of questions also take up a lot of time students spend ages writing them, and teachers spend just as long marking them [4]. Both MCQs and MEQs have their uses in medical school. One's good for checking if you know a lot of facts, while the other's better for seeing how you think through problems. Honestly, using both probably gives the fairest picture of what students actually know and how they use it. [4] Thus, the current study explores how undergraduate medical students perceive the effectiveness and fairness of the written exam system used for knowledge assessment at FOMSU.

Subjects and Methods

The current cross-sectional descriptive study was conducted at FOMSU to assess undergraduate medical students' perceptions regarding the written exam system that has been used at this faculty during the academic year 2022-2023 in order to recommend a plan for improvement. The study population (n= 73 undergraduate medical students) was selected by comprehensive sample for all medical students studying Medical Education Course which was an elective course in the first clerkship phase. Medical students study Medical Education elective courses were selected because they study the core principles of medical education, making them more aware of assessment methods and better able to critically reflect on their own

examination experiences. Their exposure to educational theory positions them to provide more informed and meaningful feedback on the written exam system. Usually, MCQ exams was conducted online at Suez University' Examination Center, whereas MEQ exams was administered in a paper-based format in the lecture halls of the FOMSU.

Two self-administered anonymous questionnaires were used to: firstly: Assess students' perceptions concerning the system of Modified Essay Questions used for knowledge assessment, secondly: Assess students' perceptions regarding the system of Multiple-Choice Questions used for assessment of their knowledge. The questionnaires were distributed in paper-based format at the end of the Medical Education course sessions during the second semester of the 2022–2023 academic year, and responses were collected immediately after completion to ensure a high response rate and minimize recall bias. Both questionnaires included three sections: The 1st section: Questions for the logistics of the written exam. The 2nd section: Questions for the general characteristics of written exam paper. The 3rd section: Questions for the specific characteristics of written exam items. To verify that questions included in the questionnaire are understandable and relevant; a pilot test was conducted for 10 students (not included in the sample studied). Based on the results of this test some changes in the format and content of the questionnaire were made. Cronbach's alpha was found to be 0.875 which indicates high internal consistency.

In addition, the following were done to assure validity:

•   Content validity of the questionnaire was assessed through the subject area experts' review. A meeting was conducted with subject area expert who commented on the content of the questionnaire through adding further needed items or removing useless items.

•   The questionnaire was tested for validity through discussing them with the staff members of the Medical Education Department to test for clarity and intelligibility of the items of the questionnaires. Few items were considered vague by some of the members, and their opinions were considered in modifying those items and making them more comprehensible.

Data was coded and entered into a computer and processed using the Statistical Package for Social Sciences (SPSS) v. 17. Descriptive statistics were used, as frequency distribution (numbers and percentages). The level of p- value < 0.05 was considered as the cut-off value for statistical significance. Data was presented by tables and graphs like bar and pie charts.

Results

The results of this study are described in terms of 1. Distribution of the sample studied, 2. Logistics of the written exam, 3. Written Exam Paper, and 4. "Questions" in the written Exam.

It has been observed that the maximum contribution of the studied sample was from males was 64.4% and from females was 35.6% as shown in figure (1).

Distribution of the sample studied

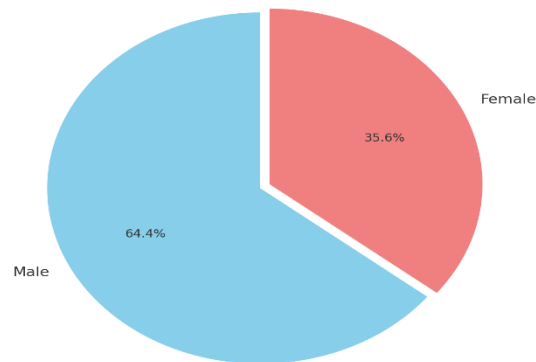Gender Distribution of the Studied Sample (n = 73)

