Factors Determining Time Allocation of a Multiple-Choice Question Examination: The Students’ Perspective

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Abstract

Introduction:

The MCQ is one of the objective assessment methods. It is proper to evaluate the cognitive domain of learners with high objectivity. However, there are no definite criteria for determining the appropriate exam time. The ability to comprehend the meaning of a text, when reading, cannot be directly applied to reading for decision-making or answering questions. The authors were interested in exploring the aspects of the medical students’ perspective about the factors affecting their discussion on MCQs answering.

Materials and Methods

The study was conducted at the Institute of Medicine, Suranaree University of Technology, Thailand. The authors utilized a mixed method that consisted of a quantitative approach and a sequential, explanatory approach. Survey research was used as the part quantitative technique meanwhile the semi-structured interview was used in qualitative data analysis for collecting the data.

Results

The questionnaire was done online by the participants from second to fifth-year medical students. It was found that there were 298 respondents. The qualitative analysis indicated that there were five domains, including the total word count of tests, non-native English examiners, test difficulty, images in tests, and atmosphere of the examination affecting the testing time.

Conclusion

This report indicated that the data acquired from comprehensive reading examination should be distinguished from decisive reading examination. Apart from the length of text, the question taxonomy such as recall or application as well as questions with given images and tables should be considered as factors determining time allocation of a MCQ examination.

Introduction

The multiple-choice question (MCQ) is one of the objective assessment methods. It is also considered the most widely used assessment form, especially in the medical sciences and technology fields. The MCQ is proper to evaluate the cognitive domain of learners with high objectivity. In addition, it is also easier to create an MCQ exam that can cover learning topics and objectives, compared to other assessments in terms of content validity, uncomplicated preparation, and suitability for large amounts of students. It is true that the test mainly evaluates students’ cognitive domain, however, it can be adjusted to various levels of difficulty such as recalling, comprehension, problem solving, etc. Though some investigators
claim they may not be ideal for the evaluation of higher-order thinking skills. However, there are no
definite criteria for determining the appropriate exam time. The appropriate examination time for each
exam should consider the type of questions whether they are analytics or calculations, the language
used, and the number of words used to determine the test time.

When an exam is developed, there are several key variables that will impact the exam duration. The
number and type of questions (recall, comprehension, or application), the difficulty of subject matter and
duration is also dependent on whether the intent of the exam is to test knowledge acquired (closed book)
or to use it for assessment and learning purposes (open book) (1). In Thailand, many medical schools or
universities often take the same time as Thai National Licensing Examination step 1–2. The Thai NLE1-2
assess the medical students’ learning outcomes (2) by requiring 3 hours of exam time per 150 questions,
or an average of 50 questions per 60 minutes to complete. According to the assessment, the exam time
might not be appropriate to apply for each medical school, especially the tests containing calculations
may require more time. For instance, when the test time is almost over, the students will decide to guess
the answers (including high performance students), resulting in inaccuracies to classify the actual
performance of students or item discrimination (3). On the other hand, the long duration of exam time
can waste significant budgets, such as the invigilator's remuneration, electricity bills, and excessive
internet usage.

There was evidence that recall of short words often exceeds recall of long words. This finding is often
interpreted within a working memory model and the role of the phonological loop in immediate recall.
However, the word-length effect is also found with delayed tests, and with lists that should exceed the
memory span, challenging the working memory interpretation of the effect. Three different distinctive
interpretations of the word-length effect have been offered as alternatives to the working memory
hypothesis to determine the length of each exam (4). Moreover, the difficulty of subject, domain learning
area as well as English performance of examiners may affect on the length of MCQ tests (1).

There were educational theories related to decision-making which suggested that decision-making was a
dynamic process that arises from past experiences (5–7) and meaningful learning (8–10). Therefore, the
ability to comprehend the meaning of a text, when reading, cannot be directly applied to reading for
decision-making or answering questions.