Figure (1): Frequency distribution of the participants according to their gender

Educational Year Distribution of the Studied Sample (n = 73)
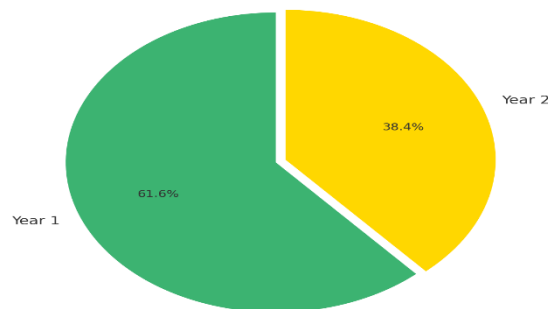

Figure (2): Frequency distribution of the participants according to their educational year

It has been observed that the maximum contribution of the sample studied was from the first educational year's students was 61.6% and from second educational year's students was 38.4% as shown in figure (2).

* **Logistics of the written exams (MEQ and MCQ)**

Regarding the students' opinion towards the MEQ exams' organization and management, the majority (more than 70%) agreed that the MEQ exams were well organized and properly arranged, the time allocated for the MEQ exams was adequate, and the venue of the MEQ exams was quiet, well-ventilated, adequately lighted, well-furnished, exam desks available for the MEQ exams were adequately spaced, enough number of observers were available all thorough the MEQ exams, there was representative from each department in the exam clarified vague issues in the exam paper, there was one exam paper per day, there was an adequate time break between exam papers in case more than one paper presented per day, and exam observers could deal with different exam emergencies (Medical emergencies, psychological reactions, cheating, using bathrooms, Students' grumble, etc.) as shown in table (1). Regarding the students' opinion

*Corresponding Author: hosamhefny@gmail.com

towards the MCQ exams' organization and management, the majority (more than 80%) agreed that the MCQ exams were well organized and properly arranged, the time allocated for the MCQ exams was adequate, and the venue of the MCQ exams was quiet, well-ventilated, adequately lighted, well-furnished, exam desks available for the MEQ exams were adequately spaced, enough number of observers were available all thorough the MEQ exams, there was representative from each department in the exam clarified vague issues in the exam paper, there was one exam paper per day, there was an adequate time break between exam papers in case more than one paper presented per day, and exam observers could deal with different exam emergencies (Medical emergencies, psychological reactions, cheating, using bathrooms, Students' grumble, etc.) as shown in table (2).

Table (1): Frequency distribution of the studied sample according to their opinion towards the organization and arrangement of the MEQ exams						
Organization and arrangement of the MEQ exams	Disagree F (%)	To some extent F (%)	Agree F (%)	Total	MEAN	SD
1. Time allocated for the MEQ exams was adequate	6	3	**64**	73	2.79	.576
	8.2	4.1	**87.7**	100.0		
2. The venue of the MEQ exams was quiet	8	2	**63**	73	2.75	.641
	11.0	2.7	**86.3**	100.0		
3. The venue of the MEQ exams was well-ventilated	1	-	**72**	73	2.97	.234
	1.4	-	**98.6**	100.0		
4. The venue of the MEQ exams was adequately lighted	2	-	**71**	73	2.95	.329
	2.7	-	**97.3**	100.0		
5. The venue of the MEQ exams was well-furnished	3	2	**68**	73	2.889	.4297
	4.1	2.8	**93.1**	100.0		
6. Exam desks available for the MEQ exams were adequately spaced	4	4	**65**	73	2.84	.500
	5.5	5.5	**89.0**	100.0		
7. Enough number of observers were available all thorough the MEQ exams	7	7	**59**	73	2.71	.634
	9.6	9.6	**80.8**	100.0		
8. There was representative from each department in the exam clarified vague issues in the exam paper	7	13	**53**	73	2.63	.656
	9.6	17.8	**72.6**	100.0		
9. There was one exam paper per day	7	7	**59**	73	2.71	.634
	9.6	9.6	**80.8**	100.0		
10. There was an adequate time break between exam papers in case more than one paper presented per day	10	7	**56**	73	2.63	.717
	13.7	9.6	**76.7**	100.0		
11. Exam observers could deal with different exam emergencies (Medical emergencies, psychological reactions, cheating, using bathrooms, Students' grumble, etc.)	6	11	**56**	73	2.71	.592
	8.2	15.1	**76.7**	100.0		
					2.7791	**.27482**

Table (2): Frequency distribution of the studied sample according to their opinion towards the organization and arrangement of the MCQ exams					
Organization and arrangement of the MCQ exams	Disagree F (%)	To some extent F (%)	Agree F (%)	Total	MEAN	SD
1. Time allocated for the MCQ exams was adequate	6	3	**61**	70	2.79	.587
	8.6	4.3	**87.1**	100.0		
2. The venue of the MCQ exams was quiet	6	1	**63**	70	2.81	.572
	8.6	1.4	**90.0**	100.0		
3. The venue of the MCQ exams was well-ventilated	2	-	**68**	70	2.94	.336
	2.9	-	**97.1**	100.0		
4. The venue of the MCQ exams was adequately lighted	1	-	**70**	71	2.97	.237
	1.4	-	**98.6**	100.0		
5. The venue of the MCQ exams was well-furnished	3	1	**67**	71	2.90	.419
	4.2	1.4	**94.4**	100.0		
6. Exam desks available for the MCQ exams were adequately spaced	10	3	**57**	70	2.73	.608
	14.3	4.3	**81.4**	100.0		
7. Enough number of observers were available all thorough the MCQ exams	4	7	**60**	71	2.79	.532
	5.6	9.9	**84.5**	100.0		
8. There was representative from each department in the exam clarified vague issues in the exam paper	10	3	**57**	70	2.67	.717
	14.3	4.3	**81.4**	100.0		
9. There was one exam paper per day	7	6	**58**	71	2.72	.637
	9.9	8.5	**81.7**	100.0		
10. There was an adequate time break between exam papers in case more than one paper presented per day	2	8	**61**	71	2.56	.751
	2.8	11.3	**85.9**	100.0		
11. Exam observers could deal with different exam emergencies (Medical emergencies, psychological reactions, cheating, using bathrooms, Students' grumble, etc.)	4	5	**61**	70	2.81	.519
	5.7	7.1	**87.1**	100.0		
					2.7909	**.23825**

General Characteristics of Written Exam Paper (MEQ and MCQ)

On analysis of the perception of the studied sample towards the general characteristics of the MEQ exam paper, about more than seventy percent of studied sample agreed that the MEQ were stated in clear language, free of linguistic defects, the questions were free from overlapping, so that one question does not aid in answering another, the questions were numbered in order throughout the test, and the questions measure a representative sample of the different cognitive functions. About 58% of the samples studied pointed out that the questions were written in order of increasing difficulty. Eighty-five percent stated that the questions measure a representative sample of the different cognitive functions as shown in table (3). Regarding the perception of the studied sample towards the MEQ directions in exam paper, about more than seventy percent of studied sample agreed that the directions were at the proper reading level, there were

directions for each part of the MEQ exam paper. The majority of the samples studied agreed that the spacing on the page contributed to the ease of reading (88.7%) as shown in table (3).

Table (3): Frequency distribution of the sample studied according to their perception towards the general characteristics of the MEQ exam paper						
General characteristics of MEQ exam paper	Disagree F (%)	To some extent F (%)	Agree F (%)	Total	MEAN	SD
1. The questions were stated in clear language	5	11	**56**	72	2.81	.490
	6.9	15.3	**77.8**	100.0		
2. The questions were free of linguistic defects	3	8	**62**	73	2.64	.653
	4.1	11.0	**84.9**	100.0		
3. The questions were free from overlapping, so that one question does not aid in answering another	6	11	**55**	72	2.68	.624
	8.3	15.3	**76.4**	100.0		
4. The questions were written in order of increasing difficulty	11	19	**42**	72	2.43	.747
	15.3	26.4	**58.3**	100.0		
5. The questions were numbered in order throughout the test	2	6	**64**	72	2.86	.421
	2.8	8.3	**88.9**	100.0		
6. The questions measure a representative sample of the different cognitive functions	2	9	**62**	73	2.82	.452
	2.7	12.3	**84.9**	100.0		
7. There were directions for the whole test	9	12	**52**	73	2.59	.704
	12.3	16.4	**71.2**	100.0		
8. There were directions for each part of the test	9	11	**52**	72	2.60	.705
	12.5	15.3	**72.2**	100.0		
9. The directions were concise	3	15	**53**	71	2.70	.545
	4.2	21.1	**74.6**	100.0		
10. The directions were at the proper reading level	5	10	**56**	71	2.72	.590
	7.0	14.1	**78.9**	100.0		
11. The directions included time limits	6	17	**49**	72	2.60	.643
	8.3	23.6	**68.1**	100.0		
12. The directions included how to record answers	6	14	**52**	72	2.64	.635
	8.3	19.4	**72.2**	100.0		
13. The spacing on the page contributed to the ease of reading	6	2	**63**	71	2.80	.576
	8.5	2.8	**88.7**	100.0		
					2.6843	.27676