The inappropriate examination time would lead to the guessing of answers because the ending is
approaching. This would cause the threat to validity which worsen the quality of the assessment (11).
The authors were interested in exploring the aspects of the medical students’ perspective about the
factors affecting their discussion on MCQs answering. Since the act of selecting answers to questions is
related to decision-making theory, research should be approached from the perspective of the student in
order to obtain appropriate data. The data obtained from the research can be used to enhance the
methods of evaluating the curriculum in the future. This research has approached in Institute of Medicine,
Suranaree University of Technology in the academic year of 2021–2022. All of them were non-native
English speakers.
MATERIALS AND METHODS

Study Population

The study was conducted at the Institute of Medicine, Suranaree University of Technology in Thailand. The research participants were second to fifth-year medical students of Suranaree University of Technology who had taken MCQ tests during their preclinical and clinical years between the academic years 2021–2022. In the preclinical years, the study included three learning systems (hematology, urinary, gastrointestinal system). Meanwhile, six clinical learning subjects from two major departments, medicine, and surgery were included. To minimize data artifacts caused by recall bias, the questionnaires were distributed online to the students who completed the first week after each MCQ test prior to the study. All examinations in this study were computer-based, closed book, single best answer MCQs written in English. The participants were Thai, non-native English speakers (as detailed in Definition of Terms).

A questionnaire was chosen as the data collection method due to the ease of administering it to new fourth-year medical students with minimal disruption to their learning activities. Convenience sampling was used to randomly select second to fifth-year medical students as the students would not be identifiable. An online survey or questionnaire-based study was used to collect information from participants in this study. If the data was unsaturated, triangulation data from a group of interviews would consist of students from different rotations to receive as much information on students’ perspectives as possible.

Ethical Considerations

All participants voluntarily signed a consent form prior to participating in the study. The participation protocol was approved by the Human Research Ethics Committee, Suranaree University of Technology (Issue # EC-64-102).

Study Design

The authors utilized a mixed method that consisted of a quantitative approach and a sequential, explanatory approach. The literature review revealed several factors that affect MCQ test time, including the number of questions, the type of questions (recall or comprehension), the difficulty of the subject matter, calculation items, and picture identification as indicated in the questionnaire (6, 7, 10, 12–16). To prevent neutral opinions from students. Thus, each item of the questionnaire had a four-point Likert scale correlating with the levels of agreement: ‘Strongly disagree,’ ‘Disagree,’ ‘Agree’ and ‘Strongly agree.’ The results of the questionnaire were reviewed by the experts demonstrated the high degree of content validity with Index of Item-Objective Congruence (IOC) value of 0.89.

Data Collection

An online survey or questionnaire-based study was used to collect information from participants with minimal disruption to their learning activities. The questionnaire was designed to gather quantitative data that could be subjected to further statistical analysis.
There were three sections in the questionnaire. Part I consisted of the instruction and the informed consent form. Part II consisted of general information of the participants, including sex, age, and academic year. Part III consisted of the questionnaires covering all four constructive domains mentioned previously (17–25). The domains affecting MCQ time from the literature included: 1) the number and total word count, 2) English language questions, 3) the Calculation questions, 4) the analytical thinking questions and open-ended questions about the factors that, in the students’ opinions, were helpful information about the other factors affecting MCQ time. After the questions in Part One were completed, they would be taken away so that the researchers would not be able to identify whose students have answered Part II and Part III.

To provide more accurate information, interviews were also used to allow students to express their opinions. The interviewer also asked questions based on the response of the medical students to let students explain key factors in their own opinions. Survey research was used as the part quantitative technique meanwhile the semi-structured interview was used in qualitative data analysis for collecting the data from medical students’ perception. The interview questions would explore whether the students had any additional ideas about the factors affecting the MCQ test time.

Definition of Terms

A. Multiple choice question (MCQ)

Multiple choice question (MCQ) was a form of an objective assessment. It was composed of two parts: a stem that identifies the question or problem, and a set of alternatives or possible answers that contain a key that was the best answer to the question, and a number of distractors that were plausible but incorrect (26, 27). In this paper, we studied only for the single best response (SBA) MCQ which can also be written as a question followed by 4 or 5 possible answers to the question. However, there was only one correct answer per question (28).

B. Taxonomy MCQ

MCQs were written under two assumptions: that they can be written as higher or lower order according to Bloom’s taxonomy (29). This study tried to understand the students’ approach to questions by analyzing differences in students’ perception of Bloom’s level of MCQs in relation to their knowledge and confidence. The authors applied Bloom’s taxonomy for this study as “recall”, “comprehension”, and “application”.

B.1 Recall MCQ

Recall MCQs referred to questions are those questions where you did not need to think too much about answers and can answer instantaneously without any solving techniques such as definitions, terms, or equations (30).