On analysis of the perception of the studied sample towards the general characteristics of the MCQ exam paper, about more than seventy five percent of studied sample agreed that the MCQ were stated in clear language, free of linguistic defects, the questions were free from overlapping, so that one question does not aid in answering another, the questions were numbered in order throughout the test, and the questions measure a representative sample of the different cognitive functions. About 63% of the samples studied pointed out that the questions were written in order of increasing difficulty. Eighty six percent stated that the questions measure a representative sample of

the different cognitive functions as shown in table (4). Regarding the perception of the studied sample towards the MEQ directions in exam paper, about more than sixty five percent of studied sample agreed that the directions were at the proper reading level, there were directions for each part of the MEQ exam paper. The majority of the samples studied agreed that the spacing on the page contributed to the ease of reading (91.5%) as shown in table (4).

Table (4): Frequency distribution of the studied sample according to their perception towards the general characteristics of the MCQ exam paper

General characteristics of MCQ exam paper	Disagree F (%)	To some extent F (%)	Agree F (%)	Total	MEAN	SD
1. The questions were stated in clear language	2	8	**61**	71	2.83	.447
	2.8	11.3	**85.9**	100.0		
2. The questions were free of linguistic defects	9	8	**54**	71	2.63	.702
	12.7	11.3	**76.1**	100.0		
3. The questions were free from overlapping, so that one question does not aid in answering another	7	3	**61**	71	2.76	.620
	9.9	4.2	**85.9**	100.0		
4. The questions were written in order of increasing difficulty	9	17	**45**	71	2.51	.715
	12.7	23.9	**63.4**	100.0		
5. The questions were numbered in order throughout the test	2	7	**61**	70	2.84	.439
	2.9	10.0	**87.1**	100.0		
6. The questions measure a representative sample of the different cognitive functions	5	5	**60**	70	2.79	.562
	7.1	7.1	**85.7**	100.0		
7. There were directions for the whole test	11	5	**55**	71	2.62	.744
	15.5	7.0	**77.5**	100.0		
8. There were directions for each part of the test	13	8	**49**	70	2.51	.794
	18.6	11.4	**70.0**	100.0		
9. The directions were concise	12	13	**46**	71	2.48	.772
	16.9	18.3	**64.8**	100.0		
10. The directions were at the proper reading level	7	9	**55**	71	2.68	.650
	9.9	12.7	**77.5**	100.0		
11. The directions included time limits	6	15	**50**	71	2.62	.641
	8.5	21.1	**70.4**	100.0		
12. The directions included how to record answers	10	9	**52**	71	2.59	.729
	14.1	12.7	**73.2**	100.0		
13. The spacing on the page contributed to the ease of reading	4	2	**65**	71	2.86	.487
	5.6	2.8	**91.5**	100.0		
					2.6703	.34496

Specific Characteristics of "Questions" in written Exam

As illustrated in table 5, in MEQ exam, about more than Eighty percent of studied sample agreed that MEQ is appropriate for measuring students' achievement, the MEQ is designed to measure complex learning outcomes beyond recall of factual knowledge, the MEQs made clear what is being measured, all students were

required to answer the same questions, and the questions usually stated in harmony with the problem. More than sixty five percent of the studied sample agreed that the questions made clear how the answer will be evaluated, terms used in the questions clarified what exactly is requested from the student to do (e.g., using "describe" not "write about"), enough time has been indicated for each question, exam problems were comprehensive to provide enough coverage of the studied topics of different disciplines, and answering of the questions was dependent on understanding the problem.