Example
A 33-year-old woman presents to her physician complaining of profound shortness of breath. On physical examination her blood pressure is 110/80 mmHg, heart rate is 100/min and respiratory rate is 24/min. Jugular venous distension is noted, as are diffuse wheezes and rales at both lung bases. There is trace edema of her ankles bilaterally. Heart auscultation reveals a low-pitched, diastolic murmur with an opening snap, heard best at the apex.

What is the most likely diagnosis?
A. Pulmonic stenosis
B. Mitral valve prolapse
C. Aortic stenosis
D. Mitral stenosis
E. Tricuspid stenosis

Answer = D. Mitral stenosis

This is a sample of a recall question. If the students remember the typical “low-pitched, diastolic murmur with an opening snap, heard best at the apex”, they will know that this patient has “mitral stenosis.”

B.2 Comprehension MCQ

Comprehension MCQs were the tests which the main idea questions asked the test taker to identify understanding or implying of knowledge, not simply recall, about biology and medical sciences. For the clinical tests, it would be included the stem of diagnosis and investigation (30, 31).

Example

A 20-year-old woman presents with malar rash, alopecia and achiness in both wrists, shoulders, and knees for 3 months. She also has swelling, tenderness and decreased active range of motion of her wrists and knees, bilaterally. Laboratory evaluation shows high titer antibodies to double-stranded DNA and to the Sm (Smith) antigen.

Which of the following would most likely be found in this patient?
A. Proteinuria
B. Polycythemia
C. Onychomycosis
D. Acanthosis nigricans
E. Eschar lesion on the back of the knee
Answer = A. Proteinuria

This is a sample of a comprehensive question. Although the question does not directly give the diagnosis, students have to understand and recognize that the patient has systemic lupus erythematous provided clinical and associated laboratory presentations. If the students are able to recognize this, they should know that the patient may present with renal involvement; i.e. proteinuria.

B.3 Application MCQ

Application questions were those questions where you needed to apply your knowledge to solve some problem presented to examiners. Such as students needed to solve equations for getting the answer. For preclinical tests, the application MCQs included the knowledge which applied for the clinical scenario. Meanwhile, the clinical MCQs may include treatment, health maintenance and problem-solving items. In addition, calculation items were defined as the application in this paper (20, 21).

Example

A 59-year-old woman was admitted because of profuse diarrhea. PE: T 38.0 °C, BP 80/40 mmHg, PR 150 /min, RR 22 /min, drowsy with deep and labored breathing, flat jugular vein, poor skin turgor. The urine volume was only 400 ml/day. Labs: BUN 70 mg/dL, Cr 2.5 mg/dL (baseline 0.8 mg/dL), Na 124 mEq/L (135–145), K 3.3 mEq/L (3.5-5.0), Cl 85 mEq/L (95–105), HCO3 10 mEq/L (22–26), serum osmolality 260 mOsm/Kg H2O.

Which one is correct?

A. 3% NaCl should be considered for correcting symptomatic hyponatremia

B. 0.9% NaCl should be considered for correcting hypovolemic hyponatremia

C. Furosemide should be considered for increasing urine volume

D. 3% NaCl with 7.5% NaHCO3 should be considered for correcting symptomatic hyponatremia and severe metabolic acidosis

E. KCL infusion should be considered for correcting hypokalemia

Answer = B. 0.9% NaCl should be considered for correcting hypovolemic hyponatremia

This is a sample of an applied question. Students have to recognize that the patient has the ischemic acute kidney injury which also indicates that hyponatremia in this patient is caused by hypovolemia. The students need to summarize the conceptual idea of disease and apply problem-solving skills. In this case, isotonic solution is needed to correct the cause.

C. Non-native English speakers
The term non-native English speakers was defined as those students who spoke a language other than English at home. Non-native English speakers were inclusive of both competent biliterate and limited English Proficiency students. In addition, it also defined as students who learn the language as older children or adults (16, 32, 33).

**Statistical Analysis**

Statistical analyses were performed for quantitative analysis with SPSS Statistics for Windows, Version 18.0 (SPSS Inc., Chicago, Illinois, USA) (34). Continuous variables were presented in the form of mean ± standard deviation (SD). The differences between the two groups were compared by use of the Student’s t –test, and chi square test for the continuous and categorical variables, respectively. P-values < 0.05 were considered statistically significant.

The qualitative data was analyzed by code grouping of text fragments based on content. Subsequently, the codes were reorganized and grouped, main themes and subthemes were identified and illustrative quotations were selected. Apart from this, the information collected would be specific questions to induce saturation of information from the next interviews. The authors assigned other three medical teachers to undertake independent coding of the transcripts to each interview. The final rounds of coding and discussion were undertaken until the frameworks were agreed new themes were derived.

**Results**

**Demographic Information**

The questionnaire was done online by the participants from second to fifth-year medical students in the academic year 2021–2022. There were 93 second-year medical students, 92 third-year medical students, 92 fourth-year medical students, and 93 fifth-year medical students, respectively, with 370 participants in total. It was found that there were 298 respondents (a return rate of 81%).

There were 73 second-year medical students answering questions (a return rate of 78%), 70 third-year medical students answering questions (a return rate of 76%), 75 fourth-year medical students answering questions (a return rate of 81%), and 80 fifth-year medical students answering questions (a return rate of 86%) as shown in Table 1.
Table 1
Demographic Information of Student Participants in the Survey

<table>
<thead>
<tr>
<th>General information</th>
<th>Category</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>102(35)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>196(66)</td>
</tr>
<tr>
<td>Age (year)</td>
<td>Mean ± SD.</td>
<td>21.3 ± 1.23</td>
</tr>
<tr>
<td></td>
<td>Max, Min</td>
<td>28, 19</td>
</tr>
<tr>
<td>College Year</td>
<td>Second Year</td>
<td>73(24)</td>
</tr>
<tr>
<td></td>
<td>Third Year</td>
<td>70(23)</td>
</tr>
<tr>
<td></td>
<td>Fourth Year</td>
<td>75(25)</td>
</tr>
<tr>
<td></td>
<td>Fifth Year</td>
<td>80(27)</td>
</tr>
</tbody>
</table>

n = number, SD = Standard deviation, IQR = Interquartile range, Max = maximum, Min = minimum

Students’ perspective on Examination Time and Number of MCQs

From the questionnaires, we found that the medical students thought that the suitable numbers of questions in the 1-hour examinations that consisted of the intermediate level questions should contain approximately 41.4 ± 15.62 questions (min-max: 20–120 questions). Moreover, the students wanted to gain some more points by guessing rather than leave the answer blank during the last minutes of the examination. Regardless of the difficulty of the examinations or the time given, the students would rush to finish the examination on time. Most of the students would start to guess the answers at the last 5.4 ± 1.11 minutes (min-max: 2–10 minutes).

The information from the survey and semi-structure interview:

The quantitative information also demonstrated that there were several factors that influenced the examination time according to the students’ opinions. The first three factors were discovered from quantitative survey research which were- 1) the number of tests and total word count, 2) English language questions, 3) test difficulty determining time allocation (the calculation questions and the analytical thinking questions) (Table 2). In addition, the data demonstrated that questions with images, graphs, or tables can help make decisions easier. Meanwhile, the atmosphere of the examination also affected the student’s concentration for each test. The last two more information were confirmed by the triangulation from the semi-structured interviews.
Table 2
Evaluating Factors Affecting MCQ Test Time in Student’s Perspectives and the Rating Scores

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Moderate</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of word count (texts)</td>
<td>27</td>
<td>35</td>
<td>37</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. The English questions</td>
<td>26</td>
<td>27</td>
<td>37</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>3. The Calculation questions</td>
<td>44</td>
<td>20</td>
<td>31</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>4 Analytical thinking tests (not a comprehension test)</td>
<td>35</td>
<td>35</td>
<td>26</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

1) The Number Tests and Total Word Count: The exam questions, according to some students, were challenging and time-consuming, and the answer options were likewise lengthy. It was shown that not only the number of the tests, but the length of each test item also affected the testing time.

| Quote: Student B1F*; “The questions were too long. I can’t complete them in time.” |
| Quote: Student A2M*; “If there are too many questions in the exam, I wouldn’t be able to finish it” |
| Quote: Student C2M*; “Some questions were very lengthy, maybe half of the page. Would be a waste of time. So, I skipped. And at the end, I would have to guess anyway.” |

* student’s code

2) English Language Questions and Examiners (Native Versus Non-Native English Speakers):

The respondents, who were not native English speakers, believed that the English language test took longer to finish than the Thai language test. Accordingly, they decided to guess or answer each question slowly since they could not understand the questions. They believed that the English-language tests took longer to finish than the Thai-language tests. Accordingly, they decided to guess or answer each question slowly since they could not fully understand the English questions.
Test Difficulty Determining Time Allocation

For the analysis of coding, grouping, and generating theme, the author found that the medical students paid attention to the difficulty level of the questions which affected the decision of answering the questions.