The participants (46.5%, table 5) disagreed that understanding the problem required much time to the extent that affected the time for answering the questions. On the other hand, 39.4% agreed that understanding the problem required much time to the extent that affected the time for answering the questions. About 48.6% of the samples studied disagreed that the exam problems could be described as trivial to the extent that they do not need analysis. On the other hand, 31.4% agreed that the exam problems could be described as trivial to the extent that they do not need analysis. About 47.9% of the samples studied agreed that direct answers for the questions could be found in the problem without the need for analyzing it as shown in table (5). More than fifty percent of the samples studied agreed that the allocation of a separate exam paper for each discipline better than the collection of integrated questions related to different disciplines within

the same exam paper as shown in table (5).

As illustrated in table 6, in MCQ exam, about more than Eighty percent of studied sample agreed that MCQ is appropriate for measuring students' achievement, the MCQ is designed to measure complex learning outcomes beyond recall of factual knowledge, the MCQs made clear what is being measured, the questions made clear how the answer will be evaluated, all students were required to answer the same questions, enough time has been indicated for each question, the questions usually stated in harmony with the problem, and answering of the question was dependent on understanding the stem. More than seventy percent of the studied sample agreed that terms used in the questions clarified what exactly is requested from the student to do, and MCQs were comprehensive to provide enough coverage of the studied topics of different disciplines. The participants (52.9%, table 6) agreed that understanding the stem required much time to the extent that affected the time for answering the questions. About 60% of the sample studied agreed that direct answers for the questions could be found in the stem without the need for analyzing it. On the other hand, 44.9% agreed that the stems of the MCQs could be described as trivial to the extent that they do not need analysis. Fifty-eight percent of the sample studied agreed that the allocation of a separate exam paper for each discipline is better than the collection of integrated questions related to different disciplines within

the same exam paper as shown in table (6).

Table (5): Frequency distribution of the studied sample according to their perception towards the specific characteristics of the MEQ						
Specific characteristics of MEQ	Disagree F (%)	To some extent F (%)	Agree F (%)	Total	MEAN	SD
1. This type of questions is appropriate for measur students' achievement	6	7	**59**	72	2.74	.605
	8.3	9.7	**81.9**	100.0		
2. The question is designed to measure complex learning outcomes beyond recall of factual knowledge	7	7	**58**	72	2.71	.638
	9.7	9.7	**80.6**	100.0		
3. The questions made clear what is being measur	4	8	**59**	71	2.77	.540
	5.6	11.3	**83.1**	100.0		
4. The questions made clear how the answer will l evaluated	5	12	**53**	71	2.70	.619
	7.0	16.9	**74.6**	100.0		
5. Terms used in the questions clarified what exac is requested from the student to do (e.g., using "describe" not " write about ")	4	12	**56**	72	2.72	.562
	5.6	16.7	**77.8**	100.0		
6. All students were required to answer the same questions	4	5	**63**	72	2.82	.513
	5.6	6.9	**87.5**	100.0		
7. Enough time has been indicated for each questi	13	6	**53**	72	2.56	.785
	18.1	8.3	**73.6**	100.0		
8. The questions usually stated in harmony with th problem	4	6	**60**	70	2.80	.528
	5.7	8.6	**85.7**	100.0		
9. Answering of the questions was dependent on understanding the problem	11	13	**48**	72	2.51	.750
	15.3	18.1	**66.7**	100.0		
10. Understanding the problem required much tim to the extent that affected the time for answering the questions	**33**	10	28	71	1.93	.931
	46.5	14.1	39.4	100.0		
11. Direct answers for the questions could be foun in the problem without the need for analyzing it	25	12	**34**	71	2.13	.909
	35.2	16.9	**47.9**	100.0		
12. The exam problems could be described as trivi to the extent that they do not need analysis.	**34**	14	22	70	1.83	.884
	48.6	20.0	31.4	100.0		
13. Exam problems were comprehensive to provid enough coverage of the studied topics of differen disciplines	7	13	**50**	70	2.61	.666
	10.0	18.6	**71.4**	100.0		
14. Allocation of a separate exam paper for each discipline better than collection of integrated questions related to different disciplines within th same exam paper	24	8	**40**	72	2.22	.923
	33.3	11.1	**55.6**	100.0		
					2.5053	.27807

Table (6): Frequency distribution of the studied sample according to their perception towards the specific characteristics of the MCQ

Specific characteristics of MCQ	Disagree F (%)	To some extent F (%)	Agree F (%)	Total	MEAN	SD
1. This type of questions is appropriate for measuring students' achievement	4	6	**61**	71	2.80	.524
	5.6	8.5	**85.9**	100.0		
2. The question is designed to measure complex learning outcomes beyond recall of factual knowledge	6	5	**60**	71	2.76	.597
	8.5	7.0	**84.5**	100.0		
3. The questions made clear what is being measured	5	3	**63**	71	2.82	.543
	7.0	4.2	**88.7**	100.0		
4. The questions made clear how the answer will be evaluated	3	6	**59**	68	2.82	.487
	4.4	8.8	**86.8**	100.0		
5. Terms used in the questions clarified what exactly is requested from the student to do	8	7	**55**	70	2.67	.675
	11.4	10.0	**78.6**	100.0		
6. All students were required to answer the same questions	7	4	**60**	71	2.75	.626
	9.9	5.6	**84.5**	100.0		
7. Enough time has been indicated for each question	9	2	**59**	70	2.71	.684
	12.9	2.9	**84.3**	100.0		
8. The questions usually stated in harmony with the stem	4	2	**65**	71	2.86	.487
	5.6	2.8	**91.5**	100.0		
9. Answering of the question was dependent on understanding the stem	9	4	**58**	71	2.69	.689
	12.7	5.6	**81.7**	100.0		
10. Understanding the stem required much time to the extent that affected the time for answering the questions	27	6	**37**	70	2.14	.952
	38.6	8.6	**52.9**	100.0		
11. Direct answers for the questions could be found in the stem without the need for analyzing it	22	6	**42**	70	2.29	.919
	31.4	8.6	**60.0**	100.0		
12. The stems of the MCQs could be described as trivial to the extent that they do not need analysis.	29	9	**31**	69	2.03	.939
	42.0	13.0	**44.9**	100.0		
13. MCQs were comprehensive to provide enough coverage of the studied topics of different disciplines	8	7	**52**	67	2.66	.686
	11.9	10.4	**77.6**	100.0		
14. Allocation of a separate exam paper for each discipline better than collection of integrated questions related to different disciplines within the same exam paper	21	8	**40**	69	2.28	.906
	30.4	11.6	**58.0**	100.0		
					2.5911	**.30737**

Discussion

This study assesses undergraduate medical students' perceptions regarding the written assessment system used at the Faculty of Medicine, Suez University (FOMSU). It specifically focuses on MCQs and MEQs in terms of their organization, logistics, general characteristics, and

effectiveness in assessing students' knowledge and cognitive skills. Let's break down the results and provide a detailed discussion on each aspect:

Logistics of the Written Exams (MEQ and MCQ)

Most students seemed satisfied with how the MEQ exams were set up. A lot of them mentioned the timing worked well, and the places where they took the tests were decent—quiet enough, with good lighting and airflow. There were enough people keeping an eye on things, and the department folks made sure everything was clear. It looks like the way these exams were handled made it easier for students to focus. When it came to the MCQ exams, the feedback was pretty similar. More than 80% of students thought things ran smoothly. It seems like the school has figured out a good system for running these written tests without too many hiccups. Both types of exams had that in common—they were organized in a way that didn't add extra stress to the whole exam experience.

General Characteristics of the Written Exam Paper

Students generally felt the MEQ questions were clear and well put together. They didn't find any language issues, which is good because confusing wording can mess with how well a test actually measures what it's supposed to. Most thought the questions covered a decent range of thinking skills, though about 15 to 20 percent weren't totally convinced. It seemed like opinions were a bit mixed there. For the MCQs, it was pretty much the same story. A lot of students said the questions were straightforward and didn't have any weird phrasing. That's important because if the wording's off, it can throw people off even if they know the material. Some students mentioned that the MCQs didn't always feel like they got harder as they went along. About 63% thought the questions were supposed to be arranged from easy to hard, but it didn't always seem that way. That's something teachers might want to keep in mind when putting tests together. If the difficulty jumps around too much, it can make the test feel unfair or confusing. Getting that balance right matters if you want to check what students actually know.