The Calculation and Analytical Thinking:

The calculation and analytical thinking tests took students longer to read. Additionally, students believed that examinations they had never taken before or exams that required knowledge application took longer to complete, such as exams that included questions requiring the students to diagnose patients by themselves which occasionally left them unsure of how to respond.

The calculation and analytical questions affected the time spent answering the questions, leading to an increase in the level of difficulty. This is because these types of questions needed more time to answer, especially when these types of questions were in one third of the examinations.

Recall Question Leads to Quick Answers:

Students commented that recall type questions, including tests from previous academic years, contained duplicated sentences, pictures or messages from textbooks which students remembered. This led to
students being able to complete the test with a short thinking time.

| Quote: Student K1M*; “If the teacher copied the exact words from the course sheet, I would remember and answer questions quickly.” |
| Quote: Student L1M*; “If the questions are the same as in the sheet provided, I can answer them.” |
| Quote: Student M1F*; “If the teacher asks the same questions from the previous tests, I can answer.” |
| Quote: Student N1F*; “I think if there are questions from a test pool, it will be easier to remember. If there are more than 60-70% of the test, it can be done quickly.” |
| Quote: Student C3M*; “I would prefer if the teachers gave an exam that does not have too complicated questions. It would help me to finish on time.” |

*student' code

This information indicated that the taxonomy of test (recall-compression-application) had a large effect on decision time. Applied questions, not direct or calculated questions, required more attention and time for decision making when compared to comprehensive questions (questions about knowledge understanding). In contrast, recall questions required the least decision-making time.

**New Domains from the Open-End Questions and Semi-Structure Interviews**

*Questions with images, graphs, or tables serve as key guides for decision-making.*

The students thought that the exams that consisted of graphs and tables helped them in understanding the questions and were better than the questions that only had descriptions. That would lead to the shorted time consumed.
The Atmosphere of the Examination:

The environment and atmosphere of the exam were also mentioned. The student's response time was slowed down by distractions during the exam. The environment such as brightness, temperature, examination devices affected the concentration of the students. Therefore, the exam conductors have to consider those factors in order to make the performance of the students as true as they are supposed to be.

**Quote:** Student A2M*: “If the exam has pictures from the book, I barely take time to think, and I could answer it immediately.”

**Quote:** Student L2M*: “If the test got the exact same summary table from the book, I could remember and get the answers right away.”

**Quote:** Student K1M*: “The pictures or tables in questions would help summarize the understanding of the contents better than reading only from the texts in the questions.”

**Quote:** Student M1F*: “The tables in questions would summarize information and make it faster to select the answers from options”

**Quote:** Student O1M*: “If the question has tables or pictures, it will be easier to make a decision and find the correct answer, as they can directly tell us what the question wants to communicate.”

* student ’s code

**Discussion**

The results showed that students felt that lengthy exam content or a large number of questions resulted in wasting time, particularly when the exam is in English. The literatures indicated that English speakers could read up to 150 words/min (22, 23). However, in the case of non-native English speakers, the reading time for exams was expected to be longer. Furthermore, exam reading was focused on decisive reading rather than comprehensive reading, where the main goal was to make informed decisions. Therefore,
using the English reading rate as a basis for determining exam duration was not suitable within the context of Thai students, as English was not their daily language of communication.

In the field of medical education in Thailand, the MCQ exams in Medicine often refer to criteria set by the Thai National Licensing Examination Test, which recommends a duration of 60 minutes for 50 questions (12, 43). Alternatively, the National Board of Medical Examiners (NBME) recommended answering each question within 60–90 seconds (17, 40). However, there may be limitations if the exam questions contain lengthy content that cannot be comprehended and decided upon within one minute. Furthermore, the difficulty level of the exam questions is often established as a passing criterion, prioritizing validity considerations in terms of content format and achieving the intended objectives. Moreover, students naturally desire to obtain the highest possible score on the exam, regardless of the level of difficulty or length of the exam. Therefore, it is important for students to manage their time effectively to ensure they can complete all the exam questions within the given timeframe (11, 35, 36).