Specific Characteristics of "Questions" in Written Exam

Most students thought the MEQs were good at measuring what they learned and testing deeper understanding, not just memorized facts. That makes sense because MEQs are supposed to check how well you can think through problems. But almost 40% of students said the questions took too long to figure out, which made it hard to finish on time. Maybe the questions need to be a bit simpler or give more time. With MCQs, students mostly agreed they covered a good range of thinking skills. But nearly half felt like they could just pick answers straight from the question without really having to think too hard. That kind of defeats the purpose if the questions are supposed to make you analyze things. MCQ seem a bit too simple at times. They don't really push students to think deeply or analyze things critically. Some of them feel like they're just testing basic recall rather than actual understanding. It's like they're missing that extra layer that makes you stop and really consider the answer. Maybe they could use more

complexity or scenarios that require some actual thought.

Student Preferences

Most students seem to like having separate exam papers for each subject instead of mixing different subjects together in one test. Over half of them said they prefer it this way. Maybe it's because focusing on just one thing at a time feels simpler when you're stressed about exams. Some kids probably find it harder to switch between different subjects during a test. It makes sense - your brain can only handle so much at once when the pressures on.

Student Perception of Written Assessments

Other such research has explored the perception of medical students towards written exams, more specifically MCQs and MEQs, and the results have been in agreement with some of those documented in the present study. A study by Brannick [8], pointed out that medical students typically remark on the time constraints on MCQs, especially if the question stems prove to be lengthy or ambiguous. Brannick [8] in his review of medical examination, found MCQs, while effective in testing a broad range of content, sometimes failed to test students on higher-order thinking abilities. This finding agreed with that made by Carter [9], who stated that MCQs on medical examinations have a tendency to allow the students to guess the answers without actually knowing the information. In our study, 60% of the students agreed that literal answers would be found in the stems of the MCQs, which meant that most of the students were convinced that the examinations were too simple, supporting those previous findings.

Organization and Management of Exams

Findings from this study indicate that the majority of students perceived MEQ and MCQ tests as well-organized, with adequate time allocation and testing venues. Govaerts [10] further had similar observations and highlighted the importance of examination logistics (e.g., venue, room spacing between desks, and time) towards achieving fairness and reducing stress among students. More than 70% of the participants in our study agreed that the MEQ exam venue was quiet, well ventilated, and well equipped, which agrees with the favorable assessment of testing environments in Govaerts's study. [10] Govaerts [10] further indicated that there is a sensible time interval between different papers when more than a single examination is given on the same day, which actually enhances the focus and performance of the students. The same was reflected through our research, in which 80% of the students agreed that there was a decent time interval between papers.

Question Quality and Cognitive Demand

In cognitive demands of the tests, our study had shown that the students as a whole were convinced that the questions were clear, linguistically correct, and tested a representative sample of cognitive functions. The same conclusion was drawn by Lennon [11], that well-constructed MCQs and MEQs ought to be able to test the ability of students to apply, not just recall, facts. But in our study, nearly 40% of the students agreed that understanding the question within the MEQs took too much time. This finding is in agreement with the finding of Smith [12], who was able to determine

that the complexity of MEQ questions could easily result in excessive cognitive load, with a performance impact.

MEQ vs. MCQ: Strengths and Limitations

Comparing MEQs and MCQs, most students in our research preferred using MEQs because they were found to be more effective in assessing sophisticated learning outcomes. This finding is consistent with the work of Cohen [13], who asserted that MEQs are more effective for measuring higher-order thinking skills like application and analysis, compared to MCQs that are likely to only test recall or recognition. This was corroborated by Chung [14], who suggested that MEQs are helpful in that they cause the students to structure their responses, thereby evaluating their understanding more comprehensively. However, our own study also showed a high percentage of students felt MCQs were easier to answer and allowed them to simply read off the answers from the stems. This could reflect a possible over-reliance on memorizing facts rather than critical thinking, a problem noted by Swanson [15], who identified the risk that MCQs could under-estimate clinical decision-making skills and thought.

Finally,

The aim of this study was to assess undergraduate medical students' perceptions regarding written examination system used at FOMSU, with particular reference to the MCQ and MEQ use. The study provides valuable insight into the perception and interpretation of written exams by medical students. It emphasizes the necessity for continuous revision and review of assessment methods to ensure that they are fair, integrative, and capable of assessing knowledge and cognitive skills.

Overall, the perception of the undergraduate medical students towards both types of written examinations was positive, though there were several areas that were recommended for change, such as clarity of questions and format.

Conclusion

The results indicate that both MCQs and MEQs have their strengths and weaknesses. MEQs are considered to be a good measure of complex cognitive outcomes but might be time-consuming, thereby possibly affecting student performance. On the other hand, MCQs are efficient in operation but may not always be able to measure high-level thinking skills effectively. Some improvements could be done to enhance written exams as the following: they include rephrasing MCQ stems in ways that exclude unnecessary complexity, ensuring MEQ questions are not too time wasting but neither too simple, nor reconfiguring time distribution in ways appropriate for the students' cognitive abilities. In order to optimize the assessment system, the study advises an optimal mix of both MEQs and MCQs. Potential future development may involve refining the questions to the extent that they are measuring an even wider range of cognitive abilities, with close gradation of difficulty, and sufficient time to construct the tests. In addition, research into new evaluation techniques, such as technology-based testing and grading by AI, would possibly increase the validity and reliability of such tests.

References

1. Schuwirth, L. W., & van der Vleuten, C. P. General overview of the theories used in assessment: AMEE Guide No. 57. Med. Teach.2011:33(10):783-97.
2. Miller GE. The assessment of clinical skills/competence/performance. Academic medicine.1990; 65(9): S63-7.
3. Bennett RE. Formative assessment: a critical review. Assessment in Education: Principles Policy& Practice. 2011;18(1):5-25.
4. Norcini, J. J., & McKinley, D. W. Assessment methods in medical education. Medical Teacher, 2007;29(1), 24-29.
5. Bloom, B. S. (1956). Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook I: Cognitive Domain. Longmans, Green.
6. Schuwirth, L. W., & van der Vleuten, C. P. The use of clinical case simulations in the assessment of medical students. Medical Education, 2004;38(3), 316-318.
7. Wright, S. M., & Kern, D. E. (2004). Teaching and learning in medical education: A review of the literature. Medical Education, 2004;38(6), 564-573.
8. Brannick, M. T., Wahi, M. M., Arce, M., Johnson, H. A., Nazian, S. J., & Goldin, S. B. The role of multiple-choice questions in medical education: A review. Medical Education, 2014; 48(7), 695–700.
9. Carter, R. C., Bennett, L. M., Davis, J. P., & Holmes, R. M. Student perceptions of the MCQ format in medical assessments. *Journal of Medical Education*, 2016;*50*(4), 256–262.
10. Govaerts, M., Van der Vleuten, C. P. M., Schuwirth, L. W. T., & Muijtjens, A. M. M. The role of exam logistics in reducing student stress: A systematic review. *Medical Teacher*,2018; *40*(2), 122–129.
11. Lennon, M., Patel, R., Richards, B., & Thompson, T. Assessing higher-order cognitive skills in medical education: Comparing MEQs and MCQs. *Academic Medicine*, 2017;*92*(10), 1400–1407.
12. Smith, T., Allen, R., Gray, J., & McMillan, H. . Cognitive load in medical assessments: A comparison of MCQs and MEQs. *Medical Education*,2015;*49*(1), 56–64.
13. Cohen, R., Taylor, C., Park, Y. S., & Gruppen, L. D. Enhancing the validity of medical assessments: The impact of using mixed methods. *BMC Medical Education*, 2017;*17*(1), 68.
14. Chung, J. W., Yuen, M. C., Cheng, M. M., & Wong, T. K. Assessing clinical reasoning in medical students: A comparison of MCQs and MEQs. *Medical Education*, 2018;*52*(6), 642–650.
15. Swanson, D. B., Holtzman, K. Z., & Ouyang, W. Reassessing the effectiveness of MCQs in evaluating clinical reasoning. *Academic Medicine*, 2018;*94*(4), 492–497.

Disclosure