The qualitative results indicated that regardless of the exam duration set by the administering professor, students ultimately would complete the exam within the allotted time frame. This often involves guessing answers towards the end of the exam period, as students may not have enough time to complete the exam thoroughly. It was observed that students tend to guess exam questions towards the end of the exam period, approximately 5 minutes before time runs out. Studying the context of examination time from the students' perspective is crucial to determine an appropriate exam format. This enables the reduction of threats to validity by minimizing students' guessing due to time constraints during the exam (11).

Additionally, students agree that application and calculation questions on the exam require more time to read and decide upon (50), as opposed to questions with figures and tables that aid in faster decision making. Based on these findings, it can be concluded that comprehensive reading rates may not be a reliable indicator of decision-making reading rates, particularly in the context of medical school exams. Therefore, studying decision-making reading rates within the context of medical school exams is crucial.

Based on the data on the distribution of exam items according to the taxonomy, specifically Recall (reducing decision time for selecting answers) - Comprehension (neutral) - Application/Calculation (increasing decision time for selecting answers), it can help determine whether the exam time should be increased appropriately. Student feedback also indicates that if an exam set has a significant proportion of application/calculation items, exceeding one-third of the total number of questions, there is a tendency to not complete the exam in time and resort to guessing answers before time runs out.

The researcher, therefore, examined the domain and specific factors related to the characteristics of the MCQ test. In addition, the researcher limited the study scope to only English tests given to non-native English speakers, and onsite computer-based tests, which removed unrelated factors that may affect the duration of the exam, and the results of the analysis appeared as follows.
First, the factors that tend to be a positive correlation with the duration of the exam (negative correlation and decision making) were the number of exams, number of words, calculation exam, and analytical thinking exam.

Second, the factors that tend to be a negative correlation with the duration of the exam (positive correlation and decision making) were recall questions as well as questions with given images, and tables.

The factor that led to longer reading times for decision-making purposes was when the exam had a greater proportion of application or calculation questions, comprising over 33% of the exam questions (as expressed in the students’ qualitative data). Therefore, it is not recommended to analyze the exam completion time based on data obtained from the analysis of reading comprehension since it is for decision-making purposes. Furthermore, it should be noted that these factors constitute internal threats to validity (ref), but they can be controlled to ensure that examination tools can be used effectively and aligned with the intended objectives. When incorporating the data obtained from research, it can lead to the identification of new themes related to factors influencing examination time.

Five constructive domains included: 1) the number and total word count, 2) positive factors of difficulty (application/calculation questions), 3) negative factors of difficulty (recall question), 4) examiners (non-native English speakers or not) and 5) pictures/symbols in tests.

In conjunction with the examination-related factors, students also acknowledge the importance of considering the test environment within the examination room. This is crucial for promoting student concentration and facilitating accurate response selection aligned with the objectives of the assessment tool. It aligns with the existing literature, which indicates that the test environment constitutes a construct irrelevant threat to the validity of educational measurement (35–37).

**Conclusion**

The multiple-choice question (MCQ) is one of the objective assessment methods. The author conducted the study that would be carried on students’ perspectives on the factors affecting the English one-best answer MCQ examination time for non-native English speakers. Based on student's perspective, data showed questions with lengthy content required more time whilst those with table or diagrams required less time. This report indicated that the data acquired from comprehensive reading examination should be distinguished from decisive reading examination.

In addition to the number of questions and the length of text, factors that should be positively correlated with the duration of the exam include the number of exams, word count, calculation-based questions, and analytical thinking questions. These factors should be considered for additional time allocation beyond the regular exam duration, particularly when the proportion of analytical thinking questions exceeds one-third of the total question set. On the other hand, recall questions, as well as questions accompanied by
images and tables, should be taken into account to ensure a balanced distribution of exam time, as they can be answered more easily and quickly in terms of decision-making compared to general questions.

Limitation of Study

The initial purpose of the author in this study was to utilize the exam speed in English examinations in the scientific institute. However, after conducting the study, the author found out that the Institute of Medicine and Institute of Engineering had different methods of conducting examinations which included different taxonomy, characters of mathematical questions and applications. The author decided to conduct the study in the department of medicine only and the results of the study would not be applied to other institutes or other faculties.

Abbreviations

MCQ
multiple-choice question

Declarations

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References


32. Mahboob A. Native or non-native: What do the students think. Learning and teaching from experience. 2004:121-47.
37. Paterick ZR, Paterick TE, Paterick BB. Medical informed choice: understanding the element of time to meet the standard of care for valid informed consent. Postgraduate medical journal. 2020;96(1141):708-10